ICESat (GLAS) Science Processing Software Document Series

The GLAS Standard Data Products Specification—Data Dictionary, Version 1.0

Jeffrey E. Lee
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ICESat (GLAS) Science Processing Software Document Series

The GLAS Standard Data Products Specification—Data Dictionary, Version 1.0

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Level of Review: This material has been technically reviewed by technical management.
Foreword

The GEOSCIENCE LASER ALTIMETER SYSTEM (GLAS) is the primary instrument for the ICESat (Ice, Cloud and Land Elevation Satellite) laser altimetry mission. ICESat is the benchmark Earth Observing System (EOS) mission for measuring ice sheet mass balance, cloud and aerosol heights, as well as land topography and vegetation characteristics. From 2003 to 2009, the ICESat mission provided multi-year elevation data needed to determine ice sheet mass balance as well as cloud property information, especially for stratospheric clouds common over polar areas. It also provided topography and vegetation data around the globe, in addition to the polar-specific coverage over the Greenland and Antarctic ice sheets.

This document contains the data dictionary for the GLAS standard data products. This Standard Data Products Specification is developed under the structure of the NASA STD-2100-91, a NASA standard defining a four-volume set of documents to cover an entire software life cycle. Under this standard a section of any volume may, if necessary, be rolled out to its own separate document. This document is a roll out of the GLAS ESDIS Software Detailed Design Specification under the Product Specification Volume.

This document details the parameters present on GLAS standard data products. The term “standard data products” refers to those EOS instrument data products listed in the Earth Science Data and Information System (ESDIS) Project data base that are routinely generated within the EOSDIS Distributed Active Archive Center (DAAC) or Science Computing Facilities (SCFs). Each data product has a unique Product Identification code assigned by the Senior Project Scientist.

This document was prepared under auspices of the Cryospheric Sciences Laboratory at NASA Goddard Space Flight Center, in support of B. E. Schutz, GLAS Science Team Leader for the GLAS Investigation. This work was performed under the direction of David W. Hancock, III, who may be contacted at (757) 824-1238, David.W.Hancock@nasa.gov (e-mail), or (757) 824-1036 (FAX).

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</tr>
<tr>
<td>5-53</td>
<td>High Resolution Cloud Layer Flag</td>
<td>5-39</td>
</tr>
<tr>
<td>5-54</td>
<td>Low Resolution Cloud Layer Flag</td>
<td>5-44</td>
</tr>
<tr>
<td>5-55</td>
<td>Low Resolution 1064 Quality Flag</td>
<td>5-45</td>
</tr>
<tr>
<td>5-56</td>
<td>Medium Resolution Cloud Layer Flag</td>
<td>5-45</td>
</tr>
<tr>
<td>5-57</td>
<td>Medium Resolution 1064 Quality Flag</td>
<td>5-47</td>
</tr>
<tr>
<td>5-58</td>
<td>Aerosol Backscatter Flag</td>
<td>5-48</td>
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<td>5-59</td>
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<td>5-49</td>
</tr>
<tr>
<td>5-60</td>
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<td>5-50</td>
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1.1 Identification of Document

This document is identified as the GLAS Standard Data Products Specification - Data Dictionary (SDPS-DD). The unique document identification number within the GLAS Standard Data Software documentation numbering scheme is designated on the cover page. This edition marks the first and final release of this document. Information contained within this document was formerly contained in appendices of the GLAS Standard Data Products Specification Level 1 (SDPS-L1) and Level 2 (SDPS-L2) documents.

1.2 Scope of Document

This document describes parameters contained with the GLAS Standard Data Products. The intended audience for this document is the GLAS Science and Instrument Teams, the ESDIS Project and related focus teams, the community of data users and investigators, and the GSAS Development Team.

1.3 Purpose and Objectives of Document

The purpose of the GLAS Standard Data Products Specification - Data Dictionary is to provide a detailed description of the parameters contained with the GLAS Standard Data Products.

1.4 Document Organization

This document's outline is assembled in a form similar to those presented in the NASA Software Engineering Program [Information Document 2.3a].

1.5 Document Status and Schedule

This document is the first and final version of the GLAS Standard Data Products Specification - Data Dictionary.
1.5.1 Document Change History

<table>
<thead>
<tr>
<th>Version Number</th>
<th>Date</th>
<th>Nature of Change</th>
</tr>
</thead>
</table>
Section 2

Related Documentation

2.1 Parent Documents

The GLAS Level 1 Standard Data Products Specification - Data Dictionary is considered a “roll-out” from the Product Specification as the parent document or volume. Specific topics pertaining to data descriptions are located in the External Interface section under the Detailed Design document template.

This document is subordinate to any top-level mission or instrument management plan documents, and as such, recognizes these documents as external parent documents in lineage. The recognized external EOSDIS and GLAS parent documents superior to this document are listed below.

   a) *NASA Earth Observing System Geoscience Laser Altimeter System GLAS Science Requirements Document*, Version 2.01, October 1997, Center for Space Research, University of Texas at Austin.


2.2 Applicable Documents

The following documents are related to, or contain policies or references pertinent to the contents of this document.


   f) *The Algorithm Theoretical Basis Document for Precision Orbit Determination*, 2012, University of Texas Center for Space Research, et al.

   g) *The Algorithm Theoretical Basis Document for Precision Attitude Determination*, 2012, University of Texas Center for Space Research, et al.
The following documents are provided as sources of information that provide background or supplemental information that may clarify or amplify material in this document.


d) *Memorandum: GLAS Data Products, Center for Space Research*, December 23, 1993, University of Texas at Austin.

Section 3
Standard Label Contents & Description

GLAS Products begin with ASCII header records containing information regarding the processing which created the product and the data contained within. These header records are exactly the same size as a product data record and contain ASCII information in a slightly modified KEYWORD=VALUE format. In order to conserve space on the product, the header records contain multiple KEYWORD=VALUE entries and entries are delimited by a semicolon (;) and linefeed (ASCII 10).

By design, the first two header entries are the record length and number of header records. This allows product reader code to verify the record length and jump directly to the first data record, if necessary. Most of the remaining information within the headers is directly applicable to the generation of metadata files for EOS ingest.

The following fields are defined for GLAS Product Headers:

<table>
<thead>
<tr>
<th>Keyword</th>
<th>Content Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional_Attribute</td>
<td>Product-specific additional attributes.</td>
</tr>
<tr>
<td>AutomaticQualityFlagExplan</td>
<td>Automatic Quality flag explanation (per parameter).</td>
</tr>
<tr>
<td>Cycle</td>
<td>A count of the number of exact repeats of this reference orbit.</td>
</tr>
<tr>
<td>EquatorCrossingDate</td>
<td>Date of the equator crossing.</td>
</tr>
<tr>
<td>EquatorCrossingLong</td>
<td>Longitude of equator crossing.</td>
</tr>
<tr>
<td>EquatorCrossingTime</td>
<td>Time of the equator crossing.</td>
</tr>
<tr>
<td>glas_osc_rate</td>
<td>Value that indicates the accuracy rate of the GLAS oscillator.</td>
</tr>
<tr>
<td>glas_osc_rate_date</td>
<td>Valid date of the GLAS oscillator rate. (yyyy-mm-dd)</td>
</tr>
<tr>
<td>glas_osc_rate_time</td>
<td>Valid time of the GLAS oscillator rate. (hh:mm:ss)</td>
</tr>
<tr>
<td>InputPointer</td>
<td>Name of each input product file used to created this product (one instances of this keyword appears in the product header record for each input product file used in creation of this product).</td>
</tr>
<tr>
<td>internal_range_delay</td>
<td>Internal range delay for digitizer in meters (from anc33).</td>
</tr>
<tr>
<td>internal_range_delay_date</td>
<td>Valid date of corresponding internal range delay. (yyyy-mm-dd)</td>
</tr>
<tr>
<td>internal_range_delay_time</td>
<td>Valid time of corresponding internal range delay. (hh:mm:ss)</td>
</tr>
<tr>
<td>internal_time_delay</td>
<td>Time delay for digitizer in seconds (from anc33).</td>
</tr>
<tr>
<td>internal_time_delay_date</td>
<td>Valid date of internal time delay. (yyyy-mm-dd)</td>
</tr>
<tr>
<td>internal_time_delay_time</td>
<td>Valid time of internal time delay. (hh:mm:ss)</td>
</tr>
<tr>
<td>Instance</td>
<td>The number of times that a specific reference orbit has been returned to during flight.</td>
</tr>
</tbody>
</table>

Table 3-1 Product Header Elements
### Table 3-1  Product Header Elements (Continued)

<table>
<thead>
<tr>
<th>Keyword</th>
<th>Content Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>instrument_short_name</td>
<td>Short name of instrument (GLAS).</td>
</tr>
<tr>
<td>Instrument_State</td>
<td>Flag word that indicates which redundant units (laser, detector, oscillator) of the GLAS instrument are in operation.</td>
</tr>
<tr>
<td>Instrument_State_Date</td>
<td>The date that corresponds to the Instrument_State. There are a maximum of two per granule.</td>
</tr>
<tr>
<td>Instrument_State_Time</td>
<td>The time that corresponds to the Instrument_State. There are a maximum of two per granule.</td>
</tr>
<tr>
<td>LocalGranuleID</td>
<td>Filename of the granule.</td>
</tr>
<tr>
<td>LocalVersionID</td>
<td>Granule version number (auto-incrementing, nn in filenaming convention).</td>
</tr>
<tr>
<td>Numhead</td>
<td>Number of header records preceding product data records.</td>
</tr>
<tr>
<td>OperationalQualityFlagExpl</td>
<td>Operational Quality flag explanation (per parameter).</td>
</tr>
<tr>
<td>Orbit Number</td>
<td>Orbit number</td>
</tr>
<tr>
<td>OrbitQuality</td>
<td>Status word that states what type of orbit was used during processing of the data for the granule. It specifies the models used in the orbit determination program. This provides an indication of the quality of the orbits being applied to the data.</td>
</tr>
<tr>
<td>ParameterName</td>
<td>Name of product specific parameters for which additional information follows.</td>
</tr>
<tr>
<td>PercentFullRate</td>
<td>Percent of data for this granule that atmospheric parameters are provided at 40 Hz data rate.</td>
</tr>
<tr>
<td>PercentGroundHit</td>
<td>Percent of data for this granule that had a detected ground return of the transmitted laser pulse.</td>
</tr>
<tr>
<td>PercentHighRate</td>
<td>Percent of data for this granule that atmospheric parameters are provided at 5 Hz data rate.</td>
</tr>
<tr>
<td>PercentLowRate</td>
<td>Percent of data for this granule that atmospheric parameters are provided at 0.25 Hz data rate.</td>
</tr>
<tr>
<td>PercentMediumRate</td>
<td>Percent of data for this granule that atmospheric parameters are provided at 1 Hz data rate.</td>
</tr>
<tr>
<td>Percent1064to532</td>
<td>Percent atmospheric profiles that use the 1064 nm profile data to provide estimated values for the saturated 532nm profiles.</td>
</tr>
<tr>
<td>PGEVersion</td>
<td>Version number of the GSAS software that generated this granule.</td>
</tr>
<tr>
<td>platform_short_name</td>
<td>Short name of spacecraft (Icesat).</td>
</tr>
<tr>
<td>ProductionDateTime</td>
<td>Creation time of granule.</td>
</tr>
<tr>
<td>QAPercentMissingData</td>
<td>Percent of missing data (per parameter)</td>
</tr>
<tr>
<td>QAPercentOutOfBounds</td>
<td>Percent of out-of-bounds data (per parameter)</td>
</tr>
<tr>
<td>RangeBeginningDate</td>
<td>Start date of data on the granule.</td>
</tr>
<tr>
<td>Keyword</td>
<td>Content Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>RangeEndingDate</td>
<td>End data of data on the granule.</td>
</tr>
<tr>
<td>RangeBeginningTime</td>
<td>Start time of day for data on this granule.</td>
</tr>
<tr>
<td>Range_Bias</td>
<td>The additive calibration correction in millimeters to apply to range based on the science team cal/val activities.</td>
</tr>
<tr>
<td>Range_Bias_Date</td>
<td>The date that corresponds to the first valid Range_Bias. There are a maximum of two per granule.</td>
</tr>
<tr>
<td>Range_Bias_Time</td>
<td>The time that corresponds to the first valid Range_Bias. There are a maximum of two per granule.</td>
</tr>
<tr>
<td>RangeEndingTime</td>
<td>End time of day for data on this granule.</td>
</tr>
<tr>
<td>Recl</td>
<td>Record length in bytes.</td>
</tr>
<tr>
<td>ReferenceOrbit</td>
<td>Assigned number for which exact orbital elements describe the exact repeat orbit pattern.</td>
</tr>
<tr>
<td>ReprocessingPlanned</td>
<td>Planned reprocessing status.</td>
</tr>
<tr>
<td>ReprocessingActual</td>
<td>Actual reprocessing status.</td>
</tr>
<tr>
<td>sc_osc_rate</td>
<td>Value that indicates the accuracy of the spacecraft oscillator.</td>
</tr>
<tr>
<td>sc_osc_rate_date</td>
<td>Valid date of the spacecraft oscillator measurement. (yyyy-mm-dd)</td>
</tr>
<tr>
<td>sc_osc_rate_time</td>
<td>Valid time of the spacecraft oscillator measurement. (hh:mm:ss)</td>
</tr>
<tr>
<td>sensor_short_name</td>
<td>Short name of sensor (LaserALT).</td>
</tr>
<tr>
<td>ScienceQualityFlagExplana</td>
<td>Science Quality flag explanation (per parameter).</td>
</tr>
<tr>
<td>ShortName</td>
<td>GSAS Filetype.</td>
</tr>
<tr>
<td>size_mb_ecs_data_granule</td>
<td>Size (in MB) of the granule.</td>
</tr>
<tr>
<td>SP_ICE_GLAS_EndBlock</td>
<td>Integer SPICE block number within GLAS coverage scheme in which granule data ends.</td>
</tr>
<tr>
<td>SP_ICE_PATH_NO</td>
<td>Number which represents the GLAS SPICE path number.</td>
</tr>
<tr>
<td>SP_ICE_GLAS_StartBlock</td>
<td>Integer SPICE block number within GLAS coverage scheme in which granule data starts.</td>
</tr>
<tr>
<td>time_between_contiguous_records</td>
<td>Time between contiguous data records (in seconds).</td>
</tr>
<tr>
<td>Timing_Bias</td>
<td>The time tag error determined by the calibration team that was added to the time tags to compute the true time of data as provided on the granule.</td>
</tr>
<tr>
<td>Timing_Bias_Date</td>
<td>The date that corresponds to the Timing_Bias. There are a maximum of two per granule.</td>
</tr>
<tr>
<td>Timing_Bias_Time</td>
<td>The time of day that corresponds to the Timing_Bias. There are a maximum of two per granule.</td>
</tr>
<tr>
<td>Timing_Drift</td>
<td>This is the ratio of the true time for a one second oscillator tick to nominal one.</td>
</tr>
</tbody>
</table>
In addition to the common information contained in its headers, each product may also contain information specific to the type of data it contains. This type of information is called a product-specific attribute (PSA). The PSAs mostly contain information related to product data quality. The PSAs and their attributes are listed in Table 3-2.

### Table 3-2  Product Specific Elements

<table>
<thead>
<tr>
<th>Product</th>
<th>Parameter Name</th>
<th>Attribute Name</th>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLA01</td>
<td>Range</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if percent no range &gt; N% or percent missing &gt; M% or percent out of bounds &gt; B% where N, M, B are TBD.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentMissingData</td>
<td>Percent Missing is the number of either (APID 12+13) or (APID 19).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutofBounds</td>
<td>Percent Out of Bounds is percent of time EchoPeak-Loc = 0 for shots w/ APID 19 AND (12 or 13) present.</td>
</tr>
<tr>
<td>GLA02</td>
<td>PC_Profile</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if PCProfile_PctMissing &gt; 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentMissingData</td>
<td>Percent Missing is percent missing either (APID 15) or (APID 19).</td>
</tr>
<tr>
<td>GLA02</td>
<td>CD_Profile</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if CDProfile_PctMissing &gt; 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentMissingData</td>
<td>Percent Missing is missing either (APID 17) or (APID 19).</td>
</tr>
</tbody>
</table>
Table 3-2  Product Specific Elements (Continued)

<table>
<thead>
<tr>
<th>Product</th>
<th>Parameter Name</th>
<th>Attribute Name</th>
<th>Attribute Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLA03</td>
<td>Data</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if Data_PctMissing &gt; 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentMissingData</td>
<td>Percent Missing is percent missing 16 second frames using requested granule times.</td>
</tr>
<tr>
<td>GLA03</td>
<td>Temperature</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if any temperature is out of bounds.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfBounds</td>
<td>Percent Out of Bounds is % of temperature parameters that are out of bounds. Use Red Limits.</td>
</tr>
<tr>
<td>GLA03</td>
<td>Voltage</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if any voltage is out of bounds.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfBounds</td>
<td>Percent Out of Bounds is percent of voltage parameters that are out of bounds. Use Red Limits.</td>
</tr>
<tr>
<td>GLA04</td>
<td>prap</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if PRAP_PctMissing &gt; 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentMissingData</td>
<td>Percent Missing is % missing APID 1984.</td>
</tr>
<tr>
<td>GLA04</td>
<td>Gyro</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if Gyro_PctMissing &gt; 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentMissingData</td>
<td>Percent Missing is % missing in appropriate APID.</td>
</tr>
<tr>
<td>GLA04</td>
<td>Laser Reference System</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if LRS_PctMissing &gt; 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentMissingData</td>
<td>Percent Missing is % missing in appropriate APID.</td>
</tr>
<tr>
<td>GLA04</td>
<td>Star Tracker</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if BST_PctMissing &gt; 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentMissingData</td>
<td>Percent Missing is % missing in appropriate APID.</td>
</tr>
<tr>
<td>GLA04</td>
<td>Laser Pulse Array</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if LPA_PctMissing &gt; 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentMissingData</td>
<td>Percent Missing is % missing APID 26.</td>
</tr>
</tbody>
</table>
### Table 3-2  Product Specific Elements (Continued)

<table>
<thead>
<tr>
<th>Product</th>
<th>Parameter Name</th>
<th>Attribute Name</th>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLA04</td>
<td>Instrument Star Tracker</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if IST_PctMissing &gt; 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentMissingData</td>
<td>Percent Missing is % missing in appropriate APID.</td>
</tr>
<tr>
<td>GLA05</td>
<td>Range</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if % no range &gt; 25% or percent missing &gt; 5% or percent out of bounds &gt; 15%. Percent no range = percent missing + percent out of bounds - percent out of bounds * percent missing / 100.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentMissingData</td>
<td>Percent Missing is (Expected - Received) / Expected. Expected from start/stop times on INPUT_FILE line.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfRange</td>
<td>Percent Out of Bounds is percent of received with entire signal below threshold.</td>
</tr>
<tr>
<td>GLA06</td>
<td>Surface Elevation</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if percent no elevation &gt; 25% or percent missing &gt; 5% or percent out of bounds &gt; 15%. Percent no elevation = percent missing + percent out of bounds - percent out of bounds * percent missing / 100.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentMissingData</td>
<td>Percent Missing is (Expected - Received) / Expected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfRange</td>
<td>Percent Out of Bounds is number of invalid / number of shots received.</td>
</tr>
<tr>
<td>GLA06</td>
<td>Surface Roughness</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if SurfRoughness_PctOOB &gt; 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfRange</td>
<td>Percent Out of Bounds is number of Invalid / number of shots received.</td>
</tr>
</tbody>
</table>
### Table 3-2 Product Specific Elements (Continued)

<table>
<thead>
<tr>
<th>Product</th>
<th>Parameter Name</th>
<th>Attribute Name</th>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLA06</td>
<td>Surface Reflectance</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if SurfReflectance_PctOOB &gt; 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfBounds</td>
<td>Percent Out of Bounds is number of invalid / number of shots received.</td>
</tr>
<tr>
<td>GLA06</td>
<td>Surface Slope</td>
<td>AutomaticQualityFlag</td>
<td>Flag will fail if SurfSlope_PctOOB &gt; 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfBounds</td>
<td>Percent Out of Bounds is number of invalid / number of shots received.</td>
</tr>
<tr>
<td>GLA07</td>
<td>532nm Attenuated Backscatter</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if the parameter percent out of bounds is greater than 5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfBounds</td>
<td>Percent Out of Bounds is the number of invalid divided by number of shots received</td>
</tr>
<tr>
<td>GLA07</td>
<td>1064nm Attenuated Backscatter</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if the parameter percent out of bounds is greater than 5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfBounds</td>
<td>Percent Out of Bounds is the number of invalid divided by number of shots received</td>
</tr>
<tr>
<td>GLA08</td>
<td>Aerosol Layer Heights</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if the parameter percent out of bounds is greater than 5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfBounds</td>
<td>Percent Out of Bounds is the number of invalid divided by number of shots received</td>
</tr>
<tr>
<td>GLA08</td>
<td>Planetary Boundary Layer</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if the parameter percent out of bounds is greater than 5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfBounds</td>
<td>Percent Out of Bounds is the number of invalid divided by number of shots received</td>
</tr>
</tbody>
</table>
### Table 3-2  Product Specific Elements (Continued)

<table>
<thead>
<tr>
<th>Product</th>
<th>Parameter Name</th>
<th>Attribute Name</th>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLA09</td>
<td>Cloud Layer Heights</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if the parameter percent out of bounds is greater than 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutofBounds</td>
<td>Percent Out if Bounds is the number of invalid divided by number of shots received.</td>
</tr>
<tr>
<td>GLA10</td>
<td>Cloud Backscatter Cross Section Profile</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if the parameter percent out of bounds is greater than 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutofBounds</td>
<td>Percent Out if Bounds is the number of invalid divided by number of shots received.</td>
</tr>
<tr>
<td>GLA10</td>
<td>Cloud Extinction Cross Section Profile</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if the parameter percent out of bounds is greater than 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutofBounds</td>
<td>Percent Out if Bounds is the number of invalid divided by number of shots received.</td>
</tr>
<tr>
<td>GLA10</td>
<td>Aerosol Backscatter Cross Section Profile</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if the parameter percent out of bounds is greater than 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutofBounds</td>
<td>Percent Out if Bounds is the number of invalid divided by number of shots received.</td>
</tr>
<tr>
<td>GLA10</td>
<td>Aerosol Extinction Cross Section Profile</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if the parameter percent out of bounds is greater than 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutofBounds</td>
<td>Percent Out if Bounds is the number of invalid divided by number of shots received.</td>
</tr>
<tr>
<td>GLA11</td>
<td>Cloud Optical Depth</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if the parameter percent out of bounds is greater than 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutofBounds</td>
<td>Percent Out if Bounds is the number of invalid divided by number of shots received.</td>
</tr>
</tbody>
</table>
### Table 3-2  Product Specific Elements (Continued)

<table>
<thead>
<tr>
<th>Product</th>
<th>Parameter Name</th>
<th>Attribute Name</th>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLA11</td>
<td>Aerosol Optical Depth</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if the parameter percent out of bounds is greater than 5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPerCENTOutofBounds</td>
<td>Percent Out if Bounds is the number of invalid divided by number of shots received</td>
</tr>
<tr>
<td>GLA11</td>
<td>Planetary Boundary Layer</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if the parameter percent out of bounds is greater than 5%</td>
</tr>
<tr>
<td></td>
<td>Optical Depth</td>
<td>QAPerCENTOutofBounds</td>
<td>Percent Out if Bounds is the number of invalid divided by number of shots received</td>
</tr>
<tr>
<td>GLA12</td>
<td>Surface Elevation</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if surface elevation percent out of bounds is greater than 5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPerCENTOutofBounds</td>
<td>Percent Out of Bounds is the number of invalid divided by number of shots received</td>
</tr>
<tr>
<td>GLA12</td>
<td>Surface Roughness</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if surface roughness percent out of bounds is greater than 5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPerCENTOutofBounds</td>
<td>Percent Out of Bounds is the number of invalid divided by number of shots received</td>
</tr>
<tr>
<td>GLA12</td>
<td>Surface Reflectance</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if surface reflectance percent out of bounds is greater than 5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPerCENTOutofBounds</td>
<td>Percent Out if Bounds is the number of invalid divided by number of shots received</td>
</tr>
<tr>
<td>GLA12</td>
<td>Surface Slope</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if surface slope percent out of bounds is greater than 5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPerCENTOutofBounds</td>
<td>Percent Out of Bounds is the number of invalid divided by number of shots received</td>
</tr>
</tbody>
</table>
### Table 3-2 Product Specific Elements (Continued)

<table>
<thead>
<tr>
<th>Product</th>
<th>Parameter Name</th>
<th>Attribute Name</th>
<th>Attribute</th>
</tr>
</thead>
</table>
| GLA13    | Surface Elevation  | AutomaticQualityFlag          | Flag, will fail if surface elevation percent out of bounds is greater than 5%.
|          |                     | QAPercentOutofBounds          | Percent Out of Bounds is the number of invalid divided by number of shots received. |
| GLA13    | Surface Roughness  | AutomaticQualityFlag          | Flag, will fail if surface roughness percent out of bounds is greater than 5%.
|          |                     | QAPercentOutofBounds          | Percent Out of Bounds is the number of invalid divided by number of shots received. |
| GLA13    | Surface Reflectance| AutomaticQualityFlag          | Flag, will fail if surface reflectance percent out of bounds is greater than 5%.
|          |                     | QAPercentOutofBounds          | Percent Out of Bounds is the number of invalid divided by number of shots received. |
| GLA14    | Surface Elevation  | AutomaticQualityFlag          | Flag, will fail if surface elevation percent out of bounds is greater than 5%.
|          |                     | QAPercentOutofBounds          | Percent Out of Bounds is the number of invalid divided by number of shots received. |
| GLA14    | Surface Roughness  | AutomaticQualityFlag          | Flag, will fail if surface roughness percent out of bounds is greater than 5%.
|          |                     | QAPercentOutofBounds          | Percent Out of Bounds is the number of invalid divided by number of shots received. |
| GLA14    | Surface Reflectance| AutomaticQualityFlag          | Flag, will fail if surface reflectance percent out of bounds is greater than 5%.
|          |                     | QAPercentOutofBounds          | Percent Out of Bounds is the number of invalid divided by number of shots received. |
### Table 3-2  Product Specific Elements (Continued)

<table>
<thead>
<tr>
<th>Product</th>
<th>Parameter Name</th>
<th>Attribute Name</th>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLA14</td>
<td>Surface Slope</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if surface slope percent out of bounds is greater than 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfBounds</td>
<td>Percent Out of Bounds is the number of invalid divided by number of shots received.</td>
</tr>
<tr>
<td>GLA15</td>
<td>Surface Elevation</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if surface elevation percent out of bounds is greater than 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfBounds</td>
<td>Percent Out of Bounds is the number of invalid divided by number of shots received.</td>
</tr>
<tr>
<td>GLA15</td>
<td>Surface Roughness</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if surface roughness percent out of bounds is greater than 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfBounds</td>
<td>Percent Out of Bounds is the number of invalid divided by number of shots received.</td>
</tr>
<tr>
<td>GLA15</td>
<td>Surface Reflectance</td>
<td>AutomaticQualityFlag</td>
<td>Flag, will fail if surface reflectance percent out of bounds is greater than 5%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAPercentOutOfBounds</td>
<td>Percent Out of Bounds is the number of invalid divided by number of shots received.</td>
</tr>
</tbody>
</table>
Section 4
Data Dictionary

4.1 Description of the Data Dictionary

Detailed parameter descriptions are provided in this section. These descriptions provide details for each parameter within a product file. Table 4-1 lists the fields shown in each detailed data dictionary description.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Var Name</td>
<td>Unique identifying name of the product variable.</td>
</tr>
<tr>
<td>Is element of:</td>
<td>Corresponding record where variable is located.</td>
</tr>
<tr>
<td>Short Description</td>
<td>Descriptive name of the product variable.</td>
</tr>
<tr>
<td>Prod Data Type</td>
<td>Product (Unscaled) Variable Type and dimensions (in parens).</td>
</tr>
<tr>
<td>Total Bytes</td>
<td>Total number of bytes used by variable.</td>
</tr>
<tr>
<td>Product Units</td>
<td>Units in which variable is stored on product file.</td>
</tr>
<tr>
<td>Total Bytes</td>
<td>Total number of bytes used by variable.</td>
</tr>
<tr>
<td>Product Units</td>
<td>Units in which variable is stored on product file.</td>
</tr>
<tr>
<td>Invalid Value/Flag</td>
<td>Indicates what identifies the field as being invalid.</td>
</tr>
<tr>
<td>None</td>
<td>variable cannot be invalid.</td>
</tr>
<tr>
<td>gd_invalid_xxx</td>
<td>datatype-specific value which indicates the variable is not valid.</td>
</tr>
<tr>
<td>[variable name]</td>
<td>name of the flag to check in order to determine validity of the variable.</td>
</tr>
<tr>
<td>Is Correction Flag</td>
<td>Flag indicating if the variable is a correction flag.</td>
</tr>
<tr>
<td>Is Unsigned?</td>
<td>Flag indicating if variable should be treated as unsigned.</td>
</tr>
<tr>
<td>Product Minimum</td>
<td>Minimum value supported in product variable.</td>
</tr>
<tr>
<td>Product Maximum</td>
<td>Maximum value supported in product variable.</td>
</tr>
<tr>
<td>Description</td>
<td>Text description.</td>
</tr>
<tr>
<td>Comments</td>
<td>Text comments.</td>
</tr>
</tbody>
</table>
4.2 Data Dictionary

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_gla01_rectype
Is element of: GLA01 Main Record
Short Description: GLA01 Record Type
Product Data Type: i2b
Total Bytes: 2  
Product Units: n/a  
Invalid Value/Flag: No  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 2  
Description: Record type indicating whether this record is a invalid = 0, main=1, long=2, or short=3 waveform record.  
Comments:

Product Var Name i_spare1  
Is element of: GLA01 Main Record  
Short Description: Spares 1  
Product Data Type: i2b  
Total Bytes: 2  
Product Units: n/a  
Invalid Value/Flag: No  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 0  
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.  
Comments: GLA01 spare1.

Product Var Name i_dShotTime  
Is element of: GLA01 Main Record, GLA04 LPA Main Record, GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record  
Short Description: Laser Shot Time Deltas (shots 2-40)  
Product Data Type: i4b (39)  
Total Bytes: 156  
Product Units: microseconds  
Invalid Value/Flag: No  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 1200000  
Description: The time deltas of pulses 2 through 40 to i_UTCTime, the UTC time tag of the first pulse in the 1-second data frame. Adding the deltas to i_UTCTime will give the user the time of each individual shot in the frame.  
Comments: To calculate the time for shots 2-40, add these deltas to the time of the first shot.
Product Var Name: i1_pred_lat
Is element of: GLA01 Main Record, GLA02 Record
Short Description: Predicted geodetic Latitude of the laser footprint
Product Data Type: i4b
Total Bytes: 4
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: The geodetic Latitude of the laser footprint; obtained from the predicted orbit; assuming the laser is nadir pointing.
Comments:

Product Var Name: i1_pred_lon
Is element of: GLA01 Main Record, GLA02 Record
Short Description: Predicted geodetic Longitude of the laser footprint
Product Data Type: i4b
Total Bytes: 4
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000
Description: The geodetic Longitude of the laser footprint; obtained from the predicted orbit; assuming the laser is nadir pointing.
Comments:

Product Var Name: i_RespEndTime
Is element of: GLA01 Main Record
Short Description: Ending Address of Range Response
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: nanoseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 51000000
Description: Address (in digitizer counts) of the 2000-byte surface echo data dump (as measured from the start of Acquisition Memory, i.e. Start of digitization). Last in time. From APID12/13 offset 80.

Comments:

Product Var Name: i_LastThrXingT
Is element of: GLA01 Main Record
Short Description: Last Threshold Crossing Location for Selected Filter
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: ns
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5100000

Description: Address, in digitizer counts, of the detected last (i.e. last in time) threshold crossing (as measured from the start of Acquisition Memory, i.e. Start of digitization). Also called the trailing edge. Set to 0 if threshold crossing was NOT detected. From APID12/13, Offset 84.

Comments: null

Product Var Name: i_NextThrXing
Is element of: GLA01 Main Record
Short Description: Next to Last Threshold Crossing Location for Selected Filter
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: ns
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5100000

Description: Address (in digitizer counts) of the detected next to last threshold crossing (as measured from the start of Acquisition Memory, i.e. Start of digitization). Also called the leading edge. Set to 0 if a threshold crossing was NOT detected. From APID12/13 offset 88.

Comments:

Product Var Name: i_EchoPeakLoc
Is element of: GLA01 Main Record
Short Description: Echo Peak Location
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: nanoseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5100000
Description: Address (in digitizer counts) of the detected peak value (as measured from the start of Acquisition Memory, i.e. Start of digitization). Set to 0 if a threshold crossing was NOT detected. From APID12/13 offset 100.
Comments:

Product Var Name i_EchoPeakVal
Is element of: GLA01 Main Record
Short Description: Echo Peak Value
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Peak value for the selected filter returned by the FIR filter engine. Set to 0 if a threshold crossing was not detected. From APID12/13 offset 96.
Comments:

Product Var Name i_wt_fact_filt
Is element of: GLA01 Main Record
Short Description: Filter Weight Factors
Product Data Type: i4b (6, 40)
Total Bytes: 960
Product Units: unitless
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2000000000
Description: Results of weight formulas for all FIR filters. There are a total of 6 filters. From APID12/13, offset 124.
Comments:

Product Var Name i_filtr_thresh
Is element of: GLA01 Main Record
Short Description: Selected Filter Threshold Value
Product Data Type: i2b (40)  
Total Bytes: 80  
Product Units: counts  
Invalid Value/Flag: i_APID_AvFlg  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 255  
Description: Threshold values used to find the last and next to last threshold crossings for the selected filter. From APID12/13, Offset 108.  
Comments:

Product Var Name i_time_txWfPk  
Is element of: GLA01 Main Record, GLA04 LPA Main Record  
Short Description: Transmit Pulse Peak Location  
Product Data Type: i4b (40)  
Total Bytes: 160  
Product Units: ns  
Invalid Value/Flag: i_APID_AvFlg  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 500000  
Description: Address in digitizer counts of the Transmit Pulse Peak as measured from the start of Acquisition Memory, i.e. start of digitization. From APID12/13, Offset 68.  
Comments: The range measurement starts from this time. To accurately time stamp the transmit pulse, it is necessary to add the delay to start of digitizer.

Product Var Name i_TxWfStart  
Is element of: GLA01 Main Record, GLA04 LPA Main Record  
Short Description: Starting Address of Transmit Pulse Sample  
Product Data Type: i4b (40)  
Total Bytes: 160  
Product Units: ns  
Invalid Value/Flag: i_APID_AvFlg  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 500000  
Description: Starting Address in digitizer counts of the Transmit Pulse sample relative to the start of digitization. From APID12/13, Offset 76.  
Comments:
Product Var Name: i_TxNrg_EU
Is element of: GLA01 Main Record
Short Description: 1064 nm Laser Transmit Energy
Product Data Type: i4b
Total Bytes: 4
Product Units: microjoules
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 90000
Description: The 1064 nm laser pulse transmitted energy in energy units, computed from the digitized outgoing pulse, and the transmit gain.
Comments:

Product Var Name: i_RecNrgAll_EU
Is element of: GLA01 Main Record
Short Description: 1064 Laser received Energy from all signal above threshold
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: attojoules
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200000
Description: This is calculated by taking the area under the received waveform (referenced to the observed noise) from all responses between the noise crossing before the first threshold crossing and the noise crossing after the last threshold crossing.
Comments:

Product Var Name: i_RecNrgLast_EU
Is element of: GLA01 Main Record
Short Description: 1064 nm Laser Received Energy (max pk)
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: attojoules
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200000
Description: This is the energy in the 1064 nm laser pulse between the threshold crossings before and after the maximum amplitude in energy units.
Comments:

Product Var Name i txWfPpk_Flag
Is element of: GLA01 Main Record, GLA04 LPA Main Record
Short Description: Transmit Waveform Peak Status Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: n/a
Invalid Value/Flag: i APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 8
Description: Transmit Peak Status. Status Word: Bit 0: If bit is set to 1 (true), then internal software failure. Bit 1: If bit is set to 1 (true), then peak is below threshold. Bit 2: If bit is set to 1 (true), peak was not found. Note: once set to true, Bit 2 is latched and is only cleared by a DSP board reset or by a ground command. From APID12/13, Offset 72. Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i InstState
Is element of: GLA01 Main Record
Short Description: Instrument State
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 524288
Description: Flag defining current configuration of the GLAS instrument. This is a common flag. Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections.
Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i_FiltNumMask
Is element of: GLA01 Main Record
Short Description: Filter Selection Mask
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 64
Description: The low order 6 bits, bits 0 through 5, indicate which filters were selectable for a shot. The definition of complete failure of the filters has been changed to mean the complete failure of all SELECTABLE filters. Bit 0: 4 nsec filter, bit 1: 8 nsec filter, bit 2: 16 nsec filter, bit 3: 32 nsec filter, bit 4: 64 nsec filter, bit 5: 128 nsec filter. In case of the complete failure of all the filters, the result of the last 'good' shot shall be used, even if this mask procribes the filter choice. A bit value = 1 =selectable; bit value = 0 = not selectable. From APID19, Offset 30.
Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i_HOff
Is element of: GLA01 Main Record
Short Description: DEM Offset
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: Millimeters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1.0D9
Description: Offsets associated with the minimum and maximum height uploaded in the DEM used to define the range window. 1st item: minimum height offset = DEM uncertainty + bias; default is 1.125 km. 2nd item: maximum height offset = DEM uncertainty - bias; default is -0.875 km. From APID19, Offset 1116.

Comments:

Product Var Name: i_ADBias
Is element of: GLA01 Main Record
Short Description: Altimeter Digitizer Bias
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: Meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000000
Product Maximum: 1000000
Description: Altimeter Digitizer bias values added to minimum and maximum range: 1st item is bias for minimum range (Rbmin) - default = 0; 2nd item is bias for maximum range (Rbmax) - default = 0. Used when necessary to correct for off-nadir pointing angles greater than 1 degree. From APID19, Offset 1124.

Comments:

Product Var Name: i_RminRmax
Is element of: GLA01 Main Record
Short Description: Range Window Start and Stop
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: Meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000
Description: Range window start and stop in kilometers. From APID19, Offset 1100.

Comments:

Product Var Name: i_WMinMax
Is element of: GLA01 Main Record
Short Description: Window Size
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: Meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000
Description: Range window minimum and maximum size. 1st item is minimum - default is 2 km; 2nd item is maximum - default is 11 km. From APID19, Offset 1108.
Comments:

Product Var Name i_ObSCHt
Is element of: GLA01 Main Record
Short Description: On-board Height of S/C
Product Data Type: i4b
Total Bytes: 4
Product Units: Millimeters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1.0D9
Product Maximum: 1.0D9
Description: Geodetic altitude of S/C above earth surface (Hsat). From APID19, Offset 1092.
Comments:

Product Var Name i_engineering
Is element of: GLA01 Main Record
Short Description: Engineering Data
Product Data Type: i2b (12)
Total Bytes: 24
Product Units: various
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -3000
Product Maximum: 5000
Description: The following is from /glas/vob/src/l1a_lib/L_EngCorr_mod.f90 which is called by L1AMgr:
\[
d_{\text{engineering}}(1) = \text{active detector temperature [T\_detID}
\]
if detector=1, T\_detID = GLA00\_prod\%CTHW3\_hk(1)\%i\_PRTad1C24\_t
if detector=2, T\_detID = GLA00\_prod\%CTHW3\_hk(1)\%i\_PRTad2C25\_t\]
\[
d_{\text{engineering}}(2) = \text{active digitizer temperature [T\_digID}
\]
if digitizer=1, T\_digID = GLA00\_prod\%CTHW3\_hk(1)\%i\_AD1ADCC19\_t
if digitizer=2, T\_digID = GLA00\_prod\%CTHW3\_hk(1)\%i\_AD2ADCC20\_t\]
d_engineering(3) = oscillator board temperature
[T_relay = GLA00_prod%CTHW3_hk(1)%i_OscBdC11_t]
d_engineering(4) = Fiber Box temperature
[T_fb = GLA00_prod%CTHW3_hk(1)%i_PRTfboxC29_t]
d_engineering(5) thru d_engineering(12) TBD. All temperatures are in Celsius X 100.

Comments: Engineering data (temperatures, voltages, currents) affecting the altimetry data. Array of 12 values.

Product Var Name i_compRatio
Is element of: GLA01 Main Record, GLA05 record
Short Description: Compression Ratios
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: unitless
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 5
Description: Averaging values p and q for frame. First item is p; second is q. From APID19, Offset 232. First N downlink samples are generated by averaging p raw digitized elements and the rest of the allocated samples in the waveform by averaging q elements.
Comments: Not valid if APID19 is missing.

Product Var Name i_N_val
Is element of: GLA01 Main Record, GLA05 record
Short Description: Value of N
Product Data Type: i2b
Total Bytes: 2
Product Units: gates
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 544
Description: Value of N used for waveform compression for the frame. From APID19, Offset 236.
Comments: Not valid if APID19 is missing.

Product Var Name i_r_val
Is element of: GLA01 Main Record, GLA05 record
Short Description: Value of r
Product Data Type: i2b
Total Bytes: 2
Product Units: unitless
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 8
Description: Value of r used for waveform compression for frame. From APID19, Offset 238. Not valid if APID19 is missing.
Comments: After M shots with no valid return, the 'p' and 'q' averaging of the normal downlinked waveform compression type will be overridden and instead the telemetered received echo will consist of average samples averaged over 'r' raw samples.

Product Var Name i_ADdetOutGn
Is element of: GLA01 Main Record
Short Description: Transmitted Gain
Product Data Type: i2b
Total Bytes: 2
Product Units: counts
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: AD Detector Return Gain readback
Comments: This is only updated every 4 seconds.

Product Var Name i_DEMmin
Is element of: GLA01 Main Record
Short Description: DEM minimum
Product Data Type: i2b
Total Bytes: 2
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 12000
Description: Onboard spacecraft DEM minimum elevation used to calculate hmin. From APID19, Offset 1192.
Comments:
Product Var Name i_DEMmax
Is element of: GLA01 Main Record
Short Description: DEM maximum
Product Data Type: i2b
Total Bytes: 2
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 12000
Description: Onboard spacecraft DEM maximum elevation used to calculate hmax. From APID19, Offset 1193.
Comments:

Product Var Name i_tx_wf
Is element of: GLA01 Main Record, GLA04 LPA Main Record
Short Description: Sampled Transmit Pulse Waveform
Product Data Type: i1b (48, 40)
Total Bytes: 1920
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Transmit Pulse; 48 bytes of raw data samples.
Comments:

Product Var Name i_OrbFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: POD flag (Orbit Flag)
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Denotes quality of orbit, whether predicted or precision, loss of GPS data, maneuver-degraded, etc. Please see the PDF flag description in the next section for more details.

Comments:

Product Var Name i_EchoLandType
Is element of: GLA01 Main Record
Short Description: Echo Land Type
Product Data Type: i1b
Total Bytes: 1
Product Units: unitless
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Surface Echo Land Type for Compression. 0=sea, 1=land, 2=sea/ice, 3=land/ice. From APID19, Offset 231.
Comments: The long and short values and values of 'p', 'q', and 'N' are surface echo land type dependent, but can only change once per frame (1sec).

Product Var Name i_RngSrc_Flag
Is element of: GLA01 Main Record
Short Description: Range Data Source
Product Data Type: i1b
Total Bytes: 1
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2
Description: Source of Range data: 0 = s/c time and position packet; 1 = uplinked DEM bytes; 2 = uplinked Rmin/Rmax. Please see the PDF flag description in the next section for more details. From APID19, Offset 1194.
Comments:

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name: i_TxFlg
Is element of: GLA01 Main Record
Short Description: Transmit Pulse Flag
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating whether the transmit pulse is telemetered (valid) or not telemetered (invalid) in this record (1 bit set/shot). See the PDF flag description in the next section for more information.
Comments:

Product Var Name: i_GainShiftFlg
Is element of: GLA01 Main Record
Short Description: Gain Shift Flag
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicates if the gain has been shifted for the corresponding measurement. 0=Gain has been shifted (valid) or 1=Gain has not been shifted (potentially invalid) in this record (1 bit set/shot). See the PDF flag description in the next section for more information.
Comments:

Product Var Name: i_spare2
Is element of: GLA01 Main Record
Short Description: Spare 2
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA01 spare2.

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_gla01_rectype
Is element of: GLA01 Long Waveform Record
Short Description: GLA01 Record Type
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2
Description: Record type indicating whether this record is a invalid=0, main=1, long=2, or short=3 waveform record.
Comments:

Product Var Name i_spare1
Is element of: GLA01 Long Waveform Record
Short Description: Spares 1
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_filtnum
Is element of: GLA01 Long Waveform Record
Short Description: Filter Number
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5
Description: Filter with the highest weight (0 for 4 nsec filter; 1 for 8 nsec filter; 2 for 16 nsec filter; 3 for 32 nsec filter; 4 for 64 nsec filter; 5 for 128 nsec filter). May or may not be selectable! If no selectable filter can be chosen, then the last successful filter, selectable or NOT is chosen. From APID12/13, Offset 104.
Comments:

Product Var Name i_shot_ctr
Is element of: GLA01 Long Waveform Record
Short Description: Shot Counter
Product Data Type: i2b (8)
Total Bytes: 16
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: The shot number for each of the 40 shots in this record. The shot count rolls over after reaching 200. From APID12/13, Offset 16.
Comments:

Product Var Name i_statflags
Is element of: GLA01 Long Waveform Record
Short Description: Range Window Status Word
Product Data Type: i4b (8)
Total Bytes: 32
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 262144
Description: Range Window Status word: Bit 0: No first crossing found on 4-nsec filter Bit 1: No first crossing found on 8-nsec filter Bit 2: No first crossing found on 16-nsec filter Bit 3: No first crossing found on 32-nsec filter Bit 4: No first crossing found on 64-nsec filter Bit 5: No first crossing found on 128-nsec filter Bit 6: No second
crossing found on 4-nsec filter Bit 7: No second crossing found on 8-nsec filter Bit 8: No second crossing found on 6-nsec filter Bit 9: No second crossing found on 32-nsec filter Bit 10: No second crossing found on 64-nsec filter Bit 11: No second crossing found on 128-nsec filter Bit 12: First sample in range greater than or equal to threshold for 4 nsec filter Bit 13: First sample in range >= threshold for 8 nsec filter Bit 14: First sample in range >= threshold for 16 nsec filter Bit 15: First sample in range >= threshold for 32 nsec filter Bit 16: First sample in range >= threshold for 64 nsec filter Bit 17: First sample in range >= threshold for 128 nsec filter Bit 18: All filters were rejected flag. 0 = FALSE, 1 = TRUE. This flag will be set to true (1) if bits 0 through 5 in Range_Status are set. Bits 19-31 are unused spares. Please see <a href='flags/i_statflags.pdf'> the PDF flag description in the next section for more details. From APID12/13, Offset 120.

Comments:

Product Var Name i_gainSet1064
Is element of: GLA01 Long Waveform Record
Short Description: AD Gain Setting
Product Data Type: i2b (8)
Total Bytes: 16
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: The receiver gain; results of the gain algorithm. From APID12/13, Offset 148.
Comments:

Product Var Name i_4nsPeakVal
Is element of: GLA01 Long Waveform Record
Short Description: 4ns Filter Peak value
Product Data Type: i2b (8)
Total Bytes: 16
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Received pulse Peak value for the 4ns filter; returned by the FIR engine. From APID12/13, Offset 92.
Comments:

Product Var Name i_8nsPeakVal
Is element of: GLA01 Long Waveform Record
Short Description: 8ns Filter Peak value
Product Data Type: i2b (8)
Total Bytes: 16
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Received pulse Peak value for the 8ns filter; returned by the FIR engine. From APID12/13, Offset 94.
Comments:

Product Var Name i_4nsBgMean
Is element of: GLA01 Long Waveform Record
Short Description: Background Mean Value
Product Data Type: i2b (8)
Total Bytes: 16
Product Units: .01 counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 51200
Description: Background Noise Mean Value for the 4 ns filter. From APID12/13, Offset 112.
Comments:

Product Var Name i_4nsBgSDEV
Is element of: GLA01 Long Waveform Record
Short Description: Background Standard Deviation
Product Data Type: i2b (8)
Total Bytes: 16
Product Units: .01 counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 51200
Description: The standard deviation of the background noise for the 4 ns filter. From APID12/13, Offset 116.
Comments:

Product Var Name i_samp_pad
Is element of: GLA01 Long Waveform Record
Short Description: Echo Sample Padding
Product Data Type: i2b (8)
Total Bytes: 16
Product Units: gates
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 544
Description: Surface echo sample padding. Number of zero bytes used to pad the surface echo data samples after averaging. From APID12/13, Offset 152.
Comments:

Product Var Name i_comp_type
Is element of: GLA01 Long Waveform Record
Short Description: Echo Compression Type
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Surface echo compression type. Indicates the type of compression performed. 0 = N, p, and q; 1 = r. From APID12/13, Offset 154.
Comments:

Product Var Name i_rng_wf
Is element of: GLA01 Long Waveform Record
Short Description: 1064 nm Range Waveform
Product Data Type: i1b (544, 8)
Total Bytes: 4352
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: The 1064 nm echo waveform digitizer sample output, at 544 samples per shot over land and ice sheet and 200 samples per shot over sea ice and ocean. The surface type is determined by the instrument from
The on-board DEM. The digitized data was averaged according to the waveform compression parameters (M,N) and the compression ratio (p, q, and r).

Comments: This has no calibration applied. The calibration is applied internally during ground science algorithm processing. The calibration constants are available on ANC07 file.

Product Var Name: i_gainStatus
Is element of: GLA01 Long Waveform Record
Short Description: Gain Status Bits
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Note that these bits are always set to 0 on the first shot of a science run and when auto gain is disabled.
bit 0x1: 0 if the gain loop was run for this shot; 1 if the gain loop was bypassed for this shot;
bite 0x2: 0 if the gain loop did not time out; 1 if the gain loop timed out and was reset;
Comments:

Product Var Name: i_NumCoinc
Is element of: GLA01 Long Waveform Record
Short Description: Number of Coincidences for Selected Filter
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: The number of coincidences between the selected filter and all other filters (including itself). This is one of the terms used to calculate the weight of the selected filter. If no filter is selected, this value is 0.
Comments:

Product Var Name: i_rawPkHt
Is element of: GLA01 Long Waveform Record
Short Description: Height of Peak in Raw Waveform
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: The maximum raw value in a specified range at the end of the return waveform. This value is used as the input to the gain control loop in place of the 8ns peak height.
Comments:

Product Var Name i_spare2
Is element of: GLA01 Long Waveform Record
Short Description: Spare 2
Product Data Type: i1b (108)
Total Bytes: 108
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA01_long spare2.

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.

Comments:

Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647

Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_gla01_rectype
Is element of: GLA01_Short_Record
Short Description: GLA01 Record Type
Product Data Type: i2b
Total Bytes: 2
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2

Description: Record type indicating whether this record is a invalid=0, main=1, long=2, or short=3 waveform record.
Comments:

Product Var Name i_spare1
Is element of: GLA01_Short_Record
Short Description: Spare 1
Product Data Type: i2b
Total Bytes: 2
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_filtnum
Is element of: GLA01_Short_Record
Short Description: Filter Number
Product Data Type: i1b (20)
Total Bytes: 20
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5
Description: Filter with the highest weight (0 for 4 nsec filter; 1 for 8 nsec filter; 2 for 16 nsec filter; 3 for 32 nsec filter; 4 for 64 nsec filter; 5 for 128 nsec filter). May or may not be selectable! If no selectable filter can be chosen, then the last successful filter, selectable or NOT is chosen. From APID12/13, Offset 104.
Comments:

Product Var Name i_shot_ctr
Is element of: GLA01_Short_Record
Short Description: Shot Counter
Product Data Type: i2b (20)
Total Bytes: 40
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: The shot number for each of the 40 shots in this record. The shot count rolls over after reaching 200. From APID12/13, Offset 16.
Comments:

Product Var Name i_statflags
Is element of: GLA01_Short_Record
Short Description: Range Window Status Word
Product Data Type: i4b (20)
Total Bytes: 80
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 262144
Description: Range Window Status word: Bit 0: No first crossing found on 4-nsec filter
Bit 1: No first crossing found on 8-nsec filter
Bit 2: No first crossing found on 16-nsec filter
Bit 3: No first crossing found on 32-nsec filter
Bit 4: No first crossing found on 64-nsec filter
Bit 5: No first crossing found on 128-nsec filter
Bit 6: No second crossing found on 4-nsec filter
Bit 7: No second crossing found on 8-nsec filter
Bit 8: No second crossing found on 16-nsec filter
Bit 9: No second crossing found on 32-nsec filter
Bit 10: No second crossing found on 64-nsec filter
Bit 11: First sample in range greater than or equal to threshold for 4 nsec filter
Bit 12: First sample in range greater than or equal to threshold for 8 nsec filter
Bit 13: First sample in range >= threshold for 16 nsec filter
Bit 14: First sample in range >= threshold for 32 nsec filter
Bit 15: First sample in range >= threshold for 64 nsec filter
Bit 16: First sample in range >= threshold for 128 nsec filter
Bit 17: All filters were rejected flag. 0 = FALSE, 1 = TRUE. This flag will be set to true (1) if bits 0 through 5 in Range_Status are set. Bits 19-31 are unused spares. Please see <a href='flags/i_statflags.pdf'>the PDF flag description in the next section</a> for more details. From APID12/13, Offset 120.

Comments:

Product Var Name i_gainSet1064
Is element of: GLA01_Short_Record
Short Description: AD Gain Setting
Product Data Type: i2b (20)
Total Bytes: 40
Product Units: unitless
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 255
Description: The receiver gain; results of the gain algorithm. From APID12/13, Offset 148.
Comments: This number has calibrations applied so will differ from the value on the APID12/13.

Product Var Name i_4nsPeakVal
Is element of: GLA01_Short_Record
Short Description: 4ns Filter Peak Value
Product Data Type: i2b (20)
Total Bytes: 40
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Received pulse Peak value for the 4ns filter; returned by the FIR engine. From APID12/13, Offset 92.
Comments:

Product Var Name i_8nsPeakVal
Is element of: GLA01_Short_Record
Short Description: 8ns Filter Peak Value
Product Data Type: i2b (20)
Total Bytes: 40
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Received pulse Peak value for the 8ns filter; returned by the FIR engine. From APID12/13, Offset 94.
Comments:

Product Var Name i_4nsBgMean
Is element of: GLA01_Short_Record
Short Description: Background Mean Value
Product Data Type: i2b (20)
Total Bytes: 40
Product Units: .01 counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 51200
Description: Background Noise Mean Value for the 4 ns filter. From APID12/13, Offset 112.
Comments:

Product Var Name i_4nsBgSDEV
Is element of: GLA01_Short_Record
Short Description: Background Standard Deviation
Product Data Type: i2b (20)
<table>
<thead>
<tr>
<th>Product Var Name</th>
<th>Data Type</th>
<th>Total Bytes</th>
<th>Product Units</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>i_samp_pad</strong></td>
<td>i2b (20)</td>
<td>40</td>
<td>gates</td>
<td>0</td>
<td>544</td>
<td>Surface echo sample padding. Number of zero bytes used to pad the surface echo data samples after averaging. From APID12/13, Offset 152.</td>
<td></td>
</tr>
<tr>
<td><strong>i_comp_type</strong></td>
<td>i1b (20)</td>
<td>20</td>
<td>n/a</td>
<td>0</td>
<td>1</td>
<td>Surface echo compression type. Indicates the type of compression performed. 0 = N, p, and q; 1 = r. From APID12/13, Offset 154.</td>
<td></td>
</tr>
</tbody>
</table>
Is element of: GLA01_Short_Record
Short Description: 1064 nm Range Waveform
Product Data Type: i1b (200, 20)
Total Bytes: 4000
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: The 1064 nm echo waveform digitizer sample output, at 544 samples per shot over land and ice sheet and 200 samples per shot over sea ice and ocean. The surface type is determined by the instrument from the on-board DEM. The digitized data was averaged according to the waveform compression parameters (M,N) and the compression ratio (p, q, and r).
Comments: This has no calibration applied. The calibration is applied internally during ground science algorithm processing. The calibration constants are available on ANC07 file.

Product Var Name i_gainStatus
Is element of: GLA01_Short_Record
Short Description: Gain Status Bits
Product Data Type: i1b (20)
Total Bytes: 20
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 255
Description: Note that these bits are always set to 0 on the first shot of a science run and when auto gain is disabled.
bit 0x1: 0 if the gain loop was run for this shot; 1 if the gain loop was bypassed for this shot;
bit 0x2: 0 if the gain loop did not time out; 1 if the gain loop timed out and was reset;
Comments:

Product Var Name i_NumCoinc
Is element of: GLA01_Short_Record
Short Description: Number of Coincidences for Selected Filter
Product Data Type: i1b (20)
Total Bytes: 20
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: The number of coincidences between the selected filter and all other filters (including itself). This is one of the terms used to calculate the weight of the selected filter. If no filter is selected, this value is 0.
Comments:

Product Var Name i_rawPkHt
Is element of: GLA01_Short_Record
Short Description: Height of Peak in Raw Waveform
Product Data Type: i1b (20)
Total Bytes: 20
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: The maximum raw value in a specified range at the end of the return waveform. This value is used as the input to the gain control loop in place of the 8ns peak height.
Comments:

Product Var Name i_spare2
Is element of: GLA01_Short_Record
Short Description: Spare 2
Product Data Type: i1b (184)
Total Bytes: 184
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA01Short_spare2.

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04
LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i1_pred_lat
Is element of: GLA01 Main Record, GLA02 Record
Short Description: Predicted geodetic Latitude of the laser footprint
Product Data Type: i4b
Total Bytes: 4
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No  
Product Minimum: -90000000  
Product Maximum: 90000000  
Description: The geodetic Latitude of the laser footprint; obtained from the predicted orbit; assuming the laser is nadir pointing.  
Comments:  

Product Var Name i1_pred_lon  
Is element of: GLA01 Main Record, GLA02 Record  
Short Description: Predicted geodetic Longitude of the laser footprint  
Product Data Type: i4b  
Total Bytes: 4  
Product Units: microdegrees  
Invalid Value/Flag: gi_invalid_i4b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 360000000  
Description: The geodetic Longitude of the laser footprint; obtained from the predicted orbit; assuming the laser is nadir pointing.  
Comments:  

Product Var Name i_DEMmin  
Is element of: GLA02 Record  
Short Description: DEM minimum  
Product Data Type: i2b  
Total Bytes: 2  
Product Units: meters  
Invalid Value/Flag: i_APID_AvFlg  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: -1000  
Product Maximum: 12000  
Description: Onboard spacecraft DEM minimum elevation used to calculate hmin. From APID19, Offset 1192.  
Comments:  

Product Var Name i_DEMmax  
Is element of: GLA02 Record  
Short Description: DEM maximum  
Product Data Type: i2b  
Total Bytes: 2
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 12000
Description: Onboard spacecraft DEM maximum elevation used to calculate hmax. From APID19, Offset 1193.
Comments:

Product Var Name i_g_lid_qf
Is element of: GLA02 Record
Short Description: 532 nm LIDAR Data Quality Flag
Product Data Type: i1b (12)
Total Bytes: 12
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 3
Description: 532 nm lidar data quality flag. 2 bits per shot for the 40 HZ profile; 2 bits per sum for the 5 Hz profile, 2 bits for the 1 Hz profile for a total of 92 bits. There are 4 spare bits. A value of 3 indicates the background data is out of bounds (0-100).
Please see <a href='flags/i_g_lid_qf.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i40_g_lid
Is element of: GLA02 Record
Short Description: 532 nm LIDAR Data from 10 KM to -1 KM
Product Data Type: i4b (148, 40)
Total Bytes: 23680
Product Units: ((pe/bin)KM^2)/J)/1000
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 100000000
Description: The normalized lidar signal from the 532 nm photon counting channel for the 10 KM to -1 segment of the atmosphere. Background subtraction, range squared, and dead time correction is applied. NOTES: pe = photons; J = Joules.
Comments:
Product Var Name \textit{i5\_g\_lid}  
Is element of: GLA02 Record  
Short Description: 532 nm LIDAR Data from 20 KM to 10 KM  
Product Data Type: i4b (132, 5)  
Total Bytes: 2640  
Product Units: ((pe/bin)KM^2)/J)/1000  
Invalid Value/Flag: gi_invalid_i4b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: -10000  
Product Maximum: 100000000  
Description: The normalized lidar signal from the 532 nm photon counting channel for the 20 KM to 10 KM segment of the atmosphere. Background subtraction, range squared, and dead time correction is applied. Sums of 8 samples.  
Comments: 

Product Var Name \textit{i1\_g\_lid}  
Is element of: GLA02 Record  
Short Description: 532 nm LIDAR Data from 40 KM to 20 KM  
Product Data Type: i4b (268)  
Total Bytes: 1072  
Product Units: ((pe/bin)KM^2)/J)/1000  
Invalid Value/Flag: gi_invalid_i4b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: -10000  
Product Maximum: 100000000  
Description: The normalized lidar signal from the 532 nm photon counting channel for the 40 KM to 20 KM segment of the atmosphere. Background subtraction, range squared, and dead time correction is applied. 
Comments: 

Product Var Name \textit{i40\_g\_sat\_f}  
Is element of: GLA02 Record  
Short Description: 532 nm Saturation Flag for 10 to -1 KM Segment  
Product Data Type: i1b (740)  
Total Bytes: 740  
Product Units: n/a  
Invalid Value/Flag: No  
Is Correction Flag?: NA  
Is Unsigned?: Yes  
Product Minimum: 0
Product Maximum: 1
Description: Bit flag indicating whether the 532 nm signal is saturated or not for the 10 to -1 KM profile. 0 = not saturated, 1 = saturated. 1 bit flag per each bin in the profile. There are 148 bins in the profile and the profiles occur at 40 per second for a total of 5920 flags (148 * 40) per second. Bits 0-147 are the flags for shot 1, Bits 148-295 are the flags for shot 2, etc.
Please see <a href='flags/i40_g_sat_f.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i5_g_sat_f
Is element of: GLA02 Record
Short Description: 532 nm Saturation Flag for 20 to 10 KM Segment
Product Data Type: i1b (84)
Total Bytes: 84
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: Bit flag indicating whether the 532 nm signal is saturated or not for the 20 to 10 KM Profile. 0 = not saturated, 1 = saturated. There is one flag per each bin in the profile. There are 132 bins in a profile and the profiles are summed over 8 shots for a total of 660 flags (132 * 5) per second. Bits 0-131 are the flags for shots 1-8, Bits 132-263 are the flags for shots 9-16, etc. The upper 12 bits are spares.
Please see <a href='flags/i5_g_sat_f.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i1_g_sat_f
Is element of: GLA02 Record
Short Description: 532 nm Saturation Flag for 40 to 20 KM Segment
Product Data Type: i1b (36)
Total Bytes: 36
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: Bit flag indicating whether the 532 nm signal is saturated or not for the 40 to 20 KM Segment. 0 = not saturated, 1 = saturated. There is one flag per each bin in the profile. There are 268 bins in a profile and the profile is summed over the 40 shots in a second for a total of 268 flags (268 * 1) per second. The upper 20 bits are spares.
Please see <a href='flags/i1_g_sat_f.pdf'> the PDF flag description in the next section for more details.
Comments:
Product Var Name i40_g_TxNrg_EU
Is element of: GLA02 Record, GLA07 Record
Short Description: 532 nm Laser Transmit Energy at 40 Hz
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: Joules * 1.0d5
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4500
Description: The 532 nm transmitted pulse energy in energy units, converted from the counts from the transmitted energy monitor.
Comments: Not valid if APID19 is missing.

Product Var Name i5_g_TxNrg_EU
Is element of: GLA02 Record, GLA07 Record
Short Description: 532 nm Laser Transmit Energy at 5 Hz
Product Data Type: i4b (5)
Total Bytes: 20
Product Units: Joules * 1.0d5
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4500
Description: The 532 nm transmitted pulse energy in energy units, converted from the counts from the transmitted energy monitor. Averaged over 8 shots.
Comments: Not valid if APID19 is missing.

Product Var Name i1_g_TxNrg_EU
Is element of: GLA02 Record
Short Description: 532 nm Laser Transmit Energy at 1 Hz
Product Data Type: i4b
Total Bytes: 4
Product Units: Joules * 1.0d5
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4500
Description: The 532 nm transmitted pulse energy in energy units, converted from the counts from the transmitted energy monitor. Averaged over 40 shots.
Comments:

Product Var Name: i_g_IntRet
Is element of: GLA02 Record
Short Description: 532 nm Integrated Return, 40 to 20 KM
Product Data Type: i4b
Total Bytes: 4
Product Units: photons*100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 500000
Description: Sum of raw photon counts (after background is subtracted) over the 20 to 40 km bins.
Comments:

Product Var Name: i_Rng2PCProf
Is element of: GLA02 Record
Short Description: Start Range of 532 nm Backscatter Profile
Product Data Type: i4b
Total Bytes: 4
Product Units: centimeters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 50000000
Product Maximum: 70000000
Description: The range from the spacecraft to the start of the 532 nm backscatter profile - the start of the 40 KM segment of Lidar Data.
Comments: Not valid if APID19 is missing.

Product Var Name: i_Rng_PkRt
Is element of: GLA02 Record
Short Description: Range from spacecraft to peak of return
Product Data Type: i4b
Total Bytes: 4
Product Units: centimeters
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 50000000
Product Maximum: 70000000
Description: Range calculated from the spacecraft to the location of the peak as returned in the telemetry (ground).
Comments:

Product Var Name i40_g_bg
Is element of: GLA02 Record, GLA07 Record
Short Description: 532 nm Background at 40 Hz
Product Data Type: i4b (4, 40)
Total Bytes: 640
Product Units: photons/bin * 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100000
Description: The normalized 532 nm background counts from upper (1) and lower (2) integration intervals.(3) is background used to compute NRB.
Comments: Not valid if APID15 is missing.

Product Var Name i5_g_bg
Is element of: GLA02 Record, GLA07 Record
Short Description: 532 nm Background at 5 Hz
Product Data Type: i4b (4, 5)
Total Bytes: 80
Product Units: photons/bin * 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100000
Description: The normalized 532 nm background counts from upper (1) and lower (2) integration intervals.(3) is background used to compute NRB. Averaged over 8 shots.
Comments: Not valid if APID15 is missing.

Product Var Name i1_g_bg
Is element of: GLA02 Record, GLA07 Record
Short Description: 532nm Background at 1 Hz
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: photons/bin * 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100000
Description: The normalized 532 nm background counts from upper (1) and lower (2) integration intervals. (3) is background used to compute NRB. Averaged over 40 shots.
Comments: Not valid if APID15 is missing.

Product Var Name i_gPredCldTop
Is element of: GLA02 Record
Short Description: 532 nm Predicted Cloud Top Height at 5Hz
Product Data Type: i2b (5)
Total Bytes: 10
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The predicted height of the first cloud above local ground, predicted from the 532 nm lidar signal.
Comments:

Product Var Name i_g_shot_ctr
Is element of: GLA02 Record
Short Description: 532 nm LIDAR Data Shot Counter
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: Corresponds to first value of the 40 -1 km to 10 km aerosol science data. From APID15, Offset 14.
Comments:
Product Var Name: i_SpcmBg2Del
Is element of: GLA02 Record
Short Description: SPCM Background 2 Delay
Product Data Type: i2b
Total Bytes: 2
Product Units: nanoseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: The delay for the background #2 as read from the photon counter board. From APID19, Offset 586.
Comments:

Product Var Name: i_SpcmRngDel
Is element of: GLA02 Record
Short Description: SPCM Range Delay
Product Data Type: i2b
Total Bytes: 2
Product Units: nanoseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: The delay for the range gate as read from the photon counter board. This is the delay from the fire acknowledge to the start of data collection for the 40 KM profile.
Comments:

Product Var Name: i_SpcmGateDel
Is element of: GLA02 Record
Short Description: SPCM Gate Delay
Product Data Type: i2b
Total Bytes: 2
Product Units: nanoseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: The SPCM Gate Delay from the photon counter board. This is the delay from the fire acknowledge prior to enabling the SPCMs.

Comments:

Product Var Name i_SpcmBg1Del
Is element of: GLA02 Record
Short Description: SPCM Background 1 Delay
Product Data Type: i2b
Total Bytes: 2
Product Units: nanoseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: The Background #1 Delay from the photon counter board.

Comments:

Product Var Name i_spcm_stat
Is element of: GLA02 Record
Short Description: SPCM Status
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65280
Description: The status of the SPCM as read from the photon counter board. The Photon Counter Bd address 0xXX800004.

Comments:

Product Var Name i_g_TxNrg_Cts
Is element of: GLA02 Record
Short Description: 532 nm Laser Transmit Energy, counts
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: The 532 nm transmitted pulse energy, in raw counts from the transmitted pulse energy monitor.
Comments:

Product Var Name i_g_TxNrg_qf
Is element of: GLA02 Record, GLA07 Record
Short Description: 532 nm Laser Transmit Energy Quality Flag
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 3
Description: Evaluation of the 532 nm laser transmit energy which is an indication of the laser health; 2 bits per shot for 40 shots; 1 = full laser energy, 2 = marginal laser energy, 3 = deficient laser energy, 0 = not used.
Please see <a href='flags/i_g_TxNrg_qf.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_g_IntRet_qf
Is element of: GLA02 Record
Short Description: Integrated Return Quality Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 5
Description: Assessment of the integrated return value; indicator of boresight accuracy and signal strength. 0 = unused, 1 = excellent, 2 = good, 3 = marginal, 4 = poor, 5 = bad data.
Please see <a href='flags/i_g_IntRet_qf.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_spare2
Is element of: GLA02 Record
Short Description: Spare 2
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_ir_lid_qf
Is element of: GLA02 Record
Short Description: 1064 nm LIDAR Data Quality Flag
Product Data Type: i1b (12)
Total Bytes: 12
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 3
Description: 1064 nm lidar data quality flag. 2 bits per shot for the 40 HZ profile; 2 bits per sum for the 5 Hz profile for a total of 90 bits. The upper 6 bits are spares. A value of 3 indicates the background data is out of bounds (0-255).
Please see <a href='flags/i_ir_lid_qf.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_ir_shot_ctr
Is element of: GLA02 Record
Short Description: 1064 nm Cloud Digitizer Shot Counter
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: Shot number corresponding to first value of the 40 -1 km to 10 km cloud digitizer data.
Comments:

Product Var Name i_spcm_cts
Is element of: GLA02 Record
Short Description: SPCM Raw Counts
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: The raw counts for each photon counter (1-8) from the S? Photon Counter Module.
Comments:

Product Var Name i_pc_rbias
Is element of: GLA02 Record
Short Description: Photon Counter Range Bias
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000000
Product Maximum: 1000000
Description: The range bias of the photon counter; always positive.
Comments:

Product Var Name i40_ir_TxNrgEU
Is element of: GLA02 Record, GLA07 Record
Short Description: 1064 nm Laser Transmit Energy at 40 Hz
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: Joules * 1.0d5
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 9000
Description: The 1064 nm laser pulse energy, computed from the digitized outgoing pulse and the detector temperature.
Comments: Not valid if APID19 and APID12 or APID13 are missing.

Product Var Name i5_ir_TxNrgEU
Is element of: GLA02 Record, GLA07 Record
Short Description: 1064 nm Laser Transmit Energy at 5 Hz
Product Data Type: i4b (5)
Total Bytes: 20
Product Units: Joules * 1.0d5
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 9000
Description: The 1064 nm laser pulse energy, computed from the digitized outgoing pulse and the detector temperature. Averaged over 8 shots.
Comments: Not valid if APID19 and APID12 or APID13 are missing.

Product Var Name i40_ir_bg
Is element of: GLA02 Record, GLA07 Record
Short Description: 1064 nm Background at 40 Hz
Product Data Type: i4b (4, 40)
Total Bytes: 640
Product Units: W*1.0d17
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000000
Product Maximum: 100000000
Description: The normalized 1064 nm background counts from upper (1) and lower (2) integration intervals.(3) is background used to compute NRB.
Comments: Not valid if APID17 is missing.

Product Var Name i5_ir_bg
Is element of: GLA02 Record, GLA07 Record
Short Description: 1064 nm Background at 5 Hz
Product Data Type: i4b (4, 5)
Total Bytes: 80
Product Units: W*1.0d17
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000000
Product Maximum: 100000000
Description: The normalized 1064 nm background counts from upper (1) and lower (2) integration intervals.(3) is background used to compute NRB. Averaged over 8 shots.
Comments: Not valid if APID15 is missing.

Product Var Name i40_ir_lid
Is element of: GLA02 Record
Short Description: 1064 nm LIDAR Data from 10 KM to -1 KM
Product Data Type: i4b (148, 40)
Total Bytes: 23680
Product Units: (W*KM^2)/J)*1.0d8
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000000000
Product Maximum: 1000000000
Description: The normalized lidar signal from the 1064 nm cloud digitizer data for the 10 KM to -1 KM atmospheric segment. Background subtraction, and range squared correction is applied.
Comments:
Short Description: 1064 nm LIDAR Data from 20 KM to 10 KM
Product Data Type: i4b (132, 5)
Total Bytes: 2640
Product Units: (W*KM^2)/J)*10^8
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000000000
Product Maximum: 1000000000
Description: The normalized lidar signal from the 1064 nm cloud digitizer data for the 20 KM to 10 KM atmospheric segment. Background subtraction, and range squared correction is applied.
Comments:

Product Var Name i_CdBg2_Del
Is element of: GLA02 Record
Short Description: Cloud Digitizer Background 2 Delay
Product Data Type: i2b
Total Bytes: 2
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: The delays for background #2 and the range gate from the cloud digitizer board.
Comments:

Product Var Name i_RngGate_Del
Is element of: GLA02 Record
Short Description: Cloud Digitizer Range Gate Delay
Product Data Type: i2b
Total Bytes: 2
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: The delays for background #2 and the range gate from the cloud digitizer board.
Comments:
Product Var Name i_cd_bg1_del
Is element of: GLA02 Record
Short Description: Cloud Digitizer Background 1 Delay
Product Data Type: i2b
Total Bytes: 2
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: The delay for background #1 from the cloud digitizer board.
Comments:

Product Var Name i_cd_det_stat
Is element of: GLA02 Record
Short Description: Cloud Digitizer Detector Status
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: Status of the detector from the cloud digitizer board.
Comments:

Product Var Name i_cd_rbias
Is element of: GLA02 Record
Short Description: Cloud Digitizer Range Bias
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000000
Product Maximum: 1000000
Description: The range bias from the cloud digitizer; always positive.
Comments:

Product Var Name i_cd_ad_out
Is element of: GLA02 Record
Short Description: A/D Output
Product Data Type: i1b
Total Bytes: 1
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: The output from the A/D converter; from the cloud digitizer board. Used for to diagnose problems with the analog path.
Comments:

Product Var Name i_cd_att_set
Is element of: GLA02 Record
Short Description: Attenuation Setting
Product Data Type: i1b
Total Bytes: 1
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: The attenuation setting from the cloud digitizer board.
Comments:

Product Var Name i_CldPkSig
Is element of: GLA02 Record
Short Description: Cloud Return Peak Signal
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: photons / bin
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32
Description: Peak photon count in the 532 nm backscatter data within the range for cloud returns; at the 5 Hz rate.
Comments:

Product Var Name i_gndret_pksig
Is element of: GLA02 Record
Short Description: Ground Return Peak Signal
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: photons / bin
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32
Description: Peak photon count in the 532 nm backscatter data. It is assumed that a ground return causes the maximum signal; at the 5 Hz rate.
Comments:

Product Var Name i_gnd_ret_loc
Is element of: GLA02 Record
Short Description: Ground Return Location
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: bin number
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32
Description: Bin number (from the end of the profile) of the estimated ground return peak signal; at the 5 Hz rate.
Comments:

Product Var Name i_et_cal_mode
Is element of: GLA02 Record
Short Description: Etalon Calibration - Current mode
Product Data Type: i1b
Total Bytes: 1
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Current mode of Etalon calibration: 0 = Off, 1 = Acquire, 2 = Tracking, 3 = Invalid.
Comments:

Product Var Name: i_ir_TxNrg_qf
Is element of: GLA02 Record, GLA07 Record
Short Description: 1064 nm Laser Transmit Energy Quality Flag
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 3
Description: Evaluation of the 1064 nm laser transmit energy which is an indication of the laser health; 2 bits per shot for 40 shots; 1 = full laser energy, 2 = marginal laser energy, 3 = deficient laser energy, 0 = not used.
Please see <a href='flags/i_ir_TxNrg_qf.pdf'> the PDF flag description in the next section for more details.</a>
Comments:

Product Var Name: i_EtHtrC37j_c
Is element of: GLA02 Record, GLA03 Main Record
Short Description: Etalon Heater Current, Ch 37j
Product Data Type: i2b
Total Bytes: 2
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2500
Description: Etalon Heater Current, Ch 37j
Comments:

Product Var Name: i_EtC37d_t
Is element of: GLA02 Record, GLA03 Main Record
Short Description: Etalon Temperature, Ch 37d
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 3000
Description: Etalon Temperature, Ch 37d
Comments:

Product Var Name i_ETsettleTime
Is element of: GLA02 Record
Short Description: Etalon Temperature Settle Time
Product Data Type: i2b
Total Bytes: 2
Product Units: seconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: The commanded time the software will wait after a temperature setpoint is sent to the etalon heater. Integer units in seconds. Applies only to tracking mode.
Comments:

Product Var Name i_et_Flags
Is element of: GLA02 Record
Short Description: Etalon Flags
Product Data Type: i1b
Total Bytes: 1
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: bit 0: Etalon Tracking Low Transmission Flag (= low_tr_on)<br>
0 = GOOD (on-axis transmission is above limit)<br>
1 = LOW (on-axis transmission is below limit)<br>
bit 1: Etalon Tracking Active Flag (= track_ok)
0 = PAUSED   (tracking is paused)<br>
1 = ACTIVE     (tracking is active)<br>
<br>
bit 2: Etalon Test Mode Flag<br>
<br>
0 = NORMAL   (reading data from LMB sensors)<br>
1 = TEST         (using test data values)<br>
<br>
bit 3: Etalon Nonstandard Tracking Mode Flag<br>
<br>
0 = ORIGINAL   (original tracking mode)<br>
1 = MODIFIED   (open-loop or modified closed-loop mode)<br>
<br>
bit 4: Etalon Open-Loop Cycle Update Flag  (= ol_updates)<br>
<br>
0,1 = toggles each time an open-loop cycle starts<br>
Comments:

Product Var Name i_et_update_ctr
Is element of: GLA02 Record
Short Description: Etalon Averaging Update Counter
Product Data Type: i1b
Total Bytes: 1
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Etalon averaging update counter.
Comments:

Product Var Name i_et_StartTemp
Is element of: GLA02 Record
Short Description: Start Temperature
Product Data Type: i1b
Total Bytes: 1
Product Units: Celsius
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Start Temperature
Comments:

Product Var Name: i_et_StopTemp
Is element of: GLA02 Record
Short Description: Stop Temperature
Product Data Type: i1b
Total Bytes: 1
Product Units: Celsius
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Stop Temperature.
Comments:

Product Var Name: i_et_TempStep
Is element of: GLA02 Record
Short Description: Temperature Step
Product Data Type: i1b
Total Bytes: 1
Product Units: Celsius
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Temperature Step
Comments:

Product Var Name: i_et_spare
Is element of: GLA02 Record
Short Description: ET Spare
Product Data Type: i1b (3)
Total Bytes: 3
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA02 et spare.

Product Var Name i_et_acqavg_tm
Is element of: GLA02 Record
Short Description: Etalon Averaging time for acquire command
Product Data Type: i1b
Total Bytes: 1
Product Units: seconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Etalon Averaging Time for Acquire Command.
Comments:

Product Var Name i_spare6
Is element of: GLA02 Record
Short Description: Spare 6
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_et_temperr
Is element of: GLA02 Record
Short Description: Etalon Temperature Error
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Etalon Temperature Error.
Comments:

Product Var Name i_ET_state
Is element of: GLA02 Record
Short Description: Etalon State
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: State of the etalon: 0 = Init, 1 = Set Temp, 2 = Wait, 3 = Average
Comments:

Product Var Name i_spare3
Is element of: GLA02 Record
Short Description: Spare 3
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:
Product Var Name: i_et_acqset_tm
Is element of: GLA02 Record
Short Description: Etalon Temperature Settle time for acquire cmd
Product Data Type: i2b
Total Bytes: 2
Product Units: seconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32767
Description: Etalon Temperature Settle Time for acquire cmd.
Comments:

Product Var Name: i_et_onax_xmit
Is element of: GLA02 Record
Short Description: Etalon Averaged on-axis Transmission
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Etalon Averaged on-axis Transmission.
Comments:

Product Var Name: i_et_offax_xmit
Is element of: GLA02 Record
Short Description: Etalon Averaged off-axis Transmission
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Etalon Averaged off-axis Transmission.
Comments:

Product Var Name i_et_trkfltout
Is element of: GLA02 Record
Short Description: Etalon Tracking Loop Filter output
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Etalon Tracking Loop Filter output.
Comments:

Product Var Name i_et_trkfltavg
Is element of: GLA02 Record
Short Description: Etalon Tracking Failure Average
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Etalon Tracking Failure Average
Comments:

Product Var Name i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections. Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i_OrbFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: POD flag (Orbit Flag)
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Denotes quality of orbit, whether predicted or precision, loss of GPS data, maneuver-degraded, etc. Please see <a href='flags/i_OrbFlg.pdf'>the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_HoffMin
Is element of: GLA02 Record
Short Description: Offset to minimum DEM height
Product Data Type: i2b
Total Bytes: 2
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 12000
Description: Offset to minimum DEM height used in flight algorithm
Comments:

Product Var Name i_Hsat
Is element of: GLA02 Record
Short Description: Geodetic altitude of satellite above earth
Product Data Type: i4b
Total Bytes: 4
Product Units: centimeters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 50000000
Product Maximum: 70000000
Description: Geodetic altitude of satellite above earth's surface computed in real time by the GLAS flight algorithm.
Comments:

Product Var Name i_4nsBgMean
Is element of: GLA02 Record
Short Description: 4ns Background Mean Value
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 65536
Description: 4ns Filter Background mean
Comments:

Product Var Name i_4nsBgSDev
Is element of: GLA02 Record
Short Description: 4ns Background Standard Deviation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 65536
Description: 4ns filter background standard deviation.
Comments:

Product Var Name i_DualPinA
Is element of: GLA02 Record
Short Description: Dual Pin A data
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Dual Pin A data (from APID19, offset 1248)
Comments:

Product Var Name i_DualPinB
Is element of: GLA02 Record
Short Description: Dual Pin B Data
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Dual Pin B data from APID19, Offset 1288
Comments:

Product Var Name i_spare4
Is element of: GLA02 Record
Short Description: Spare 4
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:
Product Var Name i_DitheringEnabledFlag
Is element of: GLA02 Record, GLA07 Record
Short Description: Dithering Enabled Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: Yes
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 1
Description: 0=FALSE, 1=TRUE
Comments: Not valid if APID15 is missing.

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href='flags/i_timecorflg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name spare5
Is element of: GLA02 Record
Short Description: Spare 5
Product Data Type: i1b (12)
Total Bytes: 12
Product Units: n/a
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: n/a
Product Maximaum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA02 spare5.

Product Var Name: i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name: i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: One way transit time
Product Data Type: i2b
Total Bytes: 2
Product Units: microseconds
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4000
Description: One way transit time calculated using the preliminary range offset. This is added to the UTC time tag to get the ground bounce times at which to calculate the orbit
Comments:

Product Var Name i_spare1
Is element of: GLA05 record
Short Description: i_spare1
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_deltagpstmcor
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Delta GPS time correction
Product Data Type: i4b
Total Bytes: 4
Product Units: nanoseconds
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000000
Product Maximum: 1000000
Description: The high frequency delta GPS time correction calculated during the precision orbit processing step.
Comments:

Product Var Name i_dShotTime
Is element of: GLA01 Main Record, GLA04 LPA Main Record, GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Laser Shot Time Deltas (shots 2-40)
Product Data Type: i4b (39)
Total Bytes: 156
Product Units: microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1200000
Description: The time deltas of pulses 2 through 40 to i_UTCTime, the UTC time tag of the first pulse in the 1-second data frame. Adding the deltas to i_UTCTime will give the user the time of each individual shot in the frame.
Comments: To calculate the time for shots 2-40, add these deltas to the time of the first shot.

Product Var Name i_lat
Is element of: GLA05 record
Short Description: Spot Coordinate Data - Latitude (Uncorrected)
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: Microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: The geodetic latitude of the forty laser spots in this record, computed from the Precision orbit, precision attitude, and preliminary range. The preliminary range is used with no geodetic corrections applied.
Comments: This latitude may differ from that on GLA06 and the level 2 elevation products where a corrected range is used in the calculation

Product Var Name i_lon
Is element of: GLA05 record
Short Description: Spot Coordinate Data - Longitude (Uncorrected)
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: Microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000
Description: The longitude of the forty laser spots in this record, computed from the Precision orbit, precision attitude, and preliminary range. The preliminary range is used with no geodetic corrections applied.
Comments: This longitude may differ from that on GLA06 and the level 2 products where a corrected range is used in the calculation

Product Var Name i_elev
Is element of: GLA05 record
Short Description: Spot Surface Elevation with respect to ITRF ellipsoid (Uncorrected)
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -3300000
Product Maximum: 9000000
Description: The surface elevation with respect to ellipsoid of the forty laser spots in this record. The elevation is calculated using the preliminary range, the precision orbit, and precision attitude with no geodetic corrections applied.
Comments: This will differ from the elevation on the elevation products where it is calculated from the range corrected for geodetic affects and measured to a region-type dependent specific location on the received waveform.

Product Var Name i_spare43
Is element of: GLA05 record
Short Description: Spare 43
Product Data Type: i4b (12, 40)
Total Bytes: 1920
Product Units: NA
Invalid Value/Flag: NA
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: NA
Product Maximum: NA
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA05 Spare43

Product Var Name i_sigmaatt
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Quality Indicator
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6000
Description: Attitude quality indicator. Values: 0=good; 50=warning; 100=bad.
Comments: This indicator currently has only 3 values: 0, 50, and 100, leaving open the opportunity to use numbers in between for further resolution of the degradation as our knowledge improves.

Product Var Name i_gval_rcv
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: Gain Value used for Received Pulse
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: counts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Gain value used for received pulse - uncalibrated.
Comments: This value is in counts and needs to be calibrated before calculating energy from it. Same as variable in GLA01_Long/i_gainSet1064.

Product Var Name i_wfnoiseOb1
Is element of: GLA05 record

Short Description: 1064 nm Background noise, (alternate)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.0001 volts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: Either the background noise mean value measured by the instrument, or the background noise calculated from the received echo using alternative parameters. See local flag definition for l_WFqual - a flag is set if the background noise is calculated.
Comments:

Product Var Name i_wfnoiseOb2
Is element of: GLA05 record
Short Description: 1064 nm Background noise, (standard)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.0001 volts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: Either the background noise mean value measured by the instrument, or the background noise calculated from the received echo using standard parameters. See local flag definition for l_WFqual - a flag is set if the background noise is calculated.
Comments:

Product Var Name i_sDevNsOb1
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Standard deviation of 1064 nm Background noise, (alternate)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.0001 volts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The standard deviation of the background noise (alternative parameters).
Comments: Can be used for computing signal-to-noise ratio along with unsmoothed max amplitude.

Product Var Name i_sDevNsOb2
Is element of: GLA05 record
Short Description: Standard deviation of 1064 nm Background noise, (standard)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.0001 volts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The standard deviation of the background noise (standard parameters).
Comments:

Product Var Name i_refRngNs
Is element of: GLA05 record
Short Description: Reference Range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: .01 ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 400000000
Product Maximum: 1000000000
Description: Two-way Reference range in time measured from the centroid of the transmit pulse to the last received echo digitizer gate telemetered (farthest from the spacecraft).
Comments: This is not the range measurement, but a reference value from which the offsets to calculate the range measurement are given. The range measurement will be to a specific location on the received echo that represents the surface response.

Product Var Name i_thRtkRngOff1
Is element of: GLA05 record
Short Description: Threshold Retracker Range Offset (alternative)
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: 0.01 ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the two-way range in time to the threshold retracker location on the received echo calculated using alternative parameters.
Comments: The position on the received echo for threshold retracking is calculated as the first received gate where the voltage is > n*sigma (see ATBD). This is calculated after converting the noise and waveform from counts to voltage.

Product Var Name i_thRtkRngOff2
Is element of: GLA05 record
Short Description: Threshold Retracker Range Offset (standard)
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: 0.01 ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000
Product Maximum: 0

Description: Offset to be added to i_refRng to give the two-way range in time to the threshold retracker location on the received echo using standard parameters.

Comments: The position on the received echo for threshold retracking is calculated as the first received gate where the voltage is > n*sigma (see ATBD). This is calculated after converting the noise and waveform from counts to voltage.

Product Var Name i_minRngOff1
Is element of: GLA05 record
Short Description: Minimum Range Offset (alternative)
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: 0.01 ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000
Product Maximum: 0

Description: Offset to be added to i_refRng to give the two-way range in time to the location on the received echo calculated as the beginning of signal (closest to the spacecraft) using alternate parameters.

Comments: This is calculated after the received echo and noise values are calibrated and converted from counts to voltage as the first received gate where the voltage is > n*sigma (see ATBD). The value of n may be different than threshold retracker.

Product Var Name i_minRngOff2
Is element of: GLA05 record
Short Description: Minimum Range Offset (standard)
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: 0.01 ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the two-way range in time to the location on the received echo calculated as the beginning of signal (closest to the spacecraft) closest to the spacecraft using standard parameters.

Comments: This is calculated after the received echo and noise values are calibrated and converted from counts to voltage as the first received gate where the voltage is > n*sigma (see ATBD). The value of n may be different than threshold retracker.

Product Var Name i_preRngOff1
Is element of: GLA05 record
Short Description: Preliminary Uncorrected Range Offset (alternative)
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: 0.01 ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000
Product Maximum: 0

Description: Offset to be added to i_refRng to give the two-way range in time to the location on the received echo calculated as the end of signal (farthest from the spacecraft) using alternative parameters.

Comments: This is calculated after the received echo and noise values are calibrated and converted from counts to voltage (see ATBD).

Product Var Name i_preRngOff2
Is element of: GLA05 record
Short Description: Preliminary Uncorrected Range Offset (standard)
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: 0.01 ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000
Product Maximum: 0

Description: Offset to be added to i_refRng to give the two-way range in time to the location on the received echo calculated as the end of signal (farthest from the spacecraft) using standard parameters.

Comments: This is calculated after the received echo and noise values are calibrated and converted from counts to voltage (see ATBD). This is the range used to calculate the geodetic coordinates of the footprint and elevations on this record.

Product Var Name i_centroid1
Is element of: GLA05 record
Short Description: Centroid retracker offset (alternative)
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: 0.01 ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000
Product Maximum: 0

Description: Offset to be added to i_refRng to give the two-way range in time to the location of the centroid of the received echo from signal begin through signal end defined by the alternative parameters.

Comments: This is calculated after the received echo and noise values are calibrated and converted from counts to voltage (see ATBD).

Product Var Name i_centroid2
Is element of: GLA05 record
Short Description: Centroid retracker offset (standard)

Product Data Type: i4b (40)
Total Bytes: 160
Product Units: 0.01 ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000
Product Maximum: 0

Description: Offset to be added to i_refRng to give the two-way range in time to the location of the centroid of the received echo from signal begin through signal end defined by the standard parameters.

Comments: This is calculated after the received echo and noise values are calibrated and converted from counts to voltage (see ATBD).

Product Var Name i_centroidInstr
Is element of: GLA05 record
Short Description: Centroid retracker offset using max peak

Product Data Type: i4b (40)
Total Bytes: 160
Product Units: 0.01 ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000
Product Maximum: 0

Description: Offset to be added to i_refRng to give the two-way range in time to the location on the received echo of the centroid of the signal surrounding the maximum amplitude peak.
Comments: This is the definition used by the instrument team to check out the on-board algorithms. See ATBD

Product Var Name i_areaRecWF1
Is element of: GLA05 record
Short Description: Area under received echo (alternative)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 volts * ns
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32766
Description: Area under the received echo from signal begin to signal end using alternative parameters.
Comments: This is calculated after converting the return to voltage.

Product Var Name i_areaRecWF2
Is element of: GLA05 record
Short Description: Area under received echo (standard)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 volts * ns
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32766
Description: Area under the received echo from signal begin to signal end using standard parameters.
Comments: This is calculated after converting the return to voltage.

Product Var Name i_maxRecAmp
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Max Amplitude of Received Echo
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Tenth of millivolts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: Maximum Amplitude of the Received Echo.
Comments: This is calculated after converting the return to voltage. Use for scaling model fit RMS between normalized and un-normalized units.

Product Var Name i_maxSmAmp
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Peak Amplitude of Smoothed Received Echo
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Tenth of millivolts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: The peak amplitude of the received echo after it has been smoothed to remove high frequency noise (see ATBD).
Comments: This is calculated after converting the return to voltage.

Product Var Name i_reflctUncorr
Is element of: GLA05 record
Short Description: Reflectivity not corrected for Atmospheric Effects
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: Unitless*1E06
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100000
Description: Reflectivity, not corrected for atmospheric effects, is calculated as \( \text{Ref} = \frac{R}{T} \), where \( R \) is the received energy after it has been scaled for range, and \( T \) is the transmitted energy. \( i_{\text{recltUncorr}} \) has also been calibrated for gain non-linearity (only for non-saturated waveforms), ground truth calibration and boresight shift shadowing (BSS). It is not corrected for saturation effects. If the shot is saturated (satindex above 2) then to correct for saturation the reflectivity estimate needs to be multiplied by the ratio of the corrected energy to the uncorrected energy (sat corrected reflectivity = \( i_{\text{recltUncorr}} \cdot \frac{i_{\text{RecNrgAll}} + i_{\text{satNrgCorr}}}{i_{\text{RecNrgAll}}} \))

<br>
The atmospheric corrected reflectivity may be calculated from this uncorrected reflectivity by multiplying it by \( d_{\text{reflCor_atm}} \).

<br>
GLA06%i_refcltUC is the same as \( i_{\text{recltUncorr}} \), except that it is invalid when GLA06%d_satNrgCorr is invalid.
Comments: This uses all signal between signal begin and signal end.

Product Var Name: i_reflctuncmxpk
Is element of: GLA05 record
Short Description: Reflectivity Not Corrected For Atmospheric Effects from max peak
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: unitless x 1.E06
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000
Description: Reflectivity, not corrected for atmospheric effects from max peak, is calculated as $\text{Refl} = \frac{R}{T}$, where $R$ is the received energy from the maximum amplitude peak of the waveform after it has been scaled for range, and $T$ is the transmitted energy. $\text{i_reflctuncmxpk}$ has also been calibrated for gain non-linearity (only for non-saturated waveforms), ground truth calibration and boresight shift shadowing (BSS). It is not corrected for saturation effects. If the shot is saturated (satindex above 2) then to correct for saturation the reflectivity estimate needs to be multiplied by the ratio of the corrected energy to the uncorrected energy (sat corrected reflectivity = $\text{i_reflctuncmxpk} \times \frac{(\text{i_RecNrgAll} + \text{i_satNrgCorr})}{\text{i_RecNrgAll}}$).

The atmospheric corrected reflectivity may be calculated from this uncorrected reflectivity by multiplying it by $d_{\text{reflCorAtm}}$.

Comments: This uses only the signal surrounding the maximum peak.

Product Var Name: i_tpCentX
Is element of: GLA05 record
Short Description: LPA Centroid X
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: arcsec x 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32766
Description: X position of the centroid of the transmit pulse in the LPA, in arcsec from the left edge of the LPA (outer edge of pixel column 0). From ANC09.

Comments:
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: arcsec*10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32766
Description: Y position of the centroid of the transmit pulse in the LPA, in arcsec from the upper edge of the LPA (outer edge of pixel row 0). From ANC09.
Comments:

Product Var Name i_nPeaks1
Is element of: GLA05 record, GLA06 record, GLA14 Record
Short Description: Initial Number of Peaks in received echo (alternate)
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 50
Description: The initial number of peaks of the received echo; determined from the smoothed waveform, using alternative parameters
Comments:

Product Var Name i_nPeaks2
Is element of: GLA05 record
Short Description: Initial Number of Peaks in received echo (standard)
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 50
Description: The initial number of peaks found in the received echo; determined from the smoothed waveform, using standard parameters
Comments:
Product Var Name i_parm1
Is element of: GLA05 record
Short Description: Parameters from the Gaussian fit to the received echo (alternative)
Product Data Type: i4b (19, 40)
Total Bytes: 3040
Product Units: 0.0001 volts, 6 * (0.0001 volts, 0.01 ns, 0.01 ns)
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -30, 6 * (0, -100000, 0)
Product Maximum: 30000, 6 * (30000, 0, 32766)

Description: Parameters (in physical units) determined from the fit of the received echo using the alternative parameterization. In the order of: item1=noise (millivolts), then 6 sets of three Gaussian parameters (subitem1=amplitude (millivolts), subitem2=peak location (ns), and subitem3=sigma (ns)). Items 2-4 are the Gaussian parameters for the last (closest-to-the-ground or 1st) peak. Items 5-7 are the Gaussian parameters for the next-to-last (2nd) peak. Items 17-19 are the Gaussian parameters for the closest-to-the-satellite peak. If there are fewer than six peaks, the unused parameters are set invalid. Adding the location to i_refRng gives the two-way range in time to the center of that peak.

Comments: The received echo was calibrated and converted from counts to voltage using table in header records before the fit was performed.

Product Var Name i_parm2
Is element of: GLA05 record
Short Description: Parameters from Gaussian fit to the received echo (standard)
Product Data Type: i4b (19, 40)
Total Bytes: 3040
Product Units: 0.0001 volts, 6 * (0.0001 volts, 0.01 ns, 0.01 ns)
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -30, 6 * (0, -100000, 0)
Product Maximum: 30000, 6 * (30000, 0, 32766)

Description: Parameters (in physical units) determined from the fit of the received echo using the standard parameterization. In the order of: item1=noise (millivolts), then 6 sets of Gaussian parameters (subitem1=amplitude (millivolts), subitem2=peak location (ns), and subitem3=sigma (ns)). Items 2-4 are the Gaussian parameters for the last (closest-to-the-ground or 1st) peak. Items 5-7 are the Gaussian parameters for the next-to-last (2nd) peak. Items 17-19 are the Gaussian parameters for the closest-to-the-satellite peak. If there are fewer than six peaks, the unused parameters are set invalid. Adding the location to i_refRng gives the two-way range in time to the center of that peak.

Comments: The received echo was calibrated and converted from counts to voltage using table in header records before the fit was performed.

Product Var Name i_solnSigmas1
Is element of: GLA05 record
Short Description: Sigmas of fit parameters (alternative)
Product Data Type: i2b (19, 40)
Total Bytes: 1520
Product Units: 0.0001 volts, 6 * (0.0001 volts, 0.001 ns, 0.001 ns)
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000, 6 * (30000, 3000, 3000)
Description: Standard deviation of each fit parameter from diagonal of final covariance matrix from alternative parameterization. In the order of: item1=noise (millivolts), then 6 sets of three parameters (subitem1=amplitude (millivolts), subitem2=peak location (ns), and subitem3=sigma (ns)). Items 2-4 are the parameters for the last (closest-to-the-ground or 1st) peak. Items 5-7 are the parameters for the next-to-last (2nd) peak. Items 17-19 are the parameters for the closest-to-the-satellite peak. If there are fewer than six peaks, the unused parameters are set invalid.
Comments: Note that the received echo was calibrated and converted from counts to voltage using table in header records before the fit was performed.

Product Var Name i_solnSigmas2
Is element of: GLA05 record
Short Description: Sigmas of fit parameters (standard)
Product Data Type: i2b (19, 40)
Total Bytes: 1520
Product Units: 0.0001 volts, 6 * (0.0001 volts, 0.001 ns, 0.001 ns)
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000, 6 * (30000, 3000, 3000)
Description: Standard deviation of each fit parameter from diagonal of final covariance matrix from standard parameterization. In the order of: item1=noise (millivolts), then 6 sets of three parameters (subitem1=amplitude (millivolts), subitem2=peak location (ns), and subitem3=sigma (ns)). Items 2-4 are the parameters for the last (closest-to-the-ground or 1st) peak. Items 5-7 are the parameters for the next-to-last (2nd) peak. Items 17-19 are the parameters for the closest-to-the-satellite peak. If there are fewer than six peaks, the unused parameters are set invalid.
Comments: Note that the received echo was calibrated and converted from counts to voltage using table in header records before the fit was performed.

Product Var Name i_wfFitSDev_1
Is element of: GLA05 record
Short Description: The received echo fit standard deviation (alternative)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The standard deviation of the difference between the functional fit and the received echo using alternative parameters.
Comments: Note that the received echo was calibrated and converted from counts to voltage using table in header records before the fit was performed.

Product Var Name i_wfFitSDev_2
Is element of: GLA05 record
Short Description: The received echo fit standard deviation (standard)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: microvolts*10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The standard deviation of the difference between the functional fit and the received echo using the standard parameters
Comments: Note that the received echo was calibrated and converted from counts to voltage using table in header records before the fit was performed.

Product Var Name i_tpintensity
Is element of: GLA05 record
Short Description: Transmit pulse intensity
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: counts
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 25500
Description: Transmit pulse intensity as measured by the LPA. From ANC09.
Comments:

Product Var Name i_tpazimuth
Is element of: GLA05 record
Short Description: Transmit pulse azimuth
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: deg*10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Transmit pulse azimuth. Angle eastwards from north of the major axis of the transmit pulse, as seen by the LPA. From ANC09.
Comments:

Product Var Name i_tpeccentricity
Is element of: GLA05 record
Short Description: Transmit pulse eccentricity
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: e*1000
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: Transmit pulse eccentricity as measured by the LPA. From ANC09.
Comments:

Product Var Name i_tpmajoraxis
Is element of: GLA05 record
Short Description: Transmit pulse major axis
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: cm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Transmit pulse major axis as measured by the LPA. From ANC09.
Comments:
Product Var Name i_skew1
Is element of: GLA05 record, GLA14 Record
Short Description: Skewness of Received Echo (alternative)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Skewness of the received echo from signal begin to signal end using alternative parameters
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_kurt1
Is element of: GLA05 record, GLA14 Record
Short Description: Kurtosis of Received Echo (alternative)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 1000
Description: Kurtosis of the received echo from signal begin to signal end using alternative parameters
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_skew2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Skewness
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The skewness of the received echo from signal begin to signal end using standard parameters.
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_kurt2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Kurtosis of the Received Echo (standard)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 1000
Description: Kurtosis of the received echo from signal begin to signal end using standard parameters
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_WFqual
Is element of: GLA05 record
Short Description: Received Echo Quality Flag
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Indicator of the quality of the received echo (waveform); determined during the received echo assessment process, and the functional fit. Each 4 byte integer represents 32 bits of flag information. For definitions of each bit,
Please see <a href="flags/i_WFqual.pdf"> the PDF flag description in the next section.
Comments:

Product Var Name i_TxNrg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: 1064 nm Laser Transmit Energy
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 millijoules
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 32766  
Description: The 1064 nm laser pulse transmitted energy in energy units, computed from the digitized outgoing pulse, and the transmit gain.  
Comments:  

Product Var Name i_tpOrX  
Is element of: GLA05 record  
Short Description: Pulse Orientation  
Product Data Type: i2b (40)  
Total Bytes: 80  
Product Units: degrees*10  
Invalid Value/Flag: gi_invalid_i2b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 3600  
Description: Pulse Orientation (Angle measured counter-clockwise from LPA X-axis)  
Comments:  

Product Var Name i_locTr  
Is element of: GLA05 record  
Short Description: Centroid of Transmitted Pulse in time relative to gate 1 of tr wf  
Product Data Type: i4b (40)  
Total Bytes: 160  
Product Units: 0.01 ns  
Invalid Value/Flag: gi__invalid_i4b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 4800  
Description: Time from gate 1 of the transmitted pulse to the centroid of transmitted pulse calculated from 48 gates telemetered  
Comments: Note that the pulse was calibrated and converted to voltage before calculation.  

Product Var Name i_parmTr  
Is element of: GLA05 record  
Short Description: Parameters of the Gaussian fit to the Transmitted Pulse  
Product Data Type: i4b (4, 40)  
Total Bytes: 640
Product Units: microvolts*100, microvolts*100, 0.01 ns, 0.01 ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -30, -30, 0, 0
Product Maximum: 30000, 30000, 4800, 32766
Description: Parameters from the Gaussian fit to the transmitted pulse: item1=noise (millivolts), item2=amplitude (millivolts), item3=peak location (ns), and item 4=sigma (ns). Peak location is relative to gate 1 of the transmit pulse.
Comments: Note that the pulse was calibrated and converted to voltage before calculation.

Product Var Name i_sDevFitTr
Is element of: GLA05 record
Short Description: Standard deviation of fit of transmitted pulse
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: microvolts*10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: Standard deviation of fit of a gaussian model to the transmitted pulse
Comments: Note that the pulse was calibrated and converted to voltage before calculation.

Product Var Name i_skewTr
Is element of: GLA05 record
Short Description: Skewness of Transmitted Pulse
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: NA
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 1000
Description: Skewness of transmitted pulse
Comments: Note that the pulse was calibrated and converted to voltage before calculation.

Product Var Name i_maxTrAmp
Is element of: GLA05 record
Short Description: Maximum Amp of Transmitted Pulse
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.1 millivolts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: Maximum amplitude of transmitted pulse calculated from all (48) gates telemetered
Comments: Note that the pulse was calibrated and converted to voltage before calculation.

Product Var Name i_gval_tx
Is element of: GLA05 record

Short Description: Gain Value used for Transmitted Pulse - uncalibrated
Product Data Type: i2b
Total Bytes: 2
Product Units: counts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Gain value used for transmitted pulse - uncalibrated
Comments: This value is in counts and needs to be calibrated before calculating energy from it. Same as variable in GLA01_Main/i_ADdetOutGn.

Product Var Name i_compRatio
Is element of: GLA01 Main Record, GLA05 record
Short Description: Compression Ratios
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: unitless
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 5
Description: Averaging values p and q for frame. First item is p; second is q. From APID19, Offset 232. First N downlink samples are generated by averaging p raw digitized elements and the rest of the allocated samples in the waveform by averaging q elements.
Comments: Not valid if APID19 is missing.

Product Var Name i_N_val
Is element of: GLA01 Main Record, GLA05 record
Short Description: Value of N
Product Data Type: i2b
Total Bytes: 2
Product Units: gates
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 544
Description: Value of N used for waveform compression for the frame. From APID19, Offset 236.
Comments: Not valid if APID19 is missing.

Product Var Name i_r_val
Is element of: GLA01 Main Record, GLA05 record
Short Description: Value of r
Product Data Type: i2b
Total Bytes: 2
Product Units: unitless
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 8
Description: Value of r used for waveform compression for frame. From APID19, Offset 238. Not valid if APID19 is missing.
Comments: After M shots with no valid return, the 'p' and 'q' averaging of the normal downlinked waveform compression type will be overridden and instead the telemetered received echo will consist of average samples averaged over 'r' raw samples.

Product Var Name i_ElvuseFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation use flag
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating whether the elevations on this record should be used or not (1 bit set/shot). See the <a href='flags/i_ElvuseFlg.pdf'>PDF file</a> for more information.
Comments:

Product Var Name i_spare3
Is element of: GLA05 record
Short Description: Spare 3
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_ElvFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation Definition Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 127
Description: Indicates how location on the received echo was determined to calculate the elevation on the record. Please see <a href='flags/i_ElvFlg.pdf'>the PDF flag description in the next section</a> for more details. 'For GLA05, 06 and 12,13,14 and 15, bits are set to reflect the range offset used for that products elevation. Although defined as a pass-thru, the values are different on GLA06/12,13,15 and GLA14.'
Comments:

Product Var Name i_spare49
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 49
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href='flags/i_timecorflg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections.
Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i_AttFlg2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Flag 2
Product Data Type: i1b (20)
Total Bytes: 20
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Denotes at 40/sec rate whether precision attitude was used to determine spot location, and if problems with LPA, etc.
Please see <a href='flags/i_AttFlg2.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_spare4
Is element of: GLA05 record
Short Description: Spare 4
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_FrameQF
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Altimeter Frame Quality Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Denotes all bad data (no signal in whole frame), or all data good and all science team recommended corrections applied
Please see <a href='flags/i_FrameQF.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_OrbFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: POD flag (Orbit Flag)
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Denotes quality of orbit, whether predicted or precision, loss of GPS data, maneuver-degraded, etc.
Please see <a href='flags/i_OrbFlg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_rngCorrFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Correction Flag
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Denotes which geophysical or instrument corrections have been applied to the range in the calculation of the elevation on this record.
Please see <a href='flags/i_rngCorrFlg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_spare5
Is element of: GLA05 record
Short Description: Spare 5
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: NA
Product Maximum: NA
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_beam_coelev
Is element of: GLA05 record, GLA07 Record
Short Description: Co-elevation
Product Data Type: i4b
Total Bytes: 4
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: Co-elevation (CE) is direction from vertical of the laser beam as seen by an observer located at the laser ground spot.
Comments:

Product Var Name i_beam_azimuth
Is element of: GLA05 record, GLA07 Record
Short Description: Azimuth
Product Data Type: i4b
Total Bytes: 4
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: The direction, eastwards from north, of the laser beam vector as seen by an observer at the laser ground spot viewing toward the spacecraft (i.e., the vector from the ground to the spacecraft). When the spacecraft is precisely at the geodetic zenith, the value will be 99999 degrees.
Comments:

Product Var Name i_AttFlg1
Is element of: GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Flag 1
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: At 1/sec denotes large off-nadir angle, ocn sweep, target of opportunity, steering to reference track. Please see <a href='flags/i_AttFlg1.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_RMSpulseWd
Is element of: GLA05 record
Short Description: RMS Pulse Width
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 100 ns
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: The RMS width of the entire received waveform. See Eq 5 of ATBD for Derivation of Range.
Comments:

Product Var Name i_satNdx
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Index
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: ns
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 126
Description: The count of the number of gates in a waveform which have an amplitude greater than or equal to i_satNdxTh (set in anc07_0004). The value 126 means 126 or more gates are above the saturation index threshold (i_satNdxtth).
Comments:

Product Var Name i_RecNrgAll
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Received Energy signal begin to signal end
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 fJoules
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32000
Description: This is a pass through of gla01%d_recNrgAll_EU, but stored in different units on the product. This is calculated by taking the area under the received waveform (referenced to the observed noise) from all responses between the noise crossing before the first threshold crossing and the noise crossing after the last threshold crossing. It is a rescaled value of GLA01 parameter d_recNrgAll_EU and is not recomputed.
Comments:

Product Var Name i_numIters
Is element of: GLA05 record
Short Description: Number of iterations performed during fit
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 15
Description: The algorithm variable gla05%i_numIters(40,2) contains the number of iterations for both the standard fit (shot,2), and the alternate fit (shot,1). These numbers are packed into forty bytes on the product:
GLA05_prod%i_numIters(1) contains:
bits 0-3: number of iterations for alternate fit for shot 1,
bits 4-7: number of iterations for standard fit for shot 1
GLA05_prod%i_numIters(2) contains:
bits 0-3: number of iterations for alternate fit for shot 2,
bits 4-7: number of iterations for standard fit for shot 2
GLA05_prod%i_numIters(40) contains:
bits 0-3: number of iterations for alternate fit for shot 40,
bits 4-7: number of iterations for standard fit for shot 40

Comments:

Product Var Name i_spare6
Is element of: GLA05 record
Short Description: Spare 6
Product Data Type: i1b (70)
Total Bytes: 70
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: NA
Product Maximum: NA
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_transtime
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: One way transit time
Product Data Type: i2b
Total Bytes: 2
Product Units: microseconds
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4000
Description: One way transit time calculated using the preliminary range offset. This is added to the UTC time tag to get the ground bounce times at which to calculate the orbit
Comments:

Product Var Name i_Spare1
Is element of: GLA06 record
Short Description: Spare 1
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: N/A
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA06 spare1.

Product Var Name i_deltagpstmcor
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Delta GPS time correction
Product Data Type: i4b
Total Bytes: 4
Product Units: nanoseconds
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000000
Product Maximum: 1000000
Description: The high frequency delta GPS time correction calculated during the precision orbit processing step.
Comments:

Product Var Name i_dShotTime
Is element of: GLA01 Main Record, GLA04 LPA Main Record, GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Laser Shot Time Deltas (shots 2-40)
Product Data Type: i4b (39)
Total Bytes: 156
Product Units: microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1200000
Description: The time deltas of pulses 2 through 40 to i_UTCTime, the UTC time tag of the first pulse in the 1-second data frame. Adding the deltas to i_UTCTime will give the user the time of each individual shot in the frame.
Comments: To calculate the time for shots 2-40, add these deltas to the time of the first shot.

Product Var Name i_lat
Is element of: GLA06 record
Short Description: Spot 1 Coordinate Data, Latitude Corrected
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: The geodetic latitude of the 40 laser spots in the 1 second time frame, computed from the Precision orbit, precision attitude, and ice-sheet specific range after instrument corrections, atmospheric delays and tides have been applied. The values are in degrees North.
Comments:

Product Var Name i_lon
Is element of: GLA06 record
Short Description: Spot 1 Coordinate Data, Longitude Corrected
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000
Description: The longitude of the 40 laser spots in the 1 second time frame, computed from the Precision orbit, precision attitude, and ice-sheet specific range after instrument corrections, atmospheric delays and tides have been applied. The values are in east longitude.
Comments:

Product Var Name i_elev
Is element of: GLA06 record
Short Description: Surface Elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500000
Product Maximum: 10000000
Description: Surface elevation with respect to the ellipsoid at the spot location determined by the ice-sheet specific range after instrument corrections, atmospheric delays and tides have been applied. The saturation elevation correction (i_satElevCorr) has not been applied and needs to be added to this elevation. This can be over a one meter correction. If it is invalid then the elevation should not be used. The saturation correction flag (i_satCorrFlg) is an important flag to understand the possible quality of the elevation data. The saturation index (i_satNdx) can be used for more understanding of concerns on data quality from saturation effects. Also no correction for pulse spreading from forward scatter has been applied.

Comments:

Product Var Name i_campaign
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Campaign
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: INT(ICHAR(1A))
Product Maximum: INT(ICHAR(3K))
Description: The campaign. ie: for campaign L1A, it will be '1A'.
Comments:

Product Var Name i_spare40
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 40
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 40.

Product Var Name i_cycTrk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Cycle and Track
Product Data Type: i4b
Total Bytes: 4
Product Var Name i_localSolarTime
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Local apparent solar time
Product Data Type: i4b
Total Bytes: 4
Product Units: seconds*1000
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 86400000
Description: Local apparent solar time.
Comments:

Product Var Name i_spare41
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 41
Product Data Type: i4b (7)
Total Bytes: 28
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information. Comments: Spare 41.

Product Var Name i_deltaEllip
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Delta Ellipsoid
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -9000
Product Maximum: 9000
Description: Surface Elevation (T/P ellipsoid) minus Surface Elevation (WGS84 ellipsoid).
Comments:

Product Var Name i_beamCoelv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Co-elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: Co-elevation (CE) is direction from vertical of the laser beam as seen by an observer located at the laser ground spot. 40 Hz.
Comments:

Product Var Name i_beamAzimuth
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Azimuth
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: The direction, eastwards from north, of the laser beam vector as seen by an observer at the laser ground spot viewing toward the spacecraft (i.e., the vector from the ground to the spacecraft). When the spacecraft is precisely at the geodetic zenith, the value will be 99999 degrees. 40 Hz.
Comments:

Product Var Name i_d2refTrk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Distance to the reference ground track
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: m*1000
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000000
Description: Distance to the reference ground track.
Comments:

Product Var Name i_SigBegOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Signal Begin Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the range in distance to the location on the received echo calculated as the beginning of signal (closest to the spacecraft) using standard parameters.
Comments:

Product Var Name i_DEM_hires_src
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: High Resolution Source Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Flag to specify who the source provider was for the high resolution DEM. 
0 = no high res source available
1 = unfinished research   Shuttle Radar Topography Mission (SRTM)<br>
C-band 90 m DEM produced by JPL (+-1.1km E-W swath)<br>
2 = finished   SRTM C-band 90 m DEM produced by NGA (+-2.1km E-W swath)<br>
3 = ICESat Greenland V1 1km DEM<br>
4 = ICESat Antarctica V1 500m DEM<br>
5 = 90m Canadian Digital Elevation Data (CDED)<br>
6 = 90m Canadian Digital Elevation Data (CDED) if available otherwise finished   SRTM C-band 90 m DEM<br>

Comments: DEM elevations are referenced to the TOPEX/Poseidon ellipsoid and are directly comparable to the elevation on the GLAS products.

Product Var Name i_DEMhiresArElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: DEMhiresArElv
Product Data Type: i2b (9, 40)
Total Bytes: 720
Product Units: meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500
Product Maximum: 1300
Description: d_DEMhiresArElv is a 3 X 3 X 40 array of high resolution DEM values. The 1-40 index corresponds to 1/40 second samples. The 1-9 index corresponds to the position of the DEM value relative to the spot. Given the first 1/40 second of data, positional correspondence of the DEM element to the spot is as follows:<br>

The 9 points on the product correspond to the 3x3 points in the alg variable as follows:<br>

The 9 points on the product correspond to the 3x3 points in the alg variable as follows:<br>

Product Var Name i_ElevBiasCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation Bias Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 3000
Description: Correction to elevation based on post flight analysis for biases determined for each campaign. This bias correction has not been applied to the data so to apply it SUBTRACT the correction from the range estimate. To apply the correction to the elevations it must be ADDED to the elevation estimates.
Comments: See the altimeter user guide for full description.

Product Var Name i_spare42
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 42
Product Data Type: i2b (4, 40)
Total Bytes: 320
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 42

Product Var Name i_sigmaatt
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Quality Indicator
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6000
Description: Attitude quality indicator. Values: 0=good; 50=warning; 100=bad.
Comments: This indicator currently has only 3 values: 0, 50, and 100, leaving open the opportunity to use numbers in between for further resolution of the degradation as our knowledge improves.

Product Var Name i_Azimuth
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Local Azimuth
Product Data Type: i4b
Total Bytes: 4
Product Units: millideg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000
Description: Mean azimuth measured clockwise from north based on latitude, longitude, and elevation of a 1 second interval of the trace of the ground footprint-center.
Comments:

Product Var Name i_SolAng
Is element of: GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Solar Angle
Product Data Type: i4b
Total Bytes: 4
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Solar Angle above or below the plane tangent to the ellipsoid surface at the laser spot. Positive values mean the sun is above the horizon, while negative values mean it is below the horizon. The effect of atmospheric refraction is not included. This is a low-precision value, with approximately one degree accuracy.
Comments:

Product Var Name i_tpintensity_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse intensity - frame avg
Product Data Type: i4b
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 25500
Description: Transmit pulse intensity as measured by the LPA. Average over the 1-second frame. From ANC09.
Comments:

Product Var Name i_tpazimuth_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse azimuth - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees*10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Transmit pulse azimuth. Average over the 1-second frame. Angle eastwards from north of the major axis of the transmit pulse, as seen by the LPA. From ANC09.
Comments:

Product Var Name i_tpeccentricity_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse eccentricity - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: Unitless*1000
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: Transmit pulse eccentricity as measured by the LPA. Average over the 1-second frame. From ANC09.
Comments:

Product Var Name i_tpmajoraxis_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse major axis - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: cm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Transmit pulse major axis as measured by the LPA. Average over the 1-second time frame. From ANC09.
Comments:

Product Var Name i_poTide
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Pole Tide
Product Data Type: i2b
Total Bytes: 2
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Pole tide: an ocean tide which is the result of the Chandler wobble (a free nutation of the Earth caused by fluctuating pressure on the bottom of the ocean, caused by temperature and salinity changes and wind-driven changes in the circulation of the oceans).
Comments:

Product Var Name i_gdHt
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Geoid
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: cm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -20000
Product Maximum: 20000
Description: The height of the geoid above the ellipsoid for the first and last shot in the record.
Comments:
Product Var Name i_erElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Solid Earth Tide Elevation (at first & last shot)
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The solid earth tide elevation for the first & last shot in the record.
Comments:

Product Var Name i_spElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Tide Elevations, Specific
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: A tide elevation calculated from alternate tide models for specific regions for shots 1, 11, 21, and 31.
Comments:

Product Var Name i_ldElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Load Tide Elevation
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The load tide elevation applied to each shot. Elements 1-4 of the load tide vector are applied to shots 1-10, 11-20, 21-30, and 31-40, respectively.
Comments: The load tide is NOT NECESSARILY the load tide for shots 1,11,21,31. It is calculated for the first valid shot in each group of 10 and applied to all valid shots in the group.

Product Var Name: i_spare12
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spares 12
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: None
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name: i_wTrop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Correction_Wet Troposphere
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 0
Description: The range correction due to the wet troposphere at first & last shot.
Comments:

Product Var Name: i_dTrop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Range Correction, Dry Troposphere
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -2500
Product Maximum: 0
Description: The range correction due to the dry troposphere; one correction for each shot. Validity is based on results of finding a range with the standard fit.
Comments:

Product Var Name i_surfType
Is element of: GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Region Type
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 15
Description: Describes the region type or types associated with each shot: Ice Sheet, ocean, sea ice, or Land. Please see <a href='flags/i_surfType.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_spare11
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spare 11
Product Data Type: i1b (3)
Total Bytes: 3
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_DEM_elv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: DEM Elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: cm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -50000
Product Maximum: 1000000

Description: Elevation at the footprint location from the SRTM30 (GTOPO30 + SRTM) Digital Elevation Model (DEM). The reference frame for the DEM elevation was changed to the TOPEX/Poseidon ellipsoid to make it consistent with the GLAS elevations.

Comments:

Product Var Name i_refRng
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Reference Range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 400000000
Product Maximum: 1000000000

Description: Range in distance calculated from the time between the centroid of the transmit pulse and the farthest gate from the spacecraft of the received pulse. See the rngcorrflg to determine any corrections that have been applied.

Comments:

Product Var Name i_TrshRngOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Threshold Retracker Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0

Description: Offset to be added to i_refRng to give the range in distance to the threshold retracker location on the received echo using standard parameters.
Comments:

Product Var Name i_spare47
Is element of: GLA06 record, GLA14 Record
Short Description: Spare 47
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_SigEndOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Signal End Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the range in distance to the location on the received echo calculated as the end of signal (farthest from the spacecraft) using standard parameters.
Comments:

Product Var Name i_cntRngOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Centroid Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the range in distance to the location of the centroid of the received echo from signal begin through signal end defined by the standard parameters.
Comments:

Product Var Name: i_reflctUC
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: reflctUC
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: Unitless*1E06
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000
Description: Reflectivity, not corrected for atmospheric effects, is calculated as \( R / T \), where \( R \) is the received energy after it has been scaled for range, and \( T \) is the transmitted energy. \( i_{\text{reflctUC}} \) has also been calibrated for gain non-linearity (only for non-saturated waveforms), ground truth calibration and boresight shift shadowing (BSS). It is not corrected for saturation effects. If the shot is saturated (satindex above 2) then to correct for saturation the reflectivity estimate needs to be multiplied by the ratio of the corrected energy to the uncorrected energy (sat corrected reflectivity = \( i_{\text{reflctUC}} \times (i_{\text{RecNrgAll}} + i_{\text{satNrgCorr}}) / i_{\text{RecNrgAll}} \)).

The atmospheric corrected reflectivity may be calculated from this uncorrected reflectivity by multiplying it by \( d_{\text{reflCor_atm}} \).

\( i_{\text{reflctUC}} \) is invalid where GLA06%d_satNrgCorr is invalid.
Comments: This uses all signal between signal begin and signal end.

Product Var Name: i_reflCor_atm
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Reflectivity Correction Factor For Atmospheric Effects
Product Data Type: i4b
Total Bytes: 4
Product Units: Unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 250
Description: This reflectance correction factor is calculated as \( 1 / e^{-(2(tc+ta+tp+tm))} \), where \( tc \) is the cloud (column) integrated optical depth, \( ta \) is the aerosol (column) integrated optical depth, \( tp \) is the planetary boundary
layer optical depth, and tm is the molecular optical depth. tm is a constant equal to -log(gd_T_RTatm)/2, where

gd_T_RT_atm = 0.98 is defined in const_elev_mod.f90 or read from ANC07-03. The attenuation correction factor
has been corrected for multiple scattering. The reflectance has been corrected for waveform saturation.

Comments:

Product Var Name: i_maxSmAmp
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Peak Amplitude of Smoothed Received Echo
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Tenth of millivolts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: The peak amplitude of the received echo after it has been smoothed to remove high frequency noise (see ATBD).
Comments: This is calculated after converting the return to voltage.

Product Var Name: i_ocElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Ocean Tide Elevation
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The ocean tide elevation from the TPX07.1 tide model.
Comments:

Product Var Name: i_numPk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Number of Peaks found in the Return
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6
Description: The number of peaks in the return echo found by the Gaussian fitting procedure, using standard parameters.
Comments:

Product Var Name i_kurt2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Kurtosis of the Received Echo (standard)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 1000
Description: Kurtosis of the received echo from signal begin to signal end using standard parameters
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_skew2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Skewness
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The skewness of the received echo from signal begin to signal end using standard parameters.
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_spare4
Is element of: GLA06 record, GLA12 Record, GLA14 Record, GLA15 Record
Short Description: Spare 4
Product Data Type: i1b (160)
Total Bytes: 160
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_isRngOff
Is element of: GLA06 record, GLA12 Record, GLA14 Record
Short Description: Ice Sheet Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range offset to be added to i_refRng to calculate the range using the algorithm deemed appropriate for ice sheets.
Comments: Can be used for comparing elevations computed from results standard and alternate fitting.

Product Var Name i_siRngOff
Is element of: GLA06 record, GLA13 Record
Short Description: Sea Ice Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range offset to be added to i_refRng to calculate the range using the algorithm deemed appropriate for sea ice.
Comments:

Product Var Name i_idRngOff
Is element of: GLA06 record, GLA14 Record
Short Description: Land Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range offset to be added to \textit{i} \_\textit{refRng} to calculate the range using the algorithm deemed appropriate for land.
Comments:

Product Var Name \textit{i} \_\textit{ocRngOff}
Is element of: GLA06 record, GLA15 Record
Short Description: Ocean Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range offset to be added to \textit{i} \_\textit{refRng} to calculate the range using the algorithm deemed appropriate for oceans.
Comments:

Product Var Name \textit{i} \_\textit{nPeaks1}
Is element of: GLA05 record, GLA06 record, GLA14 Record
Short Description: Initial Number of Peaks in received echo (alternate)
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 50
Data Dictionary The GLAS Standard Data Products Specification - Data Dictionary

Description: The initial number of peaks of the received echo; determined from the smoothed waveform, using alternative parameters

Comments:

Product Var Name i_ElvuseFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation use flag
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating whether the elevations on this record should be used or not (1 bit set/shot). See the <a href='flags/i_ElvuseFlg.pdf'>PDF file</a> for more information.

Comments:

Product Var Name i_atm_avail
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Availability Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Please see <a href='flags/i_atm_avail.pdf'> the PDF flag description in the next section for more details.</a>

Comments:

Product Var Name i_spare16
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 16
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_cld1_mswf
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Cloud Multiple Scattering Warning Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: The multiple scattering warning flag (MSWF) is based on the total column optical depth (aerosol plus cloud) calculated in GLA11 using 532nm. It is intended as a way to quickly obtain information about the potential severity of multiple scattering with regards to the range-to-surface calculated by the altimetry processing software. It will be output on the GLA11 product for use by the altimetry group. The multiple scattering warning flag will have values ranging from 0-14, based on the total column optical depth as detailed in the PDF.
A warning flag value of 15 will signify ?invalid?. An invalid will be encoded if an optical depth in any of the layers in the 1-second column could not be calculated. This usually occurs in a very optically ?thick? cloud which extinguishes the signal. It could also occur if the extinction-to-backscatter ratio assignment is set too high, causing the transmission calculations in the lidar inversion to go out-of-range. Please see <a href='flags/i_cld1_mswf_elv.pdf'>the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_MRC_af
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Medium Resolution Cloud Availability Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Tells how many cloud layers were found at this resolution from the 532 nm channel. Please see <a href='flags/i_MRC_af.pdf'> the PDF flag description in the next section </a> for more details. This parameter is extracted from the i_MRCL_flag on GLA09.

Comments:

Product Var Name: i_spare9
Is element of: GLA06 record, GLA12 Record, GLA14 Record
Short Description: Spare 9
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: null
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: null
Product Maximum: null

Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name: i_ElvFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation Definition Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 127

Description: Indicates how location on the received echo was determined to calculate the elevation on the record. Please see <a href='flags/i_ElvFlg.pdf'> the PDF flag description in the next section </a> for more details. 'For GLA05, 06 and 12,13,14 and 15, bits are set to reflect the range offset used for that products elevation. Although defined as a pass-thru, the values are different on GLA06/12,13,15 and GLA14.'

Comments:

Product Var Name: i_rng_UQF
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Offset Quality/Use Flag
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Data quality flag for the range offsets on this record.
Please see <a href='flags/i_rng_UQF.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_spare49
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 49
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href='flags/i_timecorflg.pdf'> the PDF flag description in the next section for more details.
Comments:
Data Dictionary

Product Var Name: i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections.
Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name: i_AttFlg2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Flag 2
Product Data Type: i1b (20)
Total Bytes: 20
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Denotes at 40/sec rate whether precision attitude was used to determine spot location, and if problems with LPA, etc.
Please see <a href='flags/i_AttFlg2.pdf'>the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name: i_spare5
Is element of: GLA06 record
Short Description: Spare 5
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_FrameQF
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Altimeter Frame Quality Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Denotes all bad data (no signal in whole frame), or all data good and all science team recommended corrections applied
Please see <a href='flags/i_FrameQF.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_OrbFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: POD flag (Orbit Flag)
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Denotes quality of orbit, whether predicted or precision, loss of GPS data, maneuver-degraded, etc.
Please see <a href='flags/i_OrbFlg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_rngCorrFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Correction Flag
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Denotes which geophysical or instrument corrections have been applied to the range in the calculation of the elevation on this record.

Please see <a href='flags/i_rngCorrFlg.pdf'> the PDF flag description in the next section for more details.

Comments:

Product Var Name: i_CorrStatFlg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Correction Status Flag
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: For each geophysical correction that has multiple values denotes which algorithm or model was used.

Please see <a href='flags/i_CorrStatFlg.pdf'> the PDF flag description in the next section for more details.

Comments:

Product Var Name: i_spare15
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 15
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_AttFlg1
Is element of: GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Flag 1
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: At 1/sec denotes large off-nadir angle, ocn sweep, target of opportunity, steering to reference track.
Please see <a href='flags/i_AttFlg1.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_Spare6
Is element of: GLA06 record
Short Description: Spare 6
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA06 spare6.

Product Var Name i_spare44
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spare 44
Product Data Type: i1b (120)
Total Bytes: 120
Product Var Name: i_satNdx
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Index
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: ns
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 126
Description: The count of the number of gates in a waveform which have an amplitude greater than or equal to i_satNdxTh (set in anc07_0004). The value 126 means 126 or more gates are above the saturation index threshold (i_satNdxTh).
Comments:

Product Var Name: i_satElevCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Elevation Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description: Correction to elevation for saturated waveforms. This correction has not been applied to the data so to apply it SUBTRACT the correction from the range estimate. To apply the correction to the elevations it must be ADDED to the elevation estimates.
Comments:
Product Var Name i_satCorrFlg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Correction Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: Yes
Is Unsigned?: NA
Product Minimum: NA
Product Maximum: NA
Description: Please see <a href='flags/i_satCorrFlg.pdf'> the PDF flag description in the next section </a> for more details.<br/>

Bits 0-3: i_satElevCorr flag (4 bits); values indicated below: <br/>

0= Not Saturated (i_satNdx < 2) or No Signal
1= Sat. Correction is Inconsequential (i_satNdx >= 2 & i_pctSat < 2.0)
2= Sat. Correction is Applicable (i_satNdx >= 2 & i_pctSat >= 2.0 & Full Width* < 100ns)
3= Sat. Correction is Not Computable effects elevations can not be corrected
4= Sat. Correction model is Not Applicable so data can not be corrected (i_satNdx >= 2 & i_pctSat >= 2.0 & Full Width* >= 100ns) there are errors in the data but the effects on elevations can not be corrected

Values 5-15=TBD

Bits 4-5: i_satNrgCorr flag (2 bits):
0=TBD
1=TBD
2=TBD
3=TBD

Bits 6-7: TBD
0=TBD
1=TBD
2=TBD
3=TBD

Comments:

Product Var Name i_satNrgCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Energy Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: .01fJ
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description: Correction to energy for saturated waveforms. This correction has not been applied to the energy. It should be ADDED to any echo pulse energy calculated from the pulse area under the waveform. Also any reflectivity estimates need to be corrected for this error in energy measurement.
Comments:

Product Var Name i_spare13
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spare 13
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: null
Invalid Value/Flag: null
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_gval_rcv
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Gain Value used for Received Pulse
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: counts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Gain value used for received pulse - uncalibrated.
Comments: This value is in counts and needs to be calibrated before calculating energy from it. Same as variable in GLA01_Long/i_gainSet1064.
Product Var Name i_RecNrgAll
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Received Energy signal begin to signal end
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 fJoules
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32000
Description: This is a pass through of gla01%d_recNrgAll_EU, but stored in different units on the product. This is calculated by taking the area under the received waveform (referenced to the observed noise) from all responses between the noise crossing before the first threshold crossing and the noise crossing after the last threshold crossing. It is a rescaled value of GLA01 parameter d_recNrgAll_EU and is not recomputed.
Comments:

Product Var Name i_FRir_cldtop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Cloud Top
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1030
Description: Full resolution (40 Hz) cloud top height obtained from the 1064 atmospheric channel. This parameter is for a 1 second record. This parameter is in GLA09.
Comments:

Product Var Name i_FRir_qaFlag
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Quality Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: One byte per data quality flag.
Value 15 = No clouds.
Value 14 = Indicates the likely presence of low clouds (< 150 m) based on elevated signal from the two bins above the ground return bin that were not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (\(i_{FIRcltop}\)) is set to a value of 0.10 km.
Value 13 = Indicates the possible presence of a cloud based on the value of the integrated signal parameter (\(i_{FIRintsig}\)) that was not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (\(i_{FIRcltop}\)) is set to a value of 10.0 km.
Value 0 - 12 = Cloud detected by cloud search algorithm with higher numbers indicating a stronger average signal from the region starting at cloud top and extending 500 m below cloud top height. Please see <a href='flags/i_FRir_qaFlag.pdf'> the PDF flag description in the next section for more details. This parameter is extracted from the equivalent parameter on GLA09.

Comments:

Product Var Name i_atm_char_flag
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Characterization Flag
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10
Description: Flag to characterize cloud and blowing snow state of the atmosphere
0 clear
1 high cloud (> 5 km) low optical depth
2 high cloud (> 5 km), high optical depth
3 mid cloud (>2, <=5 km) low optical depth
4 mid cloud (>2, <=5 km) high optical depth
5 low cloud (> 500 m, <=2 km), low optical depth
6 low cloud (> 500 m, <=2 km), high optical depth
7 blowing snow or fog (< 500 m), low optical depth
8 blowing snow or fog (< 500 m), high optical depth
9 not tested
10 data quality insufficient to assign flag

Comments:

Product Var Name i_atm_char_conf
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Characterization Flag Confidence
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Confidence level ascribed to the atmosphere characterization flag
Comments: 0 Not applicable (for contamination flag values of 9 or 10)
1 low confidence
2 reasonable confidence
3 high confidence

Product Var Name: i_spare48
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 48
Product Data Type: i1b (36)
Total Bytes: 36
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name: i_FRir_intsig
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Integrated Signal
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: e7/(m-sr)
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Though called 'integrated signal' this is actually an average of all bins in the above-ground portion of the 1064 40 Hz profile with values above the threshold of 1.0e-7 (1/(m-sr) units). This parameter is for a 1 second record. This parameter is extracted from the equivalent parameter on GLA09.

Comments:

Product Var Name i_spare14
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 14
Product Data Type: i1b (120)
Total Bytes: 120
Product Units: Unknown
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_Surface_temp
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Surface Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Atmospheric temperature at Earth's surface level measured in degrees Celsius and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_pres
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Surface Pressure
Product Data Type: i2b
Total Bytes: 2
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Atmospheric pressure at Earth's surface level measured in hPa and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_relh
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Relative Humidity
Product Data Type: i2b
Total Bytes: 2
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Atmospheric relative humidity at Earth's surface level measured as a percentage and derived from the meteorological data files.
Comments:

Product Var Name i_pctSAT
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Percent Saturation
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: percent
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: Yes
Is Unsigned?: NA
Product Minimum: -127
Product Maximum: 127
Description: Percent saturation (d_pctSAT) is calculated using the formula: d_pctSAT= 100*(saturation index)/(signal end - signal begin in nanoseconds). The alternate signal end/begin are used for GLA14%d_pctSAT, while the standard fit values are used for GLA06, 12, 13, and 15. The Saturation elevation correction is not applied in the geolocation processing computation of lat, lon and elev. Because the saturation corrections are small and data is acquired within 5 deg off nadir, effects on lat and lon can be ignored. To apply the saturation elevation correction to the elevations on the products it must be ADDED to the elevation estimates. Reported elevations for returns with invalid satElevCorr values and satCorrFlg values of 3 or 4 are likely to have large, uncorrectable errors and should be excluded from analyses.
Comments:
Product Var Name: i_maxRecAmp
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Max Amplitude of Received Echo
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Tenth of millivolts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: Maximum Amplitude of the Received Echo.
Comments: This is calculated after converting the return to voltage. Use for scaling model fit RMS between normalized and un-normalized units.

Product Var Name: i_sDevNsOb1
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Standard deviation of 1064 nm Background noise, (alternate)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.0001 volts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The standard deviation of the background noise (alternative parameters).
Comments: Can be used for computing signal-to-noise ratio along with unsmoothed max amplitude.

Product Var Name: i_TxNrg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: 1064 nm Laser Transmit Energy
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 millijoules
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32766
Description: The 1064 nm laser pulse transmitted energy in energy units, computed from the digitized outgoing pulse, and the transmit gain.

Comments:

Product Var Name i_eqElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Equilibrium Tide Elevation (at first & last shot)
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: -10000
Product Maximum: 10000

Description: The equilibrium (long period) tide at first and last valid shot over the ocean.

Comments:

Product Var Name i_Spare7
Is element of: GLA06 record, GLA12 Record, GLA13 Record
Short Description: Spare 7
Product Data Type: i1b (282)
Total Bytes: 282
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null

Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments: GLA06, GLA12, GLA13 spare7.

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Var Name i_UTCTime

Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: Transmit Time of First Shot in frame in J2000

Product Data Type: i4b (2)

Total Bytes: 8

Product Units: seconds, microseconds

Invalid Value/Flag: No

Is Correction Flag?: NA

Is Unsigned?: No

Product Minimum: 0

Product Maximum: 2147483647

Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.

Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_beam_coelev

Is element of: GLA05 record, GLA07 Record

Short Description: Co-elevation

Product Data Type: i4b

Total Bytes: 4

Product Units: degrees*100

Invalid Value/Flag: gi_invalid_i4b

Is Correction Flag?: NA

Is Unsigned?: No

Product Minimum: 0

Product Maximum: 36000

Description: Co-elevation (CE) is direction from vertical of the laser beam as seen by an observer located at the laser ground spot.
Comments:

Product Var Name i_beam_azimuth
Is element of: GLA05 record, GLA07 Record
Short Description: Azimuth
Product Data Type: i4b
Total Bytes: 4
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: The direction, eastwards from north, of the laser beam vector as seen by an observer at the laser
ground spot viewing toward the spacecraft (i.e., the vector from the ground to the spacecraft). When the space-
craft is precisely at the geodetic zenith, the value will be 99999 degrees.
Comments:

Product Var Name i_spare0
Is element of: GLA07 Record
Short Description: Spares 0
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains
no meaningful information.
Comments: GLA07 spare0.

Product Var Name i_lat
Is element of: GLA07 Record
Short Description: Profile Coordinate, Latitude
Product Data Type: i4b
Total Bytes: 4
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Data Dictionary

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Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and latitude, at the 1 hertz rate.
Comments:

Product Var Name i_lon
Is element of: GLA07 Record
Short Description: Profile Coordinate, Longitude
Product Data Type: i4b
Total Bytes: 4
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000
Description: Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and latitude, at the 1 hertz rate.
Comments:

Product Var Name i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections.
Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i_OrbFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: POD flag (Orbit Flag)

Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Denotes quality of orbit, whether predicted or precision, loss of GPS data, maneuver-degraded, etc.
Please see <a href='flags/i_OrbFlg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_LidarQF
Is element of: GLA07 Record
Short Description: Lidar Frame quality flag
Product Data Type: i2b
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see <a href='flags/i_LidarQF.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_AttFlg1
Is element of: GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Flag 1
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: At 1/sec denotes large off-nadir angle, ocn sweep, target of opportunity, steering to reference track.
Please see <a href='flags/i_AttFlg1.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_surfType
Is element of: GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Region Type
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 15
Description: Describes the region type or types associated with each shot Ice Sheet, ocean, sea ice, or Land.
Please see <a href='flags/i_surfType.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_Spare1
Is element of: GLA07 Record
Short Description: Spare 1
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA07 spare1.

Product Var Name i_SolAng
Is element of: GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Solar Angle
Product Data Type: i4b
Total Bytes: 4
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Solar Angle above or below the plane tangent to the ellipsoid surface at the laser spot. Positive values mean the sun is above the horizon, while negative values mean it is below the horizon. The effect of atmospheric refraction is not included. This is a low-precision value, with approximately one degree accuracy.
Comments:

Product Var Name i_pad_angle
Is element of: GLA07 Record
Short Description: PAD Angle
Product Data Type: i4b
Total Bytes: 4
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000
Description: Attitude angle calculated from PAD and POD.
Comments:

Product Var Name i_rng_geoid
Is element of: GLA07 Record
Short Description: Range of satellite above geoid
Product Data Type: i4b
Total Bytes: 4
Product Units: meters
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 60000000
Description: Range of satellite above geoid based upon POD, PAD, and geoid
Comments:

Product Var Name i_topo_elev
Is element of: GLA07 Record
Short Description: Topographic elevation of surface above geoid
Product Data Type: i4b
Total Bytes: 4
Product Units: meters
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -2500
Product Maximum: 32000
Description: Topographic elevation of surface above geoid based upon POD, PAD, and geoid
Comments:

Product Var Name i_Rng2PCProf_Cor
Is element of: GLA07 Record
Short Description: Start Range of 532 nm Backscatter Profile
Product Data Type: i4b
Total Bytes: 4
Product Units: centimeters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 50000000
Product Maximum: 70000000
Description: The range from the spacecraft to the start of the 532 nm backscatter profile - the start of the 40 KM segment of Lidar Data. This variable has a slight correction applied to it.
Comments: Not valid if APID19 is missing.

Product Var Name i_Rng2CDProf_Cor
Is element of: GLA07 Record
Short Description: Start Range of 1064 nm Backscatter Profile
Product Data Type: i4b
Total Bytes: 4
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 50000000
Product Maximum: 70000000
Description: The range from the spacecraft to the start of the 1064 nm backscatter profile - the start of the 20 KM segment of Lidar Data. This variable has a slight correction applied to it.
Comments:
Product Var Name i1_g_bg
Is element of: GLA02 Record, GLA07 Record
Short Description: 532nm Background at 1 Hz
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: photons/bin * 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100000
Description: The normalized 532 nm background counts from upper (1) and lower (2) integration intervals. (3) is background used to compute NRB. Averaged over 40 shots.
Comments: Not valid if APID15 is missing.

Product Var Name i5_g_bg
Is element of: GLA02 Record, GLA07 Record
Short Description: 532 nm Background at 5 Hz
Product Data Type: i4b (4, 5)
Total Bytes: 80
Product Units: photons/bin * 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100000
Description: The normalized 532 nm background counts from upper (1) and lower (2) integration intervals. (3) is background used to compute NRB. Averaged over 8 shots.
Comments: Not valid if APID15 is missing.

Product Var Name i40_g_bg
Is element of: GLA02 Record, GLA07 Record
Short Description: 532 nm Background at 40 Hz
Product Data Type: i4b (4, 40)
Total Bytes: 640
Product Units: photons/bin * 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100000
Description: The normalized 532 nm background counts from upper (1) and lower (2) integration intervals.(3) is background used to compute NRB.
Comments: Not valid if APID15 is missing.

Product Var Name i5_ir_bg
Is element of: GLA02 Record, GLA07 Record
Short Description: 1064 nm Background at 5 Hz
Product Data Type: i4b (4, 5)
Total Bytes: 80
Product Units: W*1.0d17
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000000
Product Maximum: 100000000
Description: The normalized 1064 nm background counts from upper (1) and lower (2) integration intervals.(3) is background used to compute NRB. Averaged over 8 shots.
Comments: Not valid if APID15 is missing.

Product Var Name i40_ir_bg
Is element of: GLA02 Record, GLA07 Record
Short Description: 1064 nm Background at 40 Hz
Product Data Type: i4b (4, 40)
Total Bytes: 640
Product Units: W*1.0d17
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100000000
Product Maximum: 100000000
Description: The normalized 1064 nm background counts from upper (1) and lower (2) integration intervals.(3) is background used to compute NRB.
Comments: Not valid if APID17 is missing.

Product Var Name i5_g_TxNrg_EU
Is element of: GLA02 Record, GLA07 Record
Short Description: 532 nm Laser Transmit Energy at 5 Hz
Product Data Type: i4b (5)
Total Bytes: 20
Product Units: Joules * 1.0d5
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4500
Description: The 532 nm transmitted pulse energy in energy units, converted from the counts from the transmitted energy monitor. Averaged over 8 shots.
Comments: Not valid if APID19 is missing.

Product Var Name i40_g_TxNrg_EU
Is element of: GLA02 Record, GLA07 Record
Short Description: 532 nm Laser Transmit Energy at 40 Hz
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: Joules * 1.0d5
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4500
Description: The 532 nm transmitted pulse energy in energy units, converted from the counts from the transmitted energy monitor.
Comments: Not valid if APID19 is missing.

Product Var Name i5_ir_TxNrgEU
Is element of: GLA02 Record, GLA07 Record
Short Description: 1064 nm Laser Transmit Energy at 5 Hz
Product Data Type: i4b (5)
Total Bytes: 20
Product Units: Joules * 1.0d5
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 9000
Description: The 1064 nm laser pulse energy, computed from the digitized outgoing pulse and the detector temperature. Averaged over 8 shots.
Comments: Not valid if APID19 and APID12 or APID13 are missing.

Product Var Name i40_ir_TxNrgEU
Is element of: GLA02 Record, GLA07 Record
Short Description: 1064 nm Laser Transmit Energy at 40 Hz
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: Joules * 1.0d5
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 9000
Description: The 1064 nm laser pulse energy, computed from the digitized outgoing pulse and the detector temperature.
Comments: Not valid if APID19 and APID12 or APID13 are missing.

Product Var Name i_g_TxNrg_qf
Is element of: GLA02 Record, GLA07 Record
Short Description: 532 nm Laser Transmit Energy Quality Flag
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 3
Description: Evaluation of the 532 nm laser transmit energy which is an indication of the laser health; 2 bits per shot for 40 shots; 1 = full laser energy, 2 = marginal laser energy, 3 = deficient laser energy, 0 = not used.
Please see <a href='flags/i_g_TxNrg_qf.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_ir_TxNrg_qf
Is element of: GLA02 Record, GLA07 Record
Short Description: 1064 nm Laser Transmit Energy Quality Flag
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 3
Description: Evaluation of the 1064 nm laser transmit energy which is an indication of the laser health; 2 bits per shot for 40 shots; 1 = full laser energy, 2 = marginal laser energy, 3 = deficient laser energy, 0 = not used.
Please see <a href='flags/i_ir_TxNrg_qf.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_atm_dem
Is element of: GLA07 Record
Short Description: DEM value at current location from 1 km x 1 km grid
Product Data Type: i4b
Total Bytes: 4
Product Units: meters
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -32768
Product Maximum: 32768
Description: Surface height value for current location from 1 km x 1 km grid
Comments:

Product Var Name i_metFlg
Is element of: GLA07 Record
Short Description: Met/std atm source/quality flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Flag indicating if met data or standard atmosphere data are used to fill met profiles. Flag is set to 1 if time of first file > 24 hrs, 2 if time of second file > 24 hrs, 2+index of standard atmosphere file if time of both files > 24 hrs.
Please see <a href='flags/i_metFlg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_ir_bin_shift
Is element of: GLA07 Record
Short Description: 1064 vertical alignment offset
Product Data Type: i1b
Total Bytes: 1
Product Units: bins
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10
Product Maximum: 10
Description: Number of bins that 1064 nm surface return bin is shifted to align with 532 nm surface return bin.
Comments:

Product Var Name i_Spare2
Is element of: GLA07 Record
Short Description: Spare 2
Product Data Type: i1b (6)
Total Bytes: 6
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA07 spare2.

Product Var Name i_g_cal_cof
Is element of: GLA07 Record
Short Description: 532 nm Backscatter Calibration Coefficient
Product Data Type: i4b (3)
Total Bytes: 12
Product Units: 1d-6*(Photons/bin)(km^3/J)sr
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1.0d4
Product Maximum: 1.0d9
Description: The calibration value applied to the 532 nm lidar data to get the backscatter (1=high cal ht, 2=low cal ht, 3=used).
Comments:
Short Description: 1064 nm Backscatter Calibration Coefficient
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: 1d4*(Watts)(km^3/J)sr
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1.0d5
Product Maximum: 1.0d8
Description: The calibration value applied to the 1064 nm lidar data to get the backscatter (1=low cal ht, 2=used).
Comments:

Product Var Name i5_g_bscs
Is element of: GLA07 Record
Short Description: 532 nm Merged Attenuated Backscatter Profile 40 to -1 km
Product Data Type: i4b (548, 5)
Total Bytes: 10960
Product Units: e11/(m-sr)
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 1000000000
Description: For the full vertical atmospheric profile (-1 to 41 km), the atmosphere 532 nm calibrated, attenuated backscatter profile at the rate of 5 per 1 second. When the 532 nm data becomes saturated the 1064 nm data is converted and merged into the data set. The Level 1A data that occurs at 40/second, every 8 shots are averaged and stored in the profile and the 1/second is replicated to get the full 5 Hz rate on this product.
Comments:

Product Var Name i40_g_bscs
Is element of: GLA07 Record
Short Description: 532 nm Merged Attenuated Backscatter Profile 10 to -1 km
Product Data Type: i4b (148, 40)
Total Bytes: 23680
Product Units: e11/(m-sr)
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 1000000000
Description: For the 10 KM to -1 KM vertical segment, the atmosphere 532 nm calibrated, attenuated backscatter profile at the 40 per 1 second rate. When the 532 nm data becomes saturated the 1064 nm data is converted to 532 data and merged into the data set.

Comments:

Product Var Name i5_ir_bscs
Is element of: GLA07 Record
Short Description: 1064 nm Attenuated Backscatter Profile 20 to -1 km
Product Data Type: i4b (280, 5)
Total Bytes: 5600
Product Units: e11/(m-sr)
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 1000000000

Description: Atmosphere 1064 nm calibrated, attenuated backscatter profile (-1 to 20 km) at the rate of 5 per 1 second. Averages of 8 shots are used for the Level 1A data that occurs at 40/second rate.

Comments:

Product Var Name i40_ir_bscs
Is element of: GLA07 Record
Short Description: 1064 nm Attenuated Backscatter Profile 10 to -1 km
Product Data Type: i4b (148, 40)
Total Bytes: 23680
Product Units: e11/(m-sr)
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 1000000000

Description: Atmosphere 1064 nm calibrated, attenuated backscatter profile (-1 to 10 km) at the rate of 40 per 1 second.

Comments:

Product Var Name i_g_mbscs
Is element of: GLA07 Record
Short Description: 532 nm molecular backscatter cross section profile 40 to -1 km
Product Data Type: i4b (548)
Total Bytes: 2192
Product Units: e11/(m-sr)
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1000
Product Maximum: 1000000
Description: 532 nm molecular backscatter profile computed from MET data interpolated in space and time to profile location.
Comments:

Product Var Name i_ir_mbscs
Is element of: GLA07 Record
Short Description: 1064 nm molecular backscatter cross section profile 20 to -1 km
Product Data Type: i4b (280)
Total Bytes: 1120
Product Units: e11/(m-sr)
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1000
Product Maximum: 1000000
Description: 1064 nm molecular backscatter profile computed from MET data interpolated in space and time to profile location.
Comments:

Product Var Name i1_int_ret
Is element of: GLA07 Record
Short Description: 532 nm integrated return from 40 to 20 km
Product Data Type: i4b
Total Bytes: 4
Product Units: e11/(m-sr)
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 200000
Product Maximum: 10000000
Description: The integrated or summed 532 attenuated backscatter profile from 40 to 20 km. When normalized by the sum of the molecular backscatter for the same interval, gives an indication of data quality
Comments:

Product Var Name i40_g_sat_prof
Is element of: GLA07 Record
Short Description: 532 nm Saturation Flag Profile 10 to -1 km
Product Data Type: i1b (740)
Total Bytes: 740
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: 532 nm Saturation Flag Profile from 10 to -1 km. Indicates whether the 532 data were saturated and therefore whether the value is converted from the 1064 data. 0 = not saturated, 1 = saturated.
Please see <a href='flags/i40_g_sat_prof.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i5_g_sat_prof
Is element of: GLA07 Record
Short Description: 532 nm Saturation Flag Profile 40 to -1 km
Product Data Type: i1b (343)
Total Bytes: 343
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: 532 nm Saturation Flag Profile from 41 to -1 km. Indicates whether the 532 data were saturated and therefore whether the value is converted from the 1064 data. 0 = not saturated, 1 = saturated.
Please see <a href='flags/i5_g_sat_prof.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_spare3
Is element of: GLA07 Record
Short Description: Spares
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name _i_532AttBS_Flag
Is element of: GLA07 Record
Short Description: 532 nm Attenuated Backscatter Vertical Profile Flag
Product Data Type: i1b (18)
Total Bytes: 18
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Composite Flag - see Breakout for details
Please see <a href='flags/i_532AttBS_Flag.pdf'> the PDF flag description in the next section for more details.

Comments:

Product Var Name _i_1064AttBS_Flag
Is element of: GLA07 Record
Short Description: 1064 nm Attenuated Backscatter Vertical Profile Flag
Product Data Type: i1b (18)
Total Bytes: 18
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Composite Flag - see Breakout for details
Please see <a href='flags/i_1064AttBS_Flag.pdf'> the PDF flag description in the next section for more details.

Comments:

Product Var Name _i.AttFlg3
Is element of: GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Attitude Flag 3
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Please see <a href='flags/i_AttFlg3.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_DitheringEnabledFlag
Is element of: GLA02 Record, GLA07 Record
Short Description: Dithering Enabled Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: Yes
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 1
Description: 0=FALSE, 1=TRUE
Comments: Not valid if APID15 is missing.

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href='flags/i_timecorflg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_Surface_temp
Is element of: GLA07 Record
Short Description: Surface Temperature  
Product Data Type: i2b  
Total Bytes: 2  
Product Units: degrees Celsius * 100  
Invalid Value/Flag: gi_invalid_i2b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: -10000  
Product Maximum: 10000  
Description:  
Comments:  

Product Var Name i_Surface_pres  
Is element of: GLA07 Record  
Short Description: Surface Pressure  
Product Data Type: i2b  
Total Bytes: 2  
Product Units: hPa * 10  
Invalid Value/Flag: gi_invalid_i2b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 20000  
Description:  
Comments:  

Product Var Name i_Surface_relh  
Is element of: GLA07 Record  
Short Description: Relative Humidity  
Product Data Type: i2b  
Total Bytes: 2  
Product Units: percentage * 100  
Invalid Value/Flag: gi_invalid_i2b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 10000  
Description:  
Comments:
Product Var Name i_Surface_wind
Is element of: GLA07 Record, GLA15 Record
Short Description: Surface Wind Speed
Product Data Type: i2b
Total Bytes: 2
Product Units: meters/second * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Wind speed at Earth's surface level measured in km/hour and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_wdir
Is element of: GLA07 Record, GLA15 Record
Short Description: Surface Wind Direction Azimuth from North
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Wind direction at Earth's surface level measured in degrees of azimuth from North and derived from the meteorological data files.
Comments:

Product Var Name i_spare4
Is element of: GLA07 Record
Short Description: Spare 4
Product Data Type: i1b (130)
Total Bytes: 130
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.

Comments:

Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.

Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_beam_coelev
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Co-elevation
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: Co-elevation (CE) is direction from vertical of the laser beam as seen by an observer located at the laser ground spot.
Comments:

Product Var Name i_beam_azimuth
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Azimuth
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: Azimuth (Az) is the direction clockwise from north of the laser beam as seen by an observer at the laser ground spot.
Comments:

Product Var Name i_pad_angle
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: PAD Angle
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600000000
Description: Attitude angle calculated from PAD and POD.Comments:
Product Var Name i_spare0
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Spares 0
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_AttFlg1
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Attitude flag
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see <a href='flags/i_AttFlg1.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_lat
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Profile Location, Latitude
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and latitude, at the 1 hertz rate.

Comments:

Product Var Name: i_lon
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Profile Location, Longitude
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000

Description: Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and latitude, at the 1 hertz rate.
Comments:

Product Var Name: i_OrbFlg
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Orbit flag
Product Data Type: i1b (2, 4)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see <a href='flags/i_OrbFlg.pdf'> the PDF flag description in the next section</a> for more details.
There are 4 sets of this flag value, 1/sec for each of the 4 sec covered in the record.

Comments:

Product Var Name: i_surfType
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Region Type
Product Var Name: i1b
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 15
Description: Describes the region type or types associated with each shot Ice Sheet, ocean, sea ice, or Land.
Please see `<a href='flags/i_surfType.pdf'> the PDF flag description in the next section` for more details.

Comments:

Product Var Name: i1b
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see `<a href='flags/i_LidarQF.pdf'> the PDF flag description in the next section` for more details.

Comments:

Product Var Name: i1b
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: meters
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -32768
Product Maximum: 32768
Description: Surface height value for current location from 1 km x 1 km grid
Comments:

Product Var Name i4_aer_bot
Is element of: GLA08 Record
Short Description: Below 20 KM Aerosol Layer Bottom at 532 nm
Product Data Type: i2b (5)
Total Bytes: 10
Product Units: deka-meters
Invalid Value/Flag: i4_aer_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: The aerosol layer bottoms (below 20 KM in atmosphere) for up to 5 layers at 1 per 4 sec.
Comments:

Product Var Name i4_aer_top
Is element of: GLA08 Record
Short Description: Below 20 KM Aerosol Layer Top at 532 nm
Product Data Type: i2b (5)
Total Bytes: 10
Product Units: deka-meters
Invalid Value/Flag: i4_aer_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: The aerosol layer tops (below 20 KM in atmosphere) for up to 5 layers at 1 per 4 sec.
Comments:

Product Var Name i20_aer_bot
Is element of: GLA08 Record
Short Description: 20-40 KM Aerosol Layer Bottom at 532 nm
Product Data Type: i2b (3)
Total Bytes: 6
Product Units: deka-meters
Invalid Value/Flag: i20_aer_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1000
Product Maximum: 4000
Description: The aerosol layer bottoms (20 - 40 KM in atmosphere) for up to 3 layers at 1 per 4 sec.
Comments:

Product Var Name i20_aer_top
Is element of: GLA08 Record
Short Description: 20-40 KM Aerosol Layer Top at 532 nm
Product Data Type: i2b (3)
Total Bytes: 6
Product Units: deka-meters
Invalid Value/Flag: i20_aer_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1000
Product Maximum: 4000
Description: The aerosol layer tops (20 - 40 KM in atmosphere) for up to 3 layers at 1 per 4 sec.
Comments:

Product Var Name i_LRpbl_ht
Is element of: GLA08 Record
Short Description: Low Resolution PBL Height at 532 nm
Product Data Type: i2b
Total Bytes: 2
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 700
Description: Low resolution height of the planetary boundary layer, as derived from the aerosol structure; the low resolution data is averaged over 4 seconds.
Comments:

Product Var Name i_LRpbl_grd
Is element of: GLA08 Record
Short Description: Ground Detection for Low Res PBL at 532 nm
Product Data Type: i2b
Total Bytes: 2
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 1000
Description: The height above the reference ellipsoid of the ground used by the low res PBL processing algorithms.
Comments:

Product Var Name i_HRpbl_ht
Is element of: GLA08 Record
Short Description: High Resolution PBL Height at 532 nm
Product Data Type: i2b (20)
Total Bytes: 40
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 700
Description: High resolution height of the planetary boundary layer, as derived from the aerosol structure; the high resolution data occurs at the rate of 5 per second.
Comments:

Product Var Name i_HRpbl_grd
Is element of: GLA08 Record
Short Description: Ground Detection for High Res PBL
Product Data Type: i2b (20)
Total Bytes: 40
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 1000
Description: The height above the reference ellipsoid of the ground used by the high res PBL processing algorithms.
Comments:

Product Var Name i4_aer_pct
Is element of: GLA08 Record
Short Description: Percentage of Saturated Bins in Below 20 KM Aerosol Layers at 532 nm
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: unitless
Invalid Value/Flag: i4_aer_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description: Percentage of Saturated Bins in Below 20 KM Aerosol Layers at 532 nm
Comments:

Product Var Name i20_aer_pct
Is element of: GLA08 Record
Short Description: Percentage of Saturated Bins in 20-40 KM Aerosol Layers at 532 nm
Product Data Type: i1b (3)
Total Bytes: 3
Product Units: unitless
Invalid Value/Flag: i20_aer_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description: Percentage of Saturated Bins in 20-40 KM Aerosol Layers at 532 nm
Comments:

Product Var Name i_LRpbl_pct
Is element of: GLA08 Record
Short Description: Percentage of Saturated Bins in Low Resolution PBL Layer at 532 nm
Product Data Type: i1b
Total Bytes: 1
Product Units: unitless
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description: Percentage of Saturated Bins in Low Resolution PBL Layer at 532 nm
Comments:

Product Var Name i_LayHgt_Flag
Is element of: GLA08 Record
Short Description: Layer Height Flag
Product Data Type: i1b (32)
Total Bytes: 32
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Composite Flag - see Breakout for details
Please see <a href='flags/i_LayHgt_Flag.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_AttFlg3
Is element of: GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Attitude Flag 3
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Please see <a href='flags/i_AttFlg3.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href='flags/i_timecorflg.pdf'> the PDF flag description in the next section</a> for more details.

Comments:

Product Var Name i_SolarAngle
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Solar Angle
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: micro-degrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000

Description: Solar Angle above or below the plane tangent to the ellipsoid surface at the laser spot. Positive values mean the sun is above the horizon, while negative values mean it is below the horizon. The effect of atmospheric refraction is not included. This is a low-precision value, with approximately one degree accuracy.

Comments:

Product Var Name i_Aer_top_b20_temp
Is element of: GLA08 Record
Short Description: Temperature of Top of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm
Product Data Type: i2b (5)
Total Bytes: 10
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000

Description: Temperature of Top of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm

Comments:

Product Var Name i_Aer_top_b20_pres
Is element of: GLA08 Record
Short Description: Pressure of Top of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm
Product Data Type: i2b (5)
Total Bytes: 10
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA  Is Unsigned?: No  Product Minimum: 0  Product Maximum: 20000  Description: Pressure of Top of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm  Comments:

Product Var Name: i_Aer_top_b20_relh  Is element of: GLA08 Record  Short Description: Relative Humidity of Top of Aerosol Layers in Bottom 20km of Atm at 532 nm  Product Data Type: i2b (5)  Total Bytes: 10  Product Units: percentage * 100  Invalid Value/Flag: gi_invalid_i2b  Is Correction Flag?: NA  Is Unsigned?: No  Product Minimum: 0  Product Maximum: 10000  Description: Relative Humidity of Top of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm  Comments:

Product Var Name: i_Aer_bot_b20_temp  Is element of: GLA08 Record  Short Description: Temperature of Bottom of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm  Product Data Type: i2b (5)  Total Bytes: 10  Product Units: degrees Celsius * 100  Invalid Value/Flag: gi_invalid_i2b  Is Correction Flag?: NA  Is Unsigned?: No  Product Minimum: -10000  Product Maximum: 10000  Description: Temperature of Bottom of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm  Comments:

Product Var Name: i_Aer_bot_b20_pres  Is element of: GLA08 Record  Short Description: Pressure of Bottom of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm  Product Data Type: i2b (5)  Total Bytes: 10
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Bottom of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm
Comments:

Product Var Name i_Aer_bot_b20_relh
Is element of: GLA08 Record
Short Description: Relative Humidity of Bottom of Aerosol Layers in Bottom 20km of Atm at 532 nm
Product Data Type: i2b (5)
Total Bytes: 10
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Bottom of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm
Comments:

Product Var Name i_Aer_top_a20_temp
Is element of: GLA08 Record
Short Description: Temperature of Top of Aerosol Layers Above 20km of Atmosphere at 532 nm
Product Data Type: i2b (3)
Total Bytes: 6
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Temperature of Top of Aerosol Layers Above 20km of Atmosphere at 532 nm
Comments:

Product Var Name i_Aer_top_a20_pres
Is element of: GLA08 Record
Short Description: Pressure of Top of Aerosol Layers Above 20km of Atmosphere at 532 nm
Product Data Type: i2b (3)
Total Bytes: 6
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Top of Aerosol Layers Above 20km of Atmosphere at 532 nm
Comments:

Product Var Name i_Aer_top_a20_relh
Is element of: GLA08 Record
Short Description: Relative Humidity of Top of Aerosol Layers Above 20km of Atmosphere at 532 nm
Product Data Type: i2b (3)
Total Bytes: 6
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Top of Aerosol Layers Above 20km of Atmosphere at 532 nm
Comments:

Product Var Name i_Aer_bot_a20_temp
Is element of: GLA08 Record
Short Description: Temperature of Bottom of Aerosol Layers Above 20km of Atmosphere at 532 nm
Product Data Type: i2b (3)
Total Bytes: 6
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Temperature of Bottom of Aerosol Layers Above 20km of Atmosphere at 532 nm
Comments:

Product Var Name i_Aer_bot_a20_pres
Is element of: GLA08 Record
Short Description: Pressure of Bottom of Aerosol Layers Above 20km of Atmosphere at 532 nm
Product Data Type: i2b (3)
Total Bytes: 6
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Bottom of Aerosol Layers Above 20km of Atmosphere at 532 nm
Comments:

Product Var Name i_Aer_bot_a20_relh
Is element of: GLA08 Record
Short Description: Relative Humidity of Bottom of Aerosol Layers Above 20km of Atmosphere at 532 nm
Product Data Type: i2b (3)
Total Bytes: 6
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Bottom of Aerosol Layers Above 20km of Atmosphere at 532 nm
Comments:

Product Var Name i_Aer_PBL_LR_temp
Is element of: GLA08 Record, GLA11 Record
Short Description: Temperature of Low Resolution Planetary Boundary Layer Top at 532 nm
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Temperature of Low Resolution Planetary Boundary Layer Top at 532 nm
Comments:
Product Var Name: i_Aer_PBL_LR_pres
Is element of: GLA08 Record, GLA11 Record
Short Description: Pressure of Low Resolution Planetary Boundary Layer Top at 532 nm
Product Data Type: i2b
Total Bytes: 2
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Low Resolution Planetary Boundary Layer Top at 532 nm
Comments:

Product Var Name: i_Aer_PBL_LR_relh
Is element of: GLA08 Record, GLA11 Record
Short Description: Relative Humidity of Low Resolution Planetary Boundary Layer Top at 532 nm
Product Data Type: i2b
Total Bytes: 2
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Low Resolution Planetary Boundary Layer Top at 532 nm
Comments:

Product Var Name: i_Aer_ir_top
Is element of: GLA08 Record, GLA11 Record
Short Description: Elevation of Top of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2200
Description: Elevation of Top of Aerosol Layers detected in 1064 nm
Comments:

Product Var Name: i_Aer_ir_bot
Is element of: GLA08 Record, GLA11 Record
Short Description: Elevation of Bottom of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2200
Description: Elevation of Bottom of Aerosol Layers Detected in 1064 nm.
Comments:

Product Var Name: i_Aer_ir_layflg
Is element of: GLA08 Record
Short Description: Layer Flag for 1064 Aerosol
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Please see <a href='flags/i_Aer_ir_layflg.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name: i_Aer_ir_top_temp
Is element of: GLA08 Record, GLA11 Record
Short Description: Temperature of Top of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Temperature of Top of Aerosol Layers Detected in 1064 nm
Comments:

Product Var Name i_Aer_ir_top_pres
Is element of: GLA08 Record, GLA11 Record
Short Description: Pressure of Top of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Top of Aerosol Layers Detected in 1064 nm
Comments:

Product Var Name i_Aer_ir_top_relh
Is element of: GLA08 Record, GLA11 Record
Short Description: Relative Humidity of Top of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Top of Aerosol Layers Detected in 1064 nm
Comments:

Product Var Name i_Aer_ir_bot_temp
Is element of: GLA08 Record, GLA11 Record
Short Description: Temperature of Bottom of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Temperature of Bottom of Aerosol Layers Detected in 1064 nm
Comments:

Product Var Name: i_Aer_ir_bot_pres
Is element of: GLA08 Record, GLA11 Record
Short Description: Pressure of Bottom of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Bottom of Aerosol Layers Detected in 1064 nm
Comments:

Product Var Name: i_Aer_ir_bot_relh
Is element of: GLA08 Record, GLA11 Record
Short Description: Relative Humidity of Bottom of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Bottom of Aerosol Layers Detected in 1064 nm
Comments:

Product Var Name: i_Surface_temp
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Surface Temperature, 4 of 1-second intervals.
Comments:

Product Var Name i_Surface_pres
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Pressure
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Surface Pressure, 4 of 1-second intervals.
Comments:

Product Var Name i_Surface_relh
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Relative Humidity
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Surface Relative Humidity, 4 of 1-second intervals.
Comments:

Product Var Name i_Surface_wind
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Wind Speed
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: meters/second * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Surface Wind Speed, 4 of 1-second intervals. Wind speed at Earth's surface level measured in km/hour and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_wdir
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Wind Direction Azimuth from North
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: degrees * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Surface wind direction azimuth from North, 4 of 1-second intervals. Wind direction at Earth's surface level measured in degrees of azimuth from North and derived from the meteorological data files.
Comments:

Product Var Name i_PBL_Layer_ht
Is element of: GLA08 Record, GLA09 Record
Short Description: PBL Layer Height from Met Data
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 1000
Description:
Comments:
Product Var Name: i_Spec_Humid
Is element of: GLA08 Record, GLA09 Record
Short Description: Specific Humidity
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: gram/kilogram*100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: Specific humidity 2m above ground.
Comments:

Product Var Name: i_Temp2mAbvGrnd
Is element of: GLA08 Record, GLA09 Record
Short Description: Temperature 2m Above Ground Level
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description:
Comments:

Product Var Name: i_Total_CloudCov
Is element of: GLA08 Record, GLA09 Record
Short Description: Total Cloud Cover
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: percentage
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description:
Comments:

Product Var Name i_spare2
Is element of: GLA08 Record
Short Description: Spares
Product Data Type: i1b (232)
Total Bytes: 232
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA08 spare2.

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Data Dictionary

Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647

Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.

Comments: This is not the ground bounce time, but the transmit time.

Product Var Name: i_beam_coelev
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Co-elevation
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000

Description: Co-elevation (CE) is direction from vertical of the laser beam as seen by an observer located at the laser ground spot.

Comments:

Product Var Name: i_beam_azimuth
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Azimuth
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000

Description: Azimuth (Az) is the direction clockwise from north of the laser beam as seen by an observer at the laser ground spot.

Comments:
Product Var Name: i_pad_angle
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: PAD Angle
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600000000
Description: Attitude angle calculated from PAD and POD.
Comments:

Product Var Name: i_spare0
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Spares 0
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name: i_AttFlg1
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Attitude flag
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see <a href='flags/i_AttFlg1.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_lat
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Profile Location, Latitude
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and latitude, at the 1 hertz rate.
Comments:

Product Var Name i_lon
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Profile Location, Longitude
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000
Description: Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and latitude, at the 1 hertz rate.
Comments:

Product Var Name i_OrbFlg
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Orbit flag
Product Data Type: i1b (2, 4)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see <a href='flags/i_OrbFlg.pdf'> the PDF flag description in the next section</a> for more details.
There are 4 sets of this flag value, 1/sec for each of the 4 sec covered in the record.
Comments:

Product Var Name i_surfType
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Region Type
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 15
Description: Describes the region type or types associated with each shot Ice Sheet, ocean, sea ice, or Land.
Please see <a href='flags/i_surfType.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_LidarQF
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Lidar Frame quality flag
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see <a href='flags/i_LidarQF.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_spare2
Is element of: GLA09 Record
Short Description: Spare 2
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA09 spare2.

Product Var Name i_topo_elev
Is element of: GLA09 Record
Short Description: Topographic elevation of surface above geoid
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: meters
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -2500
Product Maximum: 32000
Description: Topographic elevation of surface above geoid based upon POD, PAD, and geoid
Comments:

Product Var Name i_atm_dem
Is element of: GLA09 Record
Short Description: DEM value at current location from 1 km x 1 km grid
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: meters
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -32768
Product Maximum: 32768
Description: Surface height value for current location from 1 km x 1 km grid
Comments:
Product Var Name i_LRcld_bot
Is element of: GLA09 Record
Short Description: Low Resolution Cloud Bottom at 532 nm
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: deka-meters
Invalid Value/Flag: i_LRC_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: Low resolution height above the reference ellipsoid of the bottom of a cirrus, thin, or dense cloud layer in the atmosphere. There can be up to 10 cloud layers in an atmospheric profile. The low resolution data occurs at the rate of once per 4 seconds.
Comments:

Product Var Name i_LRcld_top
Is element of: GLA09 Record
Short Description: Low Resolution Cloud Top at 532 nm
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: deka-meters
Invalid Value/Flag: i_LRC_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: Low resolution height above the reference ellipsoid of the top of a cirrus, thin, or dense cloud layer in the atmosphere. There can be up to 10 cloud layers in an atmospheric profile. The low resolution data occurs at the rate of once per 4 seconds.
Comments:

Product Var Name i_LRcld_grd
Is element of: GLA09 Record
Short Description: Low Resolution Ground Detection at 532 nm
Product Data Type: i2b
Total Bytes: 2
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 1000
Description: The height from the reference ellipsoid of the ground as detected by the low resolution cloud processing algorithms. A value of -127 indicates that the ground was searched for, but not detected.
Comments:

Product Var Name i_spare3
Is element of: GLA09 Record
Short Description: Spares
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_MRcld_bot
Is element of: GLA09 Record
Short Description: Medium Resolution Cloud Bottom at 532 nm
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: i_MRC_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: Medium resolution height above the reference ellipsoid of the bottom of a cirrus, thin, or dense cloud layer in the atmosphere. There can be up to 10 cloud layers in an atmospheric profile. The medium resolution data occurs at the rate of once per second.
Comments:

Product Var Name i_MRcld_top
Is element of: GLA09 Record
Short Description: Medium Resolution Cloud Top at 532 nm
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: i_MRC_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: Medium resolution height above the reference ellipsoid of the top of a cirrus, thin, or dense cloud layer in the atmosphere. There can be up to 10 cloud layers in an atmospheric profile. The medium resolution data occurs at the rate of once per second.
Comments:

Product Var Name i_MRclld_grd
Is element of: GLA09 Record
Short Description: Medium Resolution Ground Detection at 532 nm
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 1000
Description: The height above the reference ellipsoid of the ground as detected by the medium resolution cloud processing algorithms. A value of -127 indicates that the ground was searched for, but not detected.
Comments:

Product Var Name i_MRclld_pct
Is element of: GLA09 Record
Short Description: Percentage of Saturated Bins in Medium Resolution Cloud Layers at 532 nm
Product Data Type: i1b (10, 4)
Total Bytes: 40
Product Units: unitless
Invalid Value/Flag: i_MRC_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description: Percentage of saturated bins in medium resolution cloud layers
Comments:

Product Var Name i_HRclld_bot
Is element of: GLA09 Record
Short Description: High Resolution Cloud Bottom at 532 nm
Product Data Type: i2b (10, 20)
Total Bytes: 400
Product Units: deka-meters
Invalid Value/Flag: i_HRC_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: High resolution height above the reference ellipsoid of the bottom of a cirrus, thin, or dense cloud layer below 10KM in the atmosphere. There can be up to 10 cloud layers in an atmospheric profile. The high resolution data occurs at the rate of 5 per second.
Comments:

Product Var Name i_HRcld_top
Is element of: GLA09 Record
Short Description: High Resolution Cloud Top at 532 nm
Product Data Type: i2b (10, 20)
Total Bytes: 400
Product Units: deka-meters
Invalid Value/Flag: i_HRC_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: High resolution height above the reference ellipsoid of the top of a cirrus, thin, or dense cloud layer below 10 KM in the atmosphere. There can be up to 10 cloud layers in an atmospheric profile. The high resolution data occurs at the rate of 5 per second.
Comments:

Product Var Name i_HRcld_grd
Is element of: GLA09 Record
Short Description: High Resolution Ground Detection at 532 nm
Product Data Type: i2b (20)
Total Bytes: 40
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 1000
Description: The height above the reference ellipsoid of the ground as detected by the high resolution cloud processing algorithms. A value of -127 indicates that the ground was searched for, but not detected.

Comments:

Product Var Name i_FRcld_bot
Is element of: GLA09 Record
Short Description: Full Resolution Cloud Bottom at 532 nm
Product Data Type: i2b (160)
Total Bytes: 320
Product Units: deka-meters
Invalid Value/Flag: i_FRC_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 400

Description: The height above the reference ellipsoid to the bottom of the full resolution cloud layer (40 Hz). This resolution cloud search is independent of the lower resolution cloud search results and is done for each 40 Hz shot regardless of whether or not clouds were detected at the lower resolutions. Note that the 40 Hz data is available only below 10 km, and thus clouds existing above that level cannot be detected at the 40 Hz resolution.

Comments:

Product Var Name i_FRcld_top
Is element of: GLA09 Record
Short Description: Full Resolution Cloud Top at 532 nm
Product Data Type: i2b (160)
Total Bytes: 320
Product Units: deka-meters
Invalid Value/Flag: i_FRC_af
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 400

Description: The height above the reference ellipsoid to the top of the full resolution cloud layer (40 Hz). This resolution cloud search is independent of the lower resolution cloud search results and is done for each 40 Hz shot regardless of whether or not clouds were detected at the lower resolutions. Note that the 40 Hz data is available only below 10 km, and thus clouds existing above that level cannot be detected at the 40 Hz resolution.

Comments:

Product Var Name i_FRcld_grd
Is element of: GLA09 Record
Short Description: Full Resolution Cloud Ground Detection at 532 nm
Product Data Type: i2b (160)
Total Bytes: 320
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 1000
Description: The height above the reference ellipsoid of the ground as detected by the full resolution cloud processing algorithms. A value of -127 indicates that the ground was searched for, but not detected.
Comments:

Product Var Name i_FRg_grd_sig
Is element of: GLA09 Record
Short Description: Full Resolution Ground Return Signal at 532 nm
Product Data Type: i4b (160)
Total Bytes: 640
Product Units: e9/(m-sr)
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 10000
Product Maximum: 10000000
Description: Ground return signal from the 532 nm backscatter profile at the height that the ground return is detected.
Comments:

Product Var Name i_FRir_grd_sig
Is element of: GLA09 Record
Short Description: Full Resolution Ground Return Signal at 1064 nm
Product Data Type: i4b (160)
Total Bytes: 640
Product Units: e9/(m-sr)
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 100000
Product Maximum: 10000000
Description: Ground return signal from the 1064 nm backscatter profile at the height that the ground return is detected.
Comments:

Product Var Name i_LRCL_Flag
Is element of: GLA09 Record
Short Description: Low Resolution Cloud Layers Flag for 532 nm
Product Data Type: i1b (11)
Total Bytes: 11
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Composite Flag - see Breakout for details
Please see <a href='flags/i_LRCL_Flag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_MRCL_Flag
Is element of: GLA09 Record
Short Description: Medium Resolution Cloud Layers Flag for 532 nm
Product Data Type: i1b (37)
Total Bytes: 37
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Composite Flag - see Breakout for details
Please see <a href='flags/i_MRCL_Flag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_HRCL_Flag
Is element of: GLA09 Record
Short Description: High Resolution Cloud Layers Flag for 532 nm
Product Data Type: i1b (185)
Total Bytes: 185
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Composite Flag - see Breakout for details
Please see <a href='flags/i_HRCL_Flag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_FRCL_Flag
Is element of: GLA09 Record
Short Description: Full Resolution Cloud Layers Flag for 532 nm
Product Data Type: i1b (220)
Total Bytes: 220
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Composite Flag - see Breakout for details
Please see <a href='flags/i_FRCL_Flag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_AttFlg3
Is element of: GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Attitude Flag 3
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Please see <a href='flags/i_AttFlg3.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href='flags/i_timecorflg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_FRir_cldtop
Is element of: GLA09 Record
Short Description: Full Resolution 1064 Cloud Top
Product Data Type: i2b (160)
Total Bytes: 320
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1030
Description: Full resolution (40 Hz) cloud top height obtained from the 1064 atmospheric channel. This parameter is for a 4 second record. Also parameter is in GLA06, 12-15.
Comments:

Product Var Name i_FRir_qaFlag
Is element of: GLA09 Record
Short Description: Full Resolution 1064 Quality Flag
Product Data Type: i1b (160)
Total Bytes: 160
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Please see <a href='flags/i_FRir_qaFlag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_FRir_intsig
Is element of: GLA09 Record
Short Description: Full Resolution 1064 Integrated Signal
Product Data Type: i2b (160)
Total Bytes: 320
Product Units: e7/(m-sr)
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Though called 'integrated signal' this is actually an average of all bins in the above-ground portion of the 1064 40 Hz profile with values above the threshold of 1.0e-7 (1/(m-sr). This parameter is for a 4 second record. This parameter is also in GLA06, 12-15.
Comments:

Product Var Name i_SolarAngle
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Solar Angle
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: micro-degrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Solar Angle above or below the plane tangent to the ellipsoid surface at the laser spot. Positive values mean the sun is above the horizon, while negative values mean it is below the horizon. The effect of atmospheric refraction is not included. This is a low-precision value, with approximately one degree accuracy.
Comments:

Product Var Name i_LRir_cld_top
Is element of: GLA09 Record
Short Description: Elevation of Top of Cloud Layers Detected in 1064 nm at Low Resolution
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2200
Description: Elevation of top of cloud layers detected in 1064 nm at low resolution data rate (1 per 4 sec).

Comments:

Product Var Name i_LRir_cld_bot
Is element of: GLA09 Record
Short Description: Elevation of Bottom of Cloud Layers Detected in 1064 nm at Low Resolution
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2200

Description: Elevation of Bottom of Cloud Layers Detected in 1064 nm at Low Resolution data rate (1 per 4 sec).

Comments:

Product Var Name i_LRir_QAflag
Is element of: GLA09 Record
Short Description: Low Resolution 1064 nm Cloud Layer QA Flag
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 256

Description: Low Resolution 1064 nm Cloud Layer QA Flag. Composite Flag - see Breakout for details
Please see <a href='flags/i_LRir_QAflag.pdf'> the PDF flag description in the next section</a> for more details.

The data is arranged in 10 bytes. Within the 10 bytes:

bytes 1-4 are spares
byte 5 leaves bits 4-7 as spare, and stores the af availability flag in
    bits 0-3; it provides the number of cloud layers determined
    from 1064 nm data, with 0=layers searched for but not
    detected and 15=cloud layers not searched for
bytes 6-10 are 10 flags, each 4 bits in length giving a quality flag;
    15=cloud layers were not searched for, 0=cloud layers searched
    for but not detected, 1= low chance of being a cloud,
2=moderate, 3=high, 4=no doubt

Comments:

Product Var Name: i_LRir_cldtop_temp
Is element of: GLA09 Record
Short Description: Temperature of Top of Cloud Layers Detected in 1064 nm at Low Resolution
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Temperature of Top of Cloud Layers Detected in 1064 nm at Low Resolution data rate (1 per 4 sec).
Comments:

Product Var Name: i_LRir_cldtop_pres
Is element of: GLA09 Record
Short Description: Pressure of Top of Cloud Layers Detected in 1064 nm at Low Resolution
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Top of Cloud Layers Detected in 1064 nm at Low Resolution data rate (1 per 4 sec).
Comments:

Product Var Name: i_LRir_cldtop_relh
Is element of: GLA09 Record
Short Description: Relative Humidity of Top of Cloud Layers Detected in 1064 nm at Low Resolution
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Top of Cloud Layers Detected in 1064 nm at Low Resolution data rate (1 per 4 sec).
Comments:

Product Var Name i_LRir_cldbot_temp
Is element of: GLA09 Record
Short Description: Temperature of Bottom of Cloud Layers Detected in 1064 nm at Low Resolution
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Temperature of Bottom of Cloud Layers Detected in 1064 nm at Low Resolution data rate (1 per 4 sec).
Comments:

Product Var Name i_LRir_cldbot_pres
Is element of: GLA09 Record
Short Description: Pressure of Bottom of Cloud Layers Detected in 1064 nm at Low Resolution
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Bottom of Cloud Layers Detected in 1064 nm at Low Resolution data rate (1 per 4 sec).
Comments:

Product Var Name i_LRir_cldbot_relh
Is element of: GLA09 Record
Short Description: Relative Humidity of Bottom of Cloud Layers Detected in 1064 nm Low Resolution
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Bottom of Cloud Layers Detected in 1064 nm Low Resolution data rate (1 per 4 sec).
Comments:

Product Var Name i_MRir_cld_top
Is element of: GLA09 Record, GLA11 Record
Short Description: Elevation of Top of Cloud Layers Detected in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2200
Description: Elevation of Top of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_MRir_cld_bot
Is element of: GLA09 Record, GLA11 Record
Short Description: Elevation of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2200
Description: Elevation of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_MRir_QAflag
Is element of: GLA09 Record, GLA11 Record
Short Description: Medium Resolution 1064 nm Cloud Layer QA Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Medium Resolution 1064 nm Cloud Layer QA Flag. Composite Flag - see Breakout for details
Please see <a href='flags/i_MRir_QAflag.pdf'> the PDF flag description in the next section for more details.
The data is arranged in 40 bytes.

bytes 1-18 are spares:

bytes 19-20 are af flags: The 4 'af' flags (4 bits each) are concatenated with the QAflag storage and are contained in bytes 19-20 starting at bit 0 of byte 20.

bytes 21-40 are QAflags: The QAflag portion has been stored such that interval 1 is in bytes 40-36, interval 2 in bytes 35-31, interval 3 in bytes 30-26, and interval 4 in bytes 25-21. Each of the 10 layer flags per interval is 4 bits in length as before, such that interval 1 layer 1 is in bits 0-3 and interval 1 layer 2 is in bits 4-7 of byte 40, interval 1 layer 3 is in bits 0-3 and interval 1 layer 4 is in bits 4-7 of byte 39, etc.

Quality flag value 15=cloud layers were not searched for; 0=cloud layers were searched but not detected; 1-14 indicate increasing confidence of good cloud retrieval (value 1=least confidence, value 14=greatest confidence).

Availability flag value 15=cloud layers not searched for; 0=layers searched for but not detected.

Comments:

Product Var Name i_MRir_cldtop_temp
Is element of: GLA09 Record, GLA11 Record
Short Description: Temperature of Top of Cloud Layers Detected in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Temperature of Top of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_MRir_cldtop_pres
Is element of: GLA09 Record, GLA11 Record
Short Description: Pressure of Top of Cloud Layers Detected in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Top of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_MRir_cldtop_relh
Is element of: GLA09 Record, GLA11 Record
Short Description: Relative Humidity of Top of Cloud Layers in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Top of Cloud Layers in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_MRir_cldbot_temp
Is element of: GLA09 Record, GLA11 Record
Short Description: Temperature of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Temperature of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_MRir_cldbot_pres
Is element of: GLA09 Record, GLA11 Record
Short Description: Pressure of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_MRir_cldbot_relh
Is element of: GLA09 Record, GLA11 Record
Short Description: Relative Humidity of Bottom of Cloud Layers Detected in 1064 nm at MR
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_LRg_cldtop_temp
Is element of: GLA09 Record
Short Description: Low Resolution 532 nm Cloud Top Temperature
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Low Resolution 532 nm Cloud Top Temperature
Comments:
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<th>Short Description</th>
<th>Product Data Type</th>
<th>Total Bytes</th>
<th>Product Units</th>
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<th>Is Correction Flag?</th>
<th>Is Unsigned?</th>
<th>Product Minimum</th>
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<th>Description</th>
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<td>Low Resolution 532 nm Cloud Top Pressure</td>
<td>i2b (10)</td>
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<td>hPa * 10</td>
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<td>Low Resolution 532 nm Cloud Top Relative Humidity</td>
<td>i2b (10)</td>
<td>20</td>
<td>percentage * 100</td>
<td>gi_invalid_i2b</td>
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<td>No</td>
<td>0</td>
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<td>Low Resolution 532 nm Cloud Top Relative Humidity</td>
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<tr>
<td>i_LRg_cldbot_temp</td>
<td>GLA09 Record</td>
<td>Low Resolution 532 nm Cloud Bottom Temperature</td>
<td>i2b (10)</td>
<td>20</td>
<td>degrees Celsius * 100</td>
<td>gi_invalid_i2b</td>
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<td>No</td>
<td>-10000</td>
<td>10000</td>
<td>Low Resolution 532 nm Cloud Bottom Temperature</td>
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</table>
Comments:

Product Var Name i_LRG_cldbot_pres
Is element of: GLA09 Record
Short Description: Low Resolution 532 nm Cloud Bottom Pressure
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Low Resolution 532 nm Cloud Bottom Pressure
Comments:

Product Var Name i_LRG_cldbot_relh
Is element of: GLA09 Record
Short Description: Low Resolution 532 nm Cloud Bottom Relative Humidity
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Low Resolution 532 nm Cloud Bottom Relative Humidity
Comments:

Product Var Name i_MRG_cldtop_temp
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Top Temperature
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000

Comments:
Product Maximum: 10000
Description: Medium Resolution 532 nm Cloud Top Temperature
Comments:

Product Var Name i_MRg_cldtop_pres
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Top Pressure
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Medium Resolution 532 nm Cloud Top Pressure
Comments:

Product Var Name i_MRg_cldtop_relh
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Top Relative Humidity
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Medium Resolution 532 nm Cloud Top Relative Humidity
Comments:

Product Var Name i_MRg_cldbot_temp
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Bottom Temperature
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Medium Resolution 532 nm Cloud Bottom Temperature
Comments:

Product Var Name i_MRg_clndot_pres
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Bottom Pressure
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Medium Resolution 532 nm Cloud Bottom Pressure
Comments:

Product Var Name i_MRg_clndot_relh
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Bottom Relative Humidity
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Medium Resolution 532 nm Cloud Bottom Relative Humidity
Comments:

Product Var Name i_LRg_SourceFt
Is element of: GLA09 Record
Short Description: Low Resolution Data 532 nm Source Function
Product Data Type: i2b
Total Bytes: 2
Product Units: Unknown
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Low Resolution Data 532 nm Source Function
Comments:

Product Var Name: i_MRg_SourceFt
Is element of: GLA09 Record
Short Description: Medium Resolution Data 532 nm Source Function
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Unknown
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Medium Resolution Data 532 nm Source Function
Comments:

Product Var Name: i_HRg_SourceFt
Is element of: GLA09 Record
Short Description: High Resolution Data 532 nm Source Function
Product Data Type: i2b (20)
Total Bytes: 40
Product Units: Unknown
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: High Resolution Data 532 nm Source Function
Comments:

Product Var Name: i_LRir_SourceFt
Is element of: GLA09 Record
Short Description: Low Resolution Data 1064 nm Source Function
Product Data Type: i2b
Total Bytes: 2
Product Units: Unknown
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Low Resolution Data 1064 nm Source Function
Comments:

Product Var Name i_MRir_SourceFt
Is element of: GLA09 Record
Short Description: Medium Resolution Data 1064 nm Source Function
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Unknown
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Medium Resolution Data 1064 nm Source Function
Comments:

Product Var Name i_Surface_temp
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Surface Temperature, 4 of 1-second intervals.
Comments:

Product Var Name i_Surface_pres
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Pressure
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Surface Pressure, 4 of 1-second intervals.
Comments:

Product Var Name i_Surface_relh
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Relative Humidity
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Surface Relative Humidity, 4 of 1-second intervals.
Comments:

Product Var Name i_Surface_wind
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Wind Speed
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: meters/second * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Surface Wind Speed, 4 of 1-second intervals. Wind speed at Earth's surface level measured in km/hour and derived from the meteorological data files.
Comments:
Product Var Name: i_Surface_wdir
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Wind Direction Azimuth from North
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: degrees * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Surface wind direction azimuth from North, 4 of 1-second intervals. Wind direction at Earth's surface level measured in degrees of azimuth from North and derived from the meteorological data files.
Comments:

Product Var Name: i_PBL_Layer_ht
Is element of: GLA08 Record, GLA09 Record
Short Description: PBL Layer Height from Met Data
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 1000
Description:
Comments:

Product Var Name: i_Spec_Humid
Is element of: GLA08 Record, GLA09 Record
Short Description: Specific Humidity
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: gram/kilogram*100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: Specific humidity 2m above ground.
Comments:
Product Var Name i_Temp2mAbvGrnd
Is element of: GLA08 Record, GLA09 Record
Short Description: Temperature 2m Above Ground Level
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description:
Comments:

Product Var Name i_Total_CloudCov
Is element of: GLA08 Record, GLA09 Record
Short Description: Total Cloud Cover
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: percentage
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description:
Comments:

Product Var Name i_blow_snow_ht
Is element of: GLA09 Record
Short Description: Blowing Snow Height
Product Data Type: i2b (20)
Total Bytes: 40
Product Units: meters * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Represents the maximum height above the surface of the blowing snow layer.

Comments:

Product Var Name i_blow_snow_od
Is element of: GLA09 Record
Short Description: Blowing Snow Optical Depth
Product Data Type: i2b (20)
Total Bytes: 40
Product Units: unitless * 1000
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 255

Description: An estimate of the optical depth of the blowing snow layer.

Comments:

Product Var Name i_blow_snow_erd
Is element of: GLA09 Record
Short Description: Blowing Snow Range Delay
Product Data Type: i2b (20)
Total Bytes: 40
Product Units: millimeters * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 255

Description: An estimate of the range delay caused by blowing snow.

Comments:

Product Var Name i_blow_snow_conf
Is element of: GLA09 Record
Short Description: Blowing Snow Confidence
Product Data Type: i1b (20)
Total Bytes: 20
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: NA
Description: A number that indicates the degree of confidence that this is indeed blowing snow. Blowing snow confidence ranges from 0 - 15 and has the following meanings:

0: profile tested, but no blowing snow detected
1 - 5: Good blowing snow detection using the 1064 channel. 1 is lowest confidence that layer is blowing snow, 5 is highest confidence.
6: Layer suspected of being low cloud (such as fog), or seemingly too thick to be blowing snow (> 1.0 km thick) as determined from 1064 channel.
7 - 12: Good blowing snow detection using the 532 channel. 7 is lowest confidence that layer is blowing snow, 12 is highest confidence.
13: Layer suspected of being low cloud (such as fog), or seemingly too thick to be blowing snow (> 1.0 km thick) as determined from 532 channel.
14: Wind speed < 5 m/s or ground stroke not detected (the latter case indicating overlying thick cloud)
15: Signal not examined for blowing snow (could be because it is closer to the equator than plus or minus 60 degrees latitude, or not over sea ice or land)

Comments:

Product Var Name i_atm_char_flag
Is element of: GLA09 Record
Short Description: Atmosphere Characterization Flag
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: N/A
Invalid Value/Flag: N/A
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10
Description: Flag to characterize cloud and blowing snow state of the atmosphere
0 clear
1 high cloud (> 5 km) low optical depth
2 high cloud (> 5 km), high optical depth
3 mid cloud (>2, <=5 km) low optical depth
4 mid cloud (>2, <=5 km) high optical depth
5 low cloud (> 500 m, <=2 km), low optical depth
6 low cloud (> 500 m, <=2 km), high optical depth
7 blowing snow or fog (< 500 m), low optical depth
8 blowing snow or fog (< 500 m), high optical depth
9 not tested
10 data quality insufficient to assign flag
Comments:

Product Var Name i_atm_char_conf
Is element of: GLA09 Record
Short Description: Atmosphere Characterization Flag Confidence
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: N/A
Invalid Value/Flag: N/A
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Confidence level ascribed to the atmosphere characterization flag
Comments: 0 Not applicable (for contamination flag values of 9 or 10)
1 low confidence
2 reasonable confidence
3 high confidence

Product Var Name i_spare4
Is element of: GLA09 Record
Short Description: Spare 4
Product Data Type: i1b (402)
Total Bytes: 402
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA09 Spare4

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_beam_coelev
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Co-elevation
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: Co-elevation (CE) is direction from vertical of the laser beam as seen by an observer located at the laser ground spot.
Comments:

Product Var Name i_beam_azimuth
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Azimuth
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: Azimuth (Az) is the direction clockwise from north of the laser beam as seen by an observer at the laser ground spot.
Comments:

Product Var Name i_pad_angle
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: PAD Angle
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600000000
Description: Attitude angle calculated from PAD and POD.
Comments:

Product Var Name i_spare0
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Spares 0
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name: i_AttFlg1
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Attitude flag
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see <a href='flags/i_AttFlg1.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name: i_lat
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Profile Location, Latitude
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and latitude, at the 1 hertz rate.
Comments:

Product Var Name: i_lon
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Profile Location, Longitude
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000
Description: Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and latitude, at the 1 hertz rate.
Comments:

Product Var Name i_OrbFlg
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Orbit flag
Product Data Type: i1b (2, 4)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see <a href='flags/i_OrbFlg.pdf'> the PDF flag description in the next section for more details.
The there are 4 sets of this flag value, 1/sec for each of the 4 sec covered in the record.
Comments:

Product Var Name i_surfType
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Region Type
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 15
Description: Describes the region type or types associated with each shot Ice Sheet, ocean, sea ice, or Land.
Please see <a href='flags/i_surfType.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_LidarQF
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Lidar Frame quality flag
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see <a href='flags/i_LidarQF.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_cld1_bs_prof
Is element of: GLA10 record
Short Description: Cloud Backscatter Cross Section Profile at 532 nm
Product Data Type: i4b (280, 4)
Total Bytes: 4480
Product Units: e10/(m-sr)
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000000
Product Maximum: 100000000
Description: 532 nm cloud backscatter cross section corrected for attenuation, from 20 to -1km at 1hz. The first 4*280 bytes refer to the profile at the first second.
Comments:

Product Var Name i_cld1_ext_prof
Is element of: GLA10 record
Short Description: Cloud Extinction Cross Section Profile at 532 nm
Product Data Type: i4b (280, 4)
Total Bytes: 4480
Product Units: e9/m
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000000
Product Maximum: 1000000000
Description: Cloud extinction cross section profile from 20 to -1km at 1hz calculated from the 532 nm data. The first $4 \times 280$ bytes refer to the profile at the first second.

Comments:

Product Var Name: $i\_aer4\_bs\_prof$
Is element of: GLA10 record
Short Description: Aerosol Backscatter Cross Section Profile at 532nm
Product Data Type: i4b (548)
Total Bytes: 2192
Product Units: $e10/(m\cdot sr)$
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000000
Product Maximum: 100000000

Description: 532 nm aerosol backscatter cross section from 40 to -1km at 0.25hz. The $4 \times 548$ bytes refer to the profile at the four second interval.

Comments:

Product Var Name: $i\_aer4\_ext\_prof$
Is element of: GLA10 record
Short Description: Aerosol Extinction Cross Section Profile at 532 nm
Product Data Type: i4b (548)
Total Bytes: 2192
Product Units: $e9/m$
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000000
Product Maximum: 1000000000

Description: Aerosol extinction cross section profile for 40 to -1km calculated from the 532 nm data at 0.25hz. The $4 \times 548$ bytes refer to the profile at the four second interval.

Comments:

Product Var Name: $i\_cld1\_sval1$
Is element of: GLA10 record
Short Description: Cloud true S values from table
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: 100*sr
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 100  
Product Maximum: 20000  

Description: Cloud true extinction to backscatter ratios calculated from meteorological and geographic data. The first set of 2*10 bytes refers to the 10 possible layers at the first second.

Comments:

Product Var Name i_cld1_sval2  
Is element of: GLA10 record  
Short Description: Cloud true S values from equation calc.  
Product Data Type: i2b (10, 4)  
Total Bytes: 80  
Product Units: 100*sr  
Invalid Value/Flag: gi_invalid_i2b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 100  
Product Maximum: 20000  

Description: Cloud true extinction to backscatter ratios calculated from optically thin layer considerations. The first set of 2*10 bytes refers to the 10 possible layers at the first second.

Comments:

Product Var Name i_aer4_sval1  
Is element of: GLA10 record  
Short Description: Aerosol true S Values from table  
Product Data Type: i2b (9)  
Total Bytes: 18  
Product Units: 100*sr  
Invalid Value/Flag: gi_invalid_i2b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 100  
Product Maximum: 20000  

Description: Aerosol true extinction to backscatter ratios calculated from meteorological and geographic data

Comments:

Product Var Name i_aer4_sval2  
Is element of: GLA10 record  
Short Description: Aerosol true S Values from equation calc.  
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: 100*sr
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 100
Product Maximum: 20000
Description: Aerosol true extinction to backscatter ratios calculated from optically thin layer considerations
Comments:

Product Var Name i_cld1_bot
Is element of: GLA10 record, GLA11 Record
Short Description: Medium Resolution Cloud Bottom at 532 nm
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: Medium resolution cloud bottom heights for layers which were selected for optical processing at 1hz, 1 per layer, 10 layers
Comments:

Product Var Name i_cld1_top
Is element of: GLA10 record, GLA11 Record
Short Description: Medium Resolution Cloud Top at 532 nm
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: Medium resolution cloud top heights for layers which were selected for optical processing at 1hz, 1 per layer, 10 layers
Comments:

Product Var Name i_cld1_grd_det
Is element of: GLA10 record, GLA11 Record
Short Description: Medium Resolution Ground Detection at 532 nm
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: Medium resolution processed ground height at 1hz, 1 per profile
Comments:

Product Var Name i_aer4_bot
Is element of: GLA10 record
Short Description: Low Resolution Aerosol Layer Bottom at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 4000
Description: Low resolution aerosol layer bottom heights for layers which were selected for optical processing at 0.25hz, 1 per layer; 9 layers including the planetary boundary layer and PSC
Comments:

Product Var Name i_aer4_top
Is element of: GLA10 record
Short Description: Low Resolution Aerosol Layer Top at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 4000
Description: Low resolution aerosol layer top heights for layers which were selected for optical processing at 0.25hz, 1 per layer; 9 layers including the planetary boundary layer and PSC
Comments:

Product Var Name i_pbl4_grd_det
Is element of: GLA10 record
Short Description: Low Resolution Aerosol Layer Ground Detection
Product Data Type: i2b
Total Bytes: 2
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 1000
Description: Low resolution processed ground detection height at 0.25hz, 1 per profile
Comments:

Product Var Name i_spare2
Is element of: GLA10 record
Short Description: Spare 2
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA10 spare2.

Product Var Name i_cld1_sval uf
Is element of: GLA10 record
Short Description: Cloud true S values use flag
Product Data Type: i1b (20)
Total Bytes: 20
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Cloud true S values use flag for 10 layers at 1 Hz for 4 sec. First 40 bits (bytes 16-20) are for 10 lay-
ers of the first second, last 40 bits (bytes 1 - 5) are for 10 layers of the fourth second. Stipulates which extinction to
backscatter ratio was used in processing (1=default, 2=calculated). 15 denotes no layer detected (invalid).
Please see <a href='flags/i_cld1_sval_uf.pdf'> the PDF flag description in the next section  for more details.
Comments:

Product Var Name i_aer4_sval_uf
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol true S Values use flag
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Aerosol true S values use flag for 9 layers at 1 per 4 sec. Bits 0-3 (least significant bits) of byte 5 are
for first layer, bits 0-3 of byte 1 are for 9th layer. 15 denotes no layer detected (invalid).  Bits 36-39 are spares
needed to make 5 bytes. Stipulates which extinction to backscatter ratio was used in processing (1=default, 2=cal-
culated).
Please see <a href='flags/i_aer4_sval_uf.pdf'> the PDF flag description in the next section  for more details.
Comments:

Product Var Name i_spare3
Is element of: GLA10 record
Short Description: Spares
Product Data Type: i1b (3)
Total Bytes: 3
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains
no meaningful information.
Comments:

Product Var Name i_cld1_bs_flag
Is element of: GLA10 record
Short Description: Cloud backscatter flag for 532 nm
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Composite Flag - see Breakout for details
Please see <a href='flags/i_cld1_bs_flag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_cld1_ext_flag
Is element of: GLA10 record
Short Description: Cloud extinction flag at 532 nm
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Composite Flag - see Breakout for details
Please see <a href='flags/i_cld1_ext_flag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_aer4_bs_flag
Is element of: GLA10 record
Short Description: Aerosol backscatter flag for 532 nm
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Composite Flag - see Breakout for details
Please see `<a href='flags/i_aer4_bs_flag.pdf'> the PDF flag description in the next section for more details.</a>

Comments:

**Product Var Name i_aer4_ext_flag**
- Is element of: GLA10 record
- Short Description: Aerosol extinction flag for 532 nm
- Product Data Type: i1b (10)
- Total Bytes: 10
- Product Units: NA
- Invalid Value/Flag: No
- Is Correction Flag?: NA
- Is Unsigned?: No
- Product Minimum: 0
- Product Maximum: 15

Description: Composite Flag - see Breakout for details

Please see `<a href='flags/i_aer4_ext_flag.pdf'> the PDF flag description in the next section for more details.</a>

Comments:

**Product Var Name i_spare4**
- Is element of: GLA10 record
- Short Description: Spare 4
- Product Data Type: i1b
- Total Bytes: 1
- Product Units: null
- Invalid Value/Flag: No
- Is Correction Flag?: NA
- Is Unsigned?: No
- Product Minimum: 0
- Product Maximum: 0

Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

**Product Var Name i_AttFlg3**
- Is element of: GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
- Short Description: Attitude Flag 3
- Product Data Type: i1b
- Total Bytes: 1
- Product Units: NA
- Invalid Value/Flag: No
- Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Please see <a href='flags/i_AttFlg3.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href='flags/i_timecorflg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_SolarAngle
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Solar Angle
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: micro-degrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Solar Angle above or below the plane tangent to the ellipsoid surface at the laser spot. Positive values mean the sun is above the horizon, while negative values mean it is below the horizon. The effect of atmospheric refraction is not included. This is a low-precision value, with approximately one degree accuracy.
Comments:

Product Var Name i_MRg_cldtop_temp
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Top Temperature
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Medium Resolution 532 nm Cloud Top Temperature
Comments:

Product Var Name i_MRg_cldtop_pres
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Top Pressure
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Medium Resolution 532 nm Cloud Top Pressure
Comments:

Product Var Name i_MRg_cldtop_relh
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Top Relative Humidity
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Medium Resolution 532 nm Cloud Top Relative Humidity
Comments:
Product Var Name i_MRg_cldbot_temp
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Bottom Temperature
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Medium Resolution 532 nm Cloud Bottom Temperature
Comments:

Product Var Name i_MRg_cldbot_pres
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Bottom Pressure
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Medium Resolution 532 nm Cloud Bottom Pressure
Comments:

Product Var Name i_MRg_cldbot_relh
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Bottom Relative Humidity
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Medium Resolution 532 nm Cloud Bottom Relative Humidity
Comments:

Product Var Name i_Aer_top_temp
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol Layers Temperature at Top of Layer at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Aerosol Layers Temperature at Top of Layer at 532 nm
Comments:

Product Var Name i_Aer_top_pres
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol Layers Pressure at Top of Layer at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Aerosol Layers Pressure at Top of Layer at 532 nm
Comments:

Product Var Name i_Aer_top_relh
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol Layers Relative Humidity at Top of Layer at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Aerosol Layers Relative Humidity at Top of Layer at 532 nm
Comments:

Product Var Name i_Aer_bot_temp
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol Layers Temperature at Bottom of Layer at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Aerosol Layers Temperature at Bottom of Layer at 532 nm
Comments:

Product Var Name i_Aer_bot_pres
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol Layers Pressure at Bottom of Layer at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Aerosol Layers Pressure at Bottom of Layer at 532 nm
Comments:

Product Var Name i_Aer_bot_relh
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol Layers Relative Humidity at Bottom of Layer at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Aerosol Layers Relative Humidity at Bottom of Layer at 532 nm
Comments:

Product Var Name i_Surface_temp
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Surface Temperature, 4 of 1-second intervals.
Comments:

Product Var Name i_Surface_pres
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Pressure
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Surface Pressure, 4 of 1-second intervals.
Comments:

Product Var Name i_Surface_relh
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Relative Humidity
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Surface Relative Humidity, 4 of 1-second intervals.
Comments:

Product Var Name i_Surface_wind
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Wind Speed
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: meters/second * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Surface Wind Speed, 4 of 1-second intervals. Wind speed at Earth's surface level measured in km/hour and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_wdir
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Wind Direction Azimuth from North
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: degrees * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Surface wind direction azimuth from North, 4 of 1-second intervals. Wind direction at Earth's surface level measured in degrees of azimuth from North and derived from the meteorological data files.
Comments:

Product Var Name i_aod_botht_4s
Is element of: GLA10 record
Short Description: Cloud-free Trop. Height
Product Data Type: i2b
Total Bytes: 2
Product Units: deka-meters
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: -1000
Product Maximum: 40000
Description: Height of cloud-free troposphere (bottom of full column extinction profile).
Comments:

Product Var Name i_spare5
Is element of: GLA10 record
Short Description: Spare 5
Product Data Type: i1b (290)
Total Bytes: 290
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare5 GLA10

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_beam_coelev
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Co-elevation
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: Co-elevation (CE) is direction from vertical of the laser beam as seen by an observer located at the laser ground spot.
Comments:

Product Var Name i_beam_azimuth
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Azimuth
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: Azimuth (Az) is the direction clockwise from north of the laser beam as seen by an observer at the laser ground spot.
Comments:

Product Var Name i_pad_angle
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: PAD Angle
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600000000
Description: Attitude angle calculated from PAD and POD.
Comments:

Product Var Name i_spare0
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Spares 0
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_AttFlg1
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Attitude flag
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see <a href='flags/i_AttFlg1.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_lat
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Profile Location, Latitude
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and latitude, at the 1 hertz rate.
Comments:

Product Var Name i_lon
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Profile Location, Longitude
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microdegrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000
Description: Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and latitude, at the 1 hertz rate.
Comments:
Product Var Name: i_OrbFlg
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Orbit flag
Product Data Type: i1b (2, 4)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see <a href='flags/i_OrbFlg.pdf'> the PDF flag description in the next section</a> for more details.
There are 4 sets of this flag value, 1/sec for each of the 4 sec covered in the record.
Comments:

Product Var Name: i_surfType
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Region Type
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 15
Description: Describes the region type or types associated with each shot: Ice Sheet, ocean, sea ice, or Land.
Please see <a href='flags/i_surfType.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name: i_LidarQF
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Lidar Frame quality flag
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Composite Flag - see Common Flag Spreadsheet for details
Please see <a href='flags/i_LidarQF.pdf'>the PDF flag description in the next section for more details.
Comments:

Product Var Name i_cld1_od
Is element of: GLA11 Record
Short Description: Cloud Optical Depth at 532 nm
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: unitless\*1000
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: 532 nm cloud optical depth, corrected for multiple scattering, at 1hz, 1 per layer, 10 layers
Comments:

Product Var Name i_aer4_od
Is element of: GLA11 Record
Short Description: Aerosol Optical Depth at 532 nm
Product Data Type: i2b (8)
Total Bytes: 16
Product Units: unitless\*1000
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: 532 nm elevated aerosol optical depth, corrected for multiple scattering, at 0.25hz, 1 per layer, 8 layers
Comments:

Product Var Name i_pbl4_od
Is element of: GLA11 Record
Short Description: PBL Optical Depth at 532 nm
Product Data Type: i2b
Total Bytes: 2
Product Units: unitless*1000
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: 532 nm Planetary Boundary Layer aerosol optical depth, corrected for multiple scattering at 0.25hz, 1 per layer, 1 layer
Comments:

Product Var Name i_aer4_msf
Is element of: GLA11 Record
Short Description: Aerosol Multiple Scattering Factor
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: Aerosol multiple scattering coefficient used at 0.25hz, 1 per layer, 9 layers (including PSC and PBL)
Comments:

Product Var Name i_cld1_msf
Is element of: GLA11 Record
Short Description: Cloud Multiple Scattering Factor
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: Cloud multiple scattering coefficient at 1 hz, 1 per layer, 10 layers
Comments:

Product Var Name i_cld1_bot
Is element of: GLA10 record, GLA11 Record
Short Description: Medium Resolution Cloud Bottom at 532 nm
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: Medium resolution cloud bottom heights for layers which were selected for optical processing at 1hz, 1 per layer, 10 layers
Comments:

Product Var Name i_cld1_top
Is element of: GLA10 record, GLA11 Record
Short Description: Medium Resolution Cloud Top at 532 nm
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: Medium resolution cloud top heights for layers which were selected for optical processing at 1hz, 1 per layer, 10 layers
Comments:

Product Var Name i_cld1_grd_det
Is element of: GLA10 record, GLA11 Record
Short Description: Medium Resolution Ground Detection at 532 nm
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2000
Description: Medium resolution processed ground height at 1hz, 1 per profile
Comments:
Product Var Name: i_aer4_bot
Is element of: GLA11 Record
Short Description: Low Resolution Aerosol Layer Bottom at 532 nm
Product Data Type: i2b (8)
Total Bytes: 16
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 4000
Description: Low resolution elevated aerosol layer (including PSC) bottom height for layers which were selected for optical processing at 0.25hz, 1 per layer, 8 layers
Comments:

Product Var Name: i_aer4_top
Is element of: GLA11 Record
Short Description: Low Resolution Aerosol Layer Top at 532 nm
Product Data Type: i2b (8)
Total Bytes: 16
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 4000
Description: Low resolution elevated aerosol layer (including PSC) top height for layers which were selected for optical processing at 0.25hz, 1 per layer, 8 layers
Comments:

Product Var Name: i_aer4 ht
Is element of: GLA11 Record
Short Description: Low Resolution PBL Height at 532 nm
Product Data Type: i2b
Total Bytes: 2
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 700
Description: Low resolution Planetary Boundary Layer height at 0.25hz, 1 per profile

Comments:

Product Var Name i_aer4_grd_det
Is element of: GLA11 Record
Short Description: Low Resolution Ground Detection at 532 nm
Product Data Type: i2b
Total Bytes: 2
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 1000

Description: Low resolution processed ground detection height at 0.25hz, 1 per profile
Comments:

Product Var Name i_erd
Is element of: GLA11 Record
Short Description: Estimated Range Delay
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: millimeters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000

Description: The estimated range delay is an estimate of the effect of atmospheric multiple scattering on the measured range as deduced from the surface pulse. Tables were created using the Monte Carlo method which contain the range delay as a function of height of scatting layer, geometrical thickness, optical thickness and particle size. The i_erd is provided to the elevation process as a range correction and is reported as a negative number that can be added to the range to correct it. The computation of i_erd is restricted to those times when the 532 channel was working sufficiently well (L2A and first half of L2B (also possibly for night L3A and L3B)).

Comments:

Product Var Name i_pse
Is element of: GLA11 Record
Short Description: Particle Size Estimate
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: microns
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: Particle size estimate used to calculate warning flag and range delay, 1 per second
Comments:

Product Var Name i_cld1_mswf
Is element of: GLA11 Record
Short Description: Cloud Multiple Scattering Warning Flag
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Cloud Multiple Scattering Warning Flag at 1 Hz for 4 sec. First 4 bits are for first second, last 4 bits are for 4th second.
Please see <a href='flags/i_cld1_mswf.pdf'> the PDF flag description in the next section for more details.

The multiple scattering warning flag (MSWF) is based on the total column optical depth (aerosol plus cloud) calculated in GLA11 using 532nm. It is intended as a way to quickly obtain information about the potential severity of multiple scattering with regards to the range-to-surface calculated by the altimetry processing software. It will be output on the GLA11 product for use by the altimetry group. The multiple scattering warning flag will have values ranging from 0-14, based on the total column optical depth as detailed in the PDF.

A warning flag value of 15 will signify ?invalid?. An invalid will be encoded if an optical depth in any of the layers in the 1-second column could not be calculated. This usually occurs in a very optically ?thick? cloud which extinguishes the signal. It could also occur if the extinction-to-backscatter ratio assignment is set too high, causing the transmission calculations in the lidar inversion to go out-of-range.

Comments:

Product Var Name i_cld1_flag
Is element of: GLA11 Record
Short Description: Cloud optical depth flag for 532 nm
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Composite Flag - see Breakout for details
Please see <a href='flags/i_cld1_flag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_aer4_flag
Is element of: GLA11 Record
Short Description: Aerosol optical depth flag for 532 nm
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Composite Flag - see Breakout for details
Please see <a href='flags/i_aer4_flag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_pbl4_flag
Is element of: GLA11 Record
Short Description: PBL optical depth flag for 532 nm
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Composite Flag - see Breakout for details
Please see <a href='flags/i_pbl4_flag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_AttFlg3
Is element of: GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Attitude Flag 3
Product Data Type: i1b
Total Bytes: 1
Product Var Name i\_timecorrflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see `<a href='flags/i\_AttFlg3.pdf'>` the PDF flag description in the next section for more details.
Comments:

Product Var Name i\_rdu
Is element of: GLA11 Record
Short Description: Range Delay Uncertainty
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: millimeters
Invalid Value/Flag: gi\_invalid\_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Estimated uncertainty value in the range delay distance.
Comments:

Product Var Name i\_spare2
Is element of: GLA11 Record
Short Description: Spare 2
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA11 spare2.

Product Var Name i_SolarAngle
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Solar Angle
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: micro-degrees
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Solar Angle above or below the plane tangent to the ellipsoid surface at the laser spot. Positive values mean the sun is above the horizon, while negative values mean it is below the horizon. The effect of atmospheric refraction is not included. This is a low-precision value, with approximately one degree accuracy.
Comments:

Product Var Name i_MRg_cldtop_temp
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Top Temperature
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Medium Resolution 532 nm Cloud Top Temperature

Comments:

Product Var Name i_MRg_cldtop_pres
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Top Pressure
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Medium Resolution 532 nm Cloud Top Pressure

Comments:

Product Var Name i_MRg_cldtop_relh
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Top Relative Humidity
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Medium Resolution 532 nm Cloud Top Relative Humidity

Comments:

Product Var Name i_MRg_cldbot_temp
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Bottom Temperature
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Medium Resolution 532 nm Cloud Bottom Temperature
Comments:

Product Var Name i_MRg_cldbot_pres
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Bottom Pressure
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Medium Resolution 532 nm Cloud Bottom Pressure
Comments:

Product Var Name i_MRg_cldbot_relh
Is element of: GLA09 Record, GLA10 record, GLA11 Record
Short Description: Medium Resolution 532 nm Cloud Bottom Relative Humidity
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Medium Resolution 532 nm Cloud Bottom Relative Humidity
Comments:

Product Var Name i_Aer_top_temp
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol Layers Temperature at Top of Layer at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Aerosol Layers Temperature at Top of Layer at 532 nm
Comments:

Product Var Name: i_Aer_top_pres
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol Layers Pressure at Top of Layer at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Aerosol Layers Pressure at Top of Layer at 532 nm
Comments:

Product Var Name: i_Aer_top_relh
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol Layers Relative Humidity at Top of Layer at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Aerosol Layers Relative Humidity at Top of Layer at 532 nm
Comments:

Product Var Name: i_Aer_bot_temp
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol Layers Temperature at Bottom of Layer at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Aerosol Layers Temperature at Bottom of Layer at 532 nm
Comments:

Product Var Name i_Aer_bot_pres
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol Layers Pressure at Bottom of Layer at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Aerosol Layers Pressure at Bottom of Layer at 532 nm
Comments:

Product Var Name i_Aer_bot_relh
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol Layers Relative Humidity at Bottom of Layer at 532 nm
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Aerosol Layers Relative Humidity at Bottom of Layer at 532 nm
Comments:

Product Var Name i_Aer_ir_top
Is element of: GLA08 Record, GLA11 Record
Short Description: Elevation of Top of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)  
Total Bytes: 4  
Product Units: deka-meters  
Invalid Value/Flag: gi_invalid_i2b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: -100  
Product Maximum: 2200  
Description: Elevation of Top of Aerosol Layers detected in 1064 nm  
Comments:  
Product Var Name i_Aer_ir_bot  
Is element of: GLA08 Record, GLA11 Record  
Short Description: Elevation of Bottom of Aerosol Layers Detected in 1064 nm  
Product Data Type: i2b (2)  
Total Bytes: 4  
Product Units: deka-meters  
Invalid Value/Flag: gi_invalid_i2b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: -100  
Product Maximum: 2200  
Description: Elevation of Bottom of Aerosol Layers Detected in 1064 nm.  
Comments:  
Product Var Name i_Aer_ir_top_temp  
Is element of: GLA08 Record, GLA11 Record  
Short Description: Temperature of Top of Aerosol Layers Detected in 1064 nm  
Product Data Type: i2b (2)  
Total Bytes: 4  
Product Units: degrees Celsius * 100  
Invalid Value/Flag: gi_invalid_i2b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: -10000  
Product Maximum: 10000  
Description: Temperature of Top of Aerosol Layers Detected in 1064 nm  
Comments:  
Product Var Name i_Aer_ir_top_pres
Is element of: GLA08 Record, GLA11 Record
Short Description: Pressure of Top of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Top of Aerosol Layers Detected in 1064 nm
Comments:

Product Var Name i_Aer_ir_top_relh
Is element of: GLA08 Record, GLA11 Record
Short Description: Relative Humidity of Top of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Top of Aerosol Layers Detected in 1064 nm
Comments:

Product Var Name i_Aer_ir_bot_temp
Is element of: GLA08 Record, GLA11 Record
Short Description: Temperature of Bottom of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Temperature of Bottom of Aerosol Layers Detected in 1064 nm
Comments:
Product Var Name: i_Aer_ir_bot_pres
Is element of: GLA08 Record, GLA11 Record
Short Description: Pressure of Bottom of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Bottom of Aerosol Layers Detected in 1064 nm
Comments:

Product Var Name: i_Aer_ir_bot_relh
Is element of: GLA08 Record, GLA11 Record
Short Description: Relative Humidity of Bottom of Aerosol Layers Detected in 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Bottom of Aerosol Layers Detected in 1064 nm
Comments:

Product Var Name: i_MRir_cld_top
Is element of: GLA09 Record, GLA11 Record
Short Description: Elevation of Top of Cloud Layers Detected in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2200
Description: Elevation of Top of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.

Comments:

Product Var Name i_MRir_cld_bot
Is element of: GLA09 Record, GLA11 Record
Short Description: Elevation of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -100
Product Maximum: 2200

Description: Elevation of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.

Comments:

Product Var Name i_MRir_cldtop_temp
Is element of: GLA09 Record, GLA11 Record
Short Description: Temperature of Top of Cloud Layers Detected in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000

Description: Temperature of Top of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.

Comments:

Product Var Name i_MRir_cldtop_pres
Is element of: GLA09 Record, GLA11 Record
Short Description: Pressure of Top of Cloud Layers Detected in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Top of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_MRir_cldtop_relh
Is element of: GLA09 Record, GLA11 Record
Short Description: Relative Humidity of Top of Cloud Layers in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Top of Cloud Layers in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_MRir_cldbot_temp
Is element of: GLA09 Record, GLA11 Record
Short Description: Temperature of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Temperature of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_MRir_cldbot_pres
Is element of: GLA09 Record, GLA11 Record
Short Description: Pressure of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_MRir_cldbot_relh
Is element of: GLA09 Record, GLA11 Record
Short Description: Relative Humidity of Bottom of Cloud Layers Detected in 1064 nm at MR
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.
Comments:

Product Var Name i_MRir_QAflag
Is element of: GLA09 Record, GLA11 Record
Short Description: Medium Resolution 1064 nm Cloud Layer QA Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Medium Resolution 1064 nm Cloud Layer QA Flag. Composite Flag - see Breakout for details
Please see <a href='flags/i_MRir_QAflag.pdf'> the PDF flag description in the next section for more details.
The data is arranged in 40 bytes.
bytes 1-18 are spares:
bytes 19-20 are af flags: The 4 'af' flags (4 bits each) are concatenated with the QAflag storage and are contained in bytes 19-20 starting at bit 0 of byte 20.
bytes 21-40 are QAflags: The QAflag portion has been stored such that interval 1 is in bytes 40-36, interval 2 in bytes 35-31, interval 3 in bytes 30-26, and interval 4 in bytes 25-21. Each of the 10 layer flags per interval is 4 bits in length as before, such that interval 1 layer 1 is in bits 0-3 and interval 1 layer 2 is in bits 4-7 of byte 40, interval 1 layer 3 is in bits 0-3 and interval 1 layer 4 is in bits 4-7 of byte 39, etc.
Quality flag value 15=cloud layers were not searched for; 0=cloud layers were searched but not detected; 1-14 indicate increasing confidence of good cloud retrieval (value 1=least confidence, value 14=greatest confidence).

Availability flag value 15=cloud layers not searched for; 0=layers searched for but not detected.

Comments:

Product Var Name i_Aer_PBL_LR_temp
Is element of: GLA08 Record, GLA11 Record
Short Description: Temperature of Low Resolution Planetary Boundary Layer Top at 532 nm
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Temperature of Low Resolution Planetary Boundary Layer Top at 532 nm
Comments:

Product Var Name i_Aer_PBL_LR_pres
Is element of: GLA08 Record, GLA11 Record
Short Description: Pressure of Low Resolution Planetary Boundary Layer Top at 532 nm
Product Data Type: i2b
Total Bytes: 2
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Pressure of Low Resolution Planetary Boundary Layer Top at 532 nm
Comments:

Product Var Name i_Aer_PBL_LR_relh
Is element of: GLA08 Record, GLA11 Record
Short Description: Relative Humidity of Low Resolution Planetary Boundary Layer Top at 532 nm
Product Data Type: i2b
Total Bytes: 2
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Relative Humidity of Low Resolution Planetary Boundary Layer Top at 532 nm
Comments:

Product Var Name i_Surface_temp
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Surface Temperature, 4 of 1-second intervals.
Comments:

Product Var Name i_Surface_pres
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Pressure
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Surface Pressure, 4 of 1-second intervals.
Comments:

Product Var Name i_Surface_relh
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Relative Humidity
Product Data Type: i2b (4)
Data Dictionary  The GLAS Standard Data Products Specification - Data Dictionary

Total Bytes: 8
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Surface Relative Humidity, 4 of 1-second intervals.
Comments:

Product Var Name i_Surface_wind
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Wind Speed
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: meters/second * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Surface Wind Speed, 4 of 1-second intervals. Wind speed at Earth's surface level measured in km/hour and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_wdir
Is element of: GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record
Short Description: Surface Wind Direction Azimuth from North
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: degrees * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Surface wind direction azimuth from North, 4 of 1-second intervals. Wind direction at Earth's surface level measured in degrees of azimuth from North and derived from the meteorological data files.
Comments:

Product Var Name i_Aer_ir_OD
Is element of: GLA11 Record
Short Description: Aerosol Optical Depth at 1064 nm
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: Unknown
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Aerosol Optical Depth at 1064 nm
Comments:

Product Var Name i_cld_ir_OD
Is element of: GLA11 Record
Short Description: Cloud Optical Depth at 1064 nm
Product Data Type: i2b (10, 4)
Total Bytes: 80
Product Units: Unknown
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Cloud Optical Depth at 1064 nm
Comments:

Product Var Name i_spare6
Is element of: GLA11 Record
Short Description: Spare 6
Product Data Type: i1b (202)
Total Bytes: 202
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA11 Spare6
Product Var Name: i_reflct_1064od_40hz_cor
Is element of: GLA11 Record
Short Description: 40 Hz 1064nm total column od
Product Data Type: i2b (40, 4)
Total Bytes: 320
Product Units: unitless
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: -100
Product Maximum: 10000
Description: Total column 1064nm optical depth from surface reflectance corrected for multiple scattering.
Comments:

Product Var Name: i_reflct_1064msf_40hz
Is element of: GLA11 Record
Short Description: 40 Hz 1064nm multiple scattering corr. factor
Product Data Type: i1b (40, 4)
Total Bytes: 160
Product Units: unitless
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 255
Description: Total column od 1064nm multiple scattering correction factor.
Comments:

Product Var Name: i_reflct_1064od_1hz_cor
Is element of: GLA11 Record
Short Description: 1 Hz 1064nm total column od
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: unitless
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: -100
Product Maximum: 10000
Description: Total column 1064nm optical depth from surface reflectance corrected for multiple scattering.

Comments:

Product Var Name: \texttt{i_reflct\_1064msf\_1hz}
Is element of: GLA11 Record
Short Description: 1 Hz 1064nm multiple scattering corr. factor
Product Data Type: \texttt{i1b (4)}
Total Bytes: 4
Product Units: unitless
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 255

Description: Total column od 1064nm multiple scattering correction factor.

Comments:

Product Var Name: \texttt{i_reflct\_pristine\_1hz}
Is element of: GLA11 Record
Short Description: 1064nm modeled surface reflectance
Product Data Type: \texttt{i2b (4)}
Total Bytes: 8
Product Units: unitless
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 5000

Description: Modeled (calculated) 1064nm surface reflectance from wind speed.

Comments:

Product Var Name: \texttt{i_aod\_4s}
Is element of: GLA11 Record
Short Description: Total Column Aerosol OD (AOD)
Product Data Type: \texttt{i2b}
Total Bytes: 2
Product Units: unitless*1000
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: -100
Product Maximum: 10000
Description: Total column aerosol optical depth (AOD).
Comments:

Product Var Name: i_aod_flg_4s
Is element of: GLA11 Record
Short Description: AOD use flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 15
Description: AOD use flag.<br>
<br>
The total column AOD use flag ranges from 0 - 7 and has the following meanings:<br>
<br>
0 - night, full column good, no bad layers, ground detected - highest quality<br>
1 - day, no full column, sum of all detected layers, no bad layers, ground detected - highest daytime quality<br>
2 - night, full column good, with detected lower layers with a bad layer<br>
3 - night, full column good, with bad lower layers<br>
4 - night, full column bad, includes only detected lower layers.<br>
5 - day, no full column, sum of all good layers, but bad layer present<br>
6 - night, full column good, but no ground detected<br>
7 - day, no full column, good or no layers, but no ground detected<br>
15 - invalid<br>
<br>
Notes: In the descriptions above 'full column' means the extinction retrieval from 20 km to d_aod_botht_4s. 'Bad layer' means a layer for which extinction could not be computed.<br>
Comments:

Product Var Name: i_spare3
Is element of: GLA11 Record
Short Description: Spare 3
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_bs_erd
Is element of: GLA11 Record
Short Description: Blowing Snow Range Delay
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: millimeters * 10
Invalid Value/Flag: None
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Estimated range delay due to blowing snow.

Comments:

Product Var Name i_bs_conf
Is element of: GLA11 Record
Short Description: Blowing Snow Confidence
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 15
Description: A number that indicates the degree of confidence that this is indeed blowing snow. Blowing snow confidence ranges from 0 - 15 and has the following meanings:

15: profile never tested for blowing snow (outside of latitude limits, or over ocean).
14: wind speed too low or clouds above 1.5 km
7-13: BS detected, 532 used, low to high confidence in blowing snow
1-6: BS detected, 1064 used, low to high confidence in blowing snow
0: profile tested, but no blowing snow detected
Data Dictionary

Product Var Name i_aer4_sval1
Is element of: GLA11 Record
Short Description: Aerosol true S Values from table
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: 100*sr
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 100
Product Maximum: 20000
Description: Aerosol true extinction to backscatter ratios calculated from meteorological and geographic data

Comments:

Product Var Name i_aer4_sval_ratio
Is element of: GLA11 Record
Short Description: 532/1064 aerosol S ratio
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: N/A
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 105
Product Maximum: 210
Description: The ratio of 532 nm extinction to backscatter ratio (S532) to the 1064 nm extinction to backscatter ratio (S1064) for each detected aerosol layer.

Comments:

Product Var Name i_aer4_aod_ratio
Is element of: GLA11 Record
Short Description: 532/1064 aerosol optical depth ratio
Product Data Type: i2b (9)
Total Bytes: 18
Product Units: N/A
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 120
Product Maximum: 380
Description: The ratio of 532 nm aerosol optical depth to 1064 nm aerosol optical depth for each detected aerosol layer.
Comments:

Product Var Name i_aer4_sval_uf
Is element of: GLA10 record, GLA11 Record
Short Description: Aerosol true S Values use flag
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Aerosol true S values use flag for 9 layers at 1 per 4 sec. Bits 0-3 (least significant bits) of byte 5 are for first layer, bits 0-3 of byte 1 are for 9th layer. 15 denotes no layer detected (invalid). Bits 36-39 are spares needed to make 5 bytes. Stipulates which extinction to backscatter ratio was used in processing (1=default, 2=calculated).
Please see <a href='flags/i_aer4_sval_uf.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_spare5
Is element of: GLA11 Record
Short Description: Spare 5
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA11 Spare 5

Product Var Name i_reflCor_atm
Is element of: GLA11 Record
Short Description: Reflectivity Correction Factor For Atmospheric Effects
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Unitless
Invalid Value/Flag: N/A
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 1000000

Description: This reflectance correction factor is calculated as $1 / e^{(-2(tc+ta+tp+tm))}$, where $tc$ is the cloud (column) integrated optical depth, $ta$ is the aerosol (column) integrated optical depth, $tp$ is the planetary boundary layer optical depth, and $tm$ is the molecular optical depth. $tm$ is a constant equal to $-\log(gd\_T\_RTatm)/2$, where $gd\_T\_RTatm = 0.98$ is defined in const_elev_mod.f90 or read from ANC07-03. The reflectance has been corrected for waveform saturation. The reflectance correction factor is computed from the 532 nm channel and has been corrected for multiple scattering.

Comments:

Product Var Name i_spare4
Is element of: GLA11 Record
Short Description: Spare 4
Product Data Type: i1b (160)
Total Bytes: 160
Product Units: NA
Invalid Value/Flag: None
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255

Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_transtime
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: One way transit time
Product Data Type: i2b
Total Bytes: 2
Product Units: microseconds
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4000
Description: One way transit time calculated using the preliminary range offset. This is added to the UTC time tag to get the ground bounce times at which to calculate the orbit
Comments:

Product Var Name i_Spare1
Is element of: GLA12 Record
Short Description: Spare 1
Product Data Type: i1b (2)
Total Bytes: 2  
Product Units: N/A  
Invalid Value/Flag: No  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: null  
Product Maximum: null  
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.  
Comments: GLA12 spare1.

Product Var Name i_deltagpstmcor  
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record  
Short Description: Delta GPS time correction  
Product Data Type: i4b  
Total Bytes: 4  
Product Units: nanoseconds  
Invalid Value/Flag: gi_invalid_i4b  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: -1000000  
Product Maximum: 1000000  
Description: The high frequency delta GPS time correction calculated during the precision orbit processing step.  
Comments:

Product Var Name i_dShotTime  
Is element of: GLA01 Main Record, GLA04 LPA Main Record, GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record  
Short Description: Laser Shot Time Deltas (shots 2-40)  
Product Data Type: i4b (39)  
Total Bytes: 156  
Product Units: microseconds  
Invalid Value/Flag: No  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 1200000  
Description: The time deltas of pulses 2 through 40 to i_UTCTime, the UTC time tag of the first pulse in the 1-second data frame. Adding the deltas to i_UTCTime will give the user the time of each individual shot in the frame.  
Comments: To calculate the time for shots 2-40, add these deltas to the time of the first shot.
Product Var Name: i_lat
Is element of: GLA12 Record
Short Description: Coordinate Data, Latitude, specific to ice sheet range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: The geodetic latitude of the 40 laser spots in the 1 second time frame, computed from the Precision orbit determined GLAS laser antenna ground nadir coordinates, precision attitude, and ice sheet-specific range after all instrument corrections, atmospheric delays and tides have been applied. The values are in degrees North.
Comments:

Product Var Name: i_lon
Is element of: GLA12 Record
Short Description: Coordinate Data, Longitude, specific to ice sheet range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000
Description: The longitude of the 40 laser spots in the 1 second time frame, computed from the Precision orbit determined GLAS laser antenna ground nadir coordinates, precision attitude, and ice sheet-specific range after all instrument corrections, atmospheric delays and tides have been applied. The values are in east longitude.
Comments:

Product Var Name: i_elev
Is element of: GLA12 Record
Short Description: Ice Sheet Surface elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500000
Product Maximum: 10000000
Description: Surface elevation with respect to the ellipsoid at the spot location determined by range using the ice sheet specific algorithm after instrument corrections, atmospheric delays and tides have been applied.
Comments:

Product Var Name i_campaign
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Campaign
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: INT(ICHAR(1A))
Product Maximum: INT(ICHAR(3K))
Description: The campaign. ie: for campaign L1A, it will be ‘1A’.
Comments:

Product Var Name i_spare40
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 40
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 40.

Product Var Name i_cycTrk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Cycle and Track
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 10001
Product Maximum: 9991354
Description: The track and cycle. On the product, they will be stored as one number: cctttt.
Comments:

Product Var Name i_localSolarTime
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Local apparent solar time
Product Data Type: i4b
Total Bytes: 4
Product Units: seconds*1000
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 86400000
Description: Local apparent solar time.
Comments:

Product Var Name i_spare41
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 41
Product Data Type: i4b (7)
Total Bytes: 28
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 41.

Product Var Name i_deltaEllip
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Delta Ellipsoid
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -9000
Product Maximum: 9000
Description: Surface Elevation (T/P ellipsoid) minus Surface Elevation(WGS84 ellipsoid).
Comments:

Product Var Name i_beamCoelv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Co-elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: Co-elevation (CE) is direction from vertical of the laser beam as seen by an observer located at the laser ground spot. 40Hz.
Comments:

Product Var Name i_beamAzimuth
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Azimuth
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: The direction, eastwards from north, of the laser beam vector as seen by an observer at the laser ground spot viewing toward the spacecraft (i.e., the vector from the ground to the spacecraft). When the spacecraft is precisely at the geodetic zenith, the value will be 99999 degrees. 40 Hz.
Comments:
Product Var Name: i_d2refTrk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Distance to the reference ground track
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: m*1000
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000000
Description: Distance to the reference ground track.
Comments:

Product Var Name: i_SigBegOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Signal Begin Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the range in distance to the location on the received echo calculated as the beginning of signal (closest to the spacecraft) using standard parameters.
Comments:

Product Var Name: i_DEM_hires_src
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: High Resolution Source Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Flag to specify who the source provider was for the high resolution DEM. 

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0 = no high res source available<br>
1 = unfinished research  Shuttle Radar Topography Mission (SRTM)<br>
2 = finished  SRTM C-band 90 m DEM produced by NGA (+-2.1km E-W swath)<br>
3 = ICESat Greenland V1 1km DEM<br>
4 = ICESat Antarctica V1 500m DEM<br>
5 = 90m Canadian Digital Elevation Data (CDED)<br>
6 = 90m Canadian Digital Elevation Data (CDED) if available otherwise finished  SRTM C-band 90 m DEM<br>
Comments: DEM elevations are referenced to the TOPEX/Poseidon ellipsoid and are directly comparable to the elevation on the GLAS products.

Product Var Name i_DEMhiresArElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: DEMhiresArElv
Product Data Type: i2b (9, 40)
Total Bytes: 720
Product Units: meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500
Product Maximum: 1300
Description: d_DEMhiresArElv is a 3 X 3 X 40 array of high resolution DEM values. The 1-40 index corresponds to 1/40 second samples. The 1-9 index corresponds to the position of the DEM value relative to the spot. Given the first 1/40 second of data, positional correspondence of the DEM element to the spot is as follows:<br>
The 9 points on the product correspond to the 3x3 points in the alg variable as follows:<br>

gla06%d_DEMhiresArElv(1,1,k) = gla06_prod%i_DEMhiresArElv(1,k) NW<br>
gla06%d_DEMhiresArElv(2,1,k) = gla06_prod%i_DEMhiresArElv(2,k) N<br>
gla06%d_DEMhiresArElv(3,1,k) = gla06_prod%i_DEMhiresArElv(3,k) NE<br>
gla06%d_DEMhiresArElv(1,2,k) = gla06_prod%i_DEMhiresArElv(4,k) W<br>
gla06%d_DEMhiresArElv(2,2,k) = gla06_prod%i_DEMhiresArElv(5,k) center<br>
gla06%d_DEMhiresArElv(3,2,k) = gla06_prod%i_DEMhiresArElv(6,k) E<br>
gla06%d_DEMhiresArElv(1,3,k) = gla06_prod%i_DEMhiresArElv(7,k) SW<br>
gla06%d_DEMhiresArElv(2,3,k) = gla06_prod%i_DEMhiresArElv(8,k) S<br>
gla06%d_DEMhiresArElv(3,3,k) = gla06_prod%i_DEMhiresArElv(9,k) SE<br>
Comments:

Product Var Name i_ElevBiasCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation Bias Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 3000
Description: Correction to elevation based on post flight analysis for biases determined for each campaign. This bias correction has not been applied to the data so to apply it SUBTRACT the correction from the range estimate. To apply the correction to the elevations it must be ADDED to the elevation estimates.
Comments: See the altimeter user guide for full description.

Product Var Name i_spare42
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 42
Product Data Type: i2b (4, 40)
Total Bytes: 320
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 42

Product Var Name i_sigmaatt
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Quality Indicator
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6000
Description: Attitude quality indicator. Values: 0=good; 50=warning; 100=bad.

Comments: This indicator currently has only 3 values: 0, 50, and 100, leaving open the opportunity to use numbers in between for further resolution of the degradation as our knowledge improves.

Product Var Name: i_Azimuth
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Local Azimuth
Product Data Type: i4b
Total Bytes: 4
Product Units: millideg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000
Description: Mean azimuth measured clockwise from north based on latitude, longitude, and elevation of a 1 second interval of the trace of the ground footprint-center.

Comments:

Product Var Name: i_SolAng
Is element of: GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Solar Angle
Product Data Type: i4b
Total Bytes: 4
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Solar Angle above or below the plane tangent to the ellipsoid surface at the laser spot. Positive values mean the sun is above the horizon, while negative values mean it is below the horizon. The effect of atmospheric refraction is not included. This is a low-precision value, with approximately one degree accuracy.

Comments:

Product Var Name: i_tpintensity_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse intensity - frame avg
Product Data Type: i4b
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 25500
Description: Transmit pulse intensity as measured by the LPA. Average over the 1-second frame. From ANC09.
Comments:

Product Var Name i_tpazimuth_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse azimuth - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees*10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Transmit pulse azimuth. Average over the 1-second frame. Angle eastwards from north of the major axis of the transmit pulse, as seen by the LPA. From ANC09.
Comments:

Product Var Name i_tpeccentricity_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse eccentricity - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: Unitless*1000
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: Transmit pulse eccentricity as measured by the LPA. Average over the 1-second frame. From ANC09.
Comments:

Product Var Name i_tpmajoraxis_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse major axis - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: cm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Transmit pulse major axis as measured by the LPA. Average over the 1-second time frame. From ANC09.
Comments:

Product Var Name i_poTide
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Pole Tide
Product Data Type: i2b
Total Bytes: 2
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Pole tide: an ocean tide which is the result of the Chandler wobble (a free nutation of the Earth caused by fluctuating pressure on the bottom of the ocean, caused by temperature and salinity changes and wind-driven changes in the circulation of the oceans).
Comments:

Product Var Name i_gdHt
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Geoid
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: cm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -20000
Product Maximum: 20000
Description: The height of the geoid above the ellipsoid for the first and last shot in the record.
Comments:

Product Var Name: i_erElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Solid Earth Tide Elevation (at first & last shot)
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The solid earth tide elevation for the first & last shot in the record.
Comments:

Product Var Name: i_spElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Tide Elevations, Specific
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: A tide elevation calculated from alternate tide models for specific regions for shots 1, 11, 21, and 31.
Comments:

Product Var Name: i_ldElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Load Tide Elevation
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Data Dictionary

Product Maximum: 10000
Description: The load tide elevation applied to each shot. Elements 1-4 of the load tide vector are applied to shots 1-10, 11-20, 21-30, and 31-40, respectively.
Comments: The load tide is NOT NECESSARILY the load tide for shots 1,11,21,31. It is calculated for the first valid shot in each group of 10 and applied to all valid shots in the group.

Product Var Name i_spare12
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spares 12
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: None
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_wTrop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Correction_Wet Troposphere
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 0
Description: The range correction due to the wet troposphere at first & last shot.
Comments:

Product Var Name i_dTrop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Range Correction, Dry Troposphere
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -2500
Product Maximum: 0
Description: The range correction due to the dry troposphere; one correction for each shot. Validity is based on results of finding a range with the standard fit.
Comments:

Product Var Name i_surfType
Is element of: GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Region Type
Product Data Type: i1b
Total Bytes: 1
Product Units: n/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 15
Description: Describes the region type or types associated with each shot Ice Sheet, ocean, sea ice, or Land. Please see <a href='flags/i_surfType.pdf'>the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_spare11
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spare 11
Product Data Type: i1b (3)
Total Bytes: 3
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_DEM_elv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: DEM Elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: cm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -50000
Product Maximum: 1000000
Description: Elevation at the footprint location from the SRTM30 (GTOPO30 + SRTM) Digital Elevation Model (DEM). The reference frame for the DEM elevation was changed to the TOPEX/Poseidon ellipsoid to make it consistent with the GLAS elevations.
Comments:

Product Var Name i_refRng
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Reference Range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 400000000
Product Maximum: 1000000000
Description: Range in distance calculated from the time between the centroid of the transmit pulse and the farthest gate from the spacecraft of the received pulse. See the rngcorrflg to determine any corrections that have been applied.
Comments:

Product Var Name i_TrshRngOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Threshold Retracker Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the range in distance to the threshold retracker location on the received echo using standard parameters.

Comments:

Product Var Name: i_isRngOff
Is element of: GLA06 record, GLA12 Record, GLA14 Record
Short Description: Ice Sheet Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0

Description: Range offset to be added to i_refRng to calculate the range using the algorithm deemed appropriate for ice sheets.

Comments: Can be used for comparing elevations computed from results standard and alternate fitting.

Product Var Name: i_SigEndOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Signal End Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0

Description: Offset to be added to i_refRng to give the range in distance to the location on the received echo calculated as the end of signal (farthest from the spacecraft) using standard parameters.

Comments:

Product Var Name: i_cntRngOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Centroid Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the range in distance to the location of the centroid of the received echo from signal begin through signal end defined by the standard parameters.
Comments:

Product Var Name i_reflctUC
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: reflctUC
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: Unitless*1E06
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000
Description: Reflectivity, not corrected for atmospheric effects, is calculated as Refl = R/T, where R is the received energy after it has been scaled for range, and T is the transmitted energy. i_reflctUC has also been calibrated for gain non-linearity (only for non-saturated waveforms), ground truth calibration and boresight shift shadowing (BSS). It is not corrected for saturation effects. If the shot is saturated (satindex above 2) then to correct for saturation the reflectivity estimate needs to be multiplied by the ratio of the corrected energy to the uncorrected energy (sat corrected reflectivity = i_reflctUC * (i_RecNrgAll + i_satNrgCorr)/i_RecNrgAll)<br>
<br>
The atmospheric corrected reflectivity may be calculated from this uncorrected reflectivity by multiplying it by d_reflCor_atm.<br>
<br>
i_reflctUC is invalid where GLA06%d_satNrgCorr is invalid.<br>
Comments: This uses all signal between signal begin and signal end.

Product Var Name i_reflCor_atm
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Reflectivity Correction Factor For Atmospheric Effects
Product Data Type: i4b
Total Bytes: 4
Product Units: Unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 250
Description: This reflectance correction factor is calculated as $1 / e^{-(2(tc+ta+tp+tm))}$, where $tc$ is the cloud (column) integrated optical depth, $ta$ is the aerosol (column) integrated optical depth, $tp$ is the planetary boundary layer optical depth, and $tm$ is the molecular optical depth. $tm$ is a constant equal to $-\log(gd\_T\_RTatm)/2$, where $gd\_T\_RTatm = 0.98$ is defined in const_elev_mod.f90 or read from ANC07-03. The attenuation correction factor has been corrected for multiple scattering. The reflectance has been corrected for waveform saturation.

Comments:

Product Var Name: $i\_maxSmAmp$
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Peak Amplitude of Smoothed Received Echo
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Tenth of millivolts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: The peak amplitude of the received echo after it has been smoothed to remove high frequency noise (see ATBD).
Comments: This is calculated after converting the return to voltage.

Product Var Name: $i\_oCElv$
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Ocean Tide Elevation
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The ocean tide elevation from the TPX07.1 tide model.
Comments:

Product Var Name: $i\_numPk$
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Number of Peaks found in the Return
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6
Description: The number of peaks in the return echo found by the Gaussian fitting procedure, using standard parameters.
Comments:

Product Var Name i_kurt2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Kurtosis of the Received Echo (standard)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 1000
Description: Kurtosis of the received echo from signal begin to signal end using standard parameters
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_skew2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Skewness
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The skewness of the received echo from signal begin to signal end using standard parameters
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_spare4
Is element of: GLA06 record, GLA12 Record, GLA14 Record, GLA15 Record
Short Description: Spare 4
Product Data Type: i1b (160)
Total Bytes: 160
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_IsRngLast
Is element of: GLA12 Record
Short Description: Ice Sheet Range offset using last peak
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range offset to be added to i_refRng to calculate ice sheet specific range from centroid of last peak in standard Gaussian fit.
Comments:

Product Var Name i_IsRngFst
Is element of: GLA12 Record
Short Description: Ice Sheet Range Offset using first peak
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range offset to be added to i_refRng to calculate ice sheet specific range from centroid of first peak in standard Gaussian fit.
Comments:
Product Var Name: i_IceSVar
Is element of: GLA12 Record
Short Description: Standard Deviation of the ice sheet Gaussian Fit
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: microvolts*10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The Standard deviation of the difference between the functional fit and the received echo using standard parameters. It is directly taken from GLA05 parameter d_wfFitSDev_2 (standard).
Comments:

Product Var Name: i_ElvuseFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation use flag
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating whether the elevations on this record should be used or not (1 bit set/shot). See the `<a href='flags/i_ElvuseFlg.pdf'>PDF file</a>` for more information.
Comments:

Product Var Name: i_atm_avail
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Availability Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Please see <a href='flags/i_atm_avail.pdf'> the PDF flag description in the next section </a> for more details.

Comments:

Product Var Name i_spare16
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 16
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a

Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_cld1_mswf
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Cloud Multiple Scattering Warning Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15

Description: The multiple scattering warning flag (MSWF) is based on the total column optical depth (aerosol plus cloud) calculated in GLA11 using 532nm. It is intended as a way to quickly obtain information about the potential severity of multiple scattering with regards to the range-to-surface calculated by the altimetry processing software.

It will be output on the GLA11 product for use by the altimetry group. The multiple scattering warning flag will have values ranging from 0-14, based on the total column optical depth as detailed in the PDF.

A warning flag value of 15 will signify ?invalid?. An invalid will be encoded if an optical depth in any of the layers in the 1-second column could not be calculated. This usually occurs in a very optically ?thick? cloud which extinguishes the signal. It could also occur if the extinction-to-backscatter ratio assignment is set too high, causing the transmission calculations in the lidar inversion to go out-of-range. Please see <a href='flags/i_cld1_mswf_elv.pdf'> the PDF flag description in the next section </a> for more details.

Comments:

Product Var Name i_MRC_af
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Medium Resolution Cloud Availability Flag  
Product Data Type: i1b  
Total Bytes: 1  
Product Units: NA  
Invalid Value/Flag: No  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 15  
Description: Tells how many cloud layers were found at this resolution from the 532 nm channel. Please see <a href='flags/i_MRC_af.pdf'>the PDF flag description in the next section for more details. This parameter is extracted from the i_MRCL_flag on GLA09.

Comments:

Product Var Name i_spare9  
Is element of: GLA06 record, GLA12 Record, GLA14 Record  
Short Description: Spare 9  
Product Data Type: i1b (40)  
Total Bytes: 40  
Product Units: null  
Invalid Value/Flag: N/A  
Is Correction Flag?: NA  
Is Unsigned?: NA  
Product Minimum: null  
Product Maximum: null  
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_ElvFlg  
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record  
Short Description: Elevation Definition Flag  
Product Data Type: i1b (40)  
Total Bytes: 40  
Product Units: N/A  
Invalid Value/Flag: No  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 0  
Product Maximum: 127  
Description: Indicates how location on the received echo was determined to calculate the elevation on the record.
The GLAS Standard Data Products Specification - Data Dictionary

Please see <a href='flags/i_ElvFlg.pdf'> the PDF flag description in the next section for more details. 'For GLA05, 06 and 12,13,14 and 15, bits are set to reflect the range offset used for that products elevation. Although defined as a pass-thru, the values are different on GLA06/12,13,15 and GLA14.'

### Comments:

**Product Var Name i_rng_UQF**
- **Is element of:** GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
- **Short Description:** Range Offset Quality/Use Flag
- **Product Data Type:** i2b (40)
- **Total Bytes:** 80
- **Product Units:** N/A
- **Invalid Value/Flag:** No
- **Is Correction Flag?:** NA
- **Is Unsigned?:** No
- **Product Minimum:** 0
- **Product Maximum:** 32767
- **Description:** Data quality flag for the range offsets on this record.
- Please see <a href='flags/i_rng_UQF.pdf'> the PDF flag description in the next section for more details.

### Comments:

**Product Var Name i_spare49**
- **Is element of:** GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
- **Short Description:** Spare 49
- **Product Data Type:** i1b (10)
- **Total Bytes:** 10
- **Product Units:** N/A
- **Invalid Value/Flag:** No
- **Is Correction Flag?:** NA
- **Is Unsigned?:** No
- **Product Minimum:** 0
- **Product Maximum:** 1
- **Description:** This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

### Comments:

**Product Var Name i_timecorflg**
- **Is element of:** GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
- **Short Description:** time correction flag
- **Product Data Type:** i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see [the PDF flag description in the next section](#) for more details.
Comments:

Product Var Name i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: \textit{i1b (8)}
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections. Please see [the PDF flag description in the next section](#) for more details.
Comments:

Product Var Name i_AttFlg2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Flag 2
Product Data Type: \textit{i1b (20)}
Total Bytes: 20
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Denotes at 40/sec rate whether precision attitude was used to determine spot location, and if problems with LPA, etc.
Please see <a href="flags/i_AttFlg2.pdf"> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_spare5
Is element of: GLA12 Record
Short Description: Spares
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_FrameQF
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Altimeter Frame Quality Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Denotes all bad data (no signal in whole frame), or all data good and all science team recommended corrections applied
Please see <a href="flags/i_FrameQF.pdf"> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_OrbFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: POD flag (Orbit Flag)
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Denotes quality of orbit, whether predicted or precision, loss of GPS data, maneuver-degraded, etc.
Please see <a href='flags/i_OrbFlg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_rngCorrFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Correction Flag
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Denotes which geophysical or instrument corrections have been applied to the range in the calculation of the elevation on this record.
Please see <a href='flags/i_rngCorrFlg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_CorrStatFlg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Correction Status Flag
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: For each geophysical correction that has multiple values denotes which algorithm or model was used.
Please see <a href='flags/i_CorrStatFlg.pdf'> the PDF flag description in the next section for more details.
Comments:
Product Var Name: i_spare15
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 15
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name: i_AttFlg1
Is element of: GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Flag 1
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: At 1/sec denotes large off-nadir angle, ocn sweep, target of opportunity, steering to reference track.
Please see <a href='flags/i_AttFlg1.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name: i_Spare6
Is element of: GLA12 Record
Short Description: Spare 6
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA12 spare6.

Product Var Name i_spare44
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spare 44
Product Data Type: i1b (120)
Total Bytes: 120
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_satNdx
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Index
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: ns
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 126
Description: The count of the number of gates in a waveform which have an amplitude greater than or equal to i_satNdxTh (set in anc07_0004). The value 126 means 126 or more gates are above the saturation index threshold (i_satNdxth).
Comments:

Product Var Name i_satElevCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Elevation Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description: Correction to elevation for saturated waveforms. This correction has not been applied to the data so to apply it SUBTRACT the correction from the range estimate. To apply the correction to the elevations it must be ADDED to the elevation estimates.
Comments:

Product Var Name i_satCorrFlg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Correction Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: Yes
Is Unsigned?: NA
Product Minimum: NA
Product Maximum: NA
Description: Please see <a href='flags/i_satCorrFlg.pdf'> the PDF flag description in the next section for more details.</a><br>

Bits 0-3: i_satElevCorr flag (4 bits); values indicated below: <br>
<br>
0= Not Saturated (i_satNdx < 2) or No Signal<br>
1= Sat. Correction is Inconsequential (i_satNdx >= 2 & i_pctSat < 2.0)<br>
2= Sat. Correction is Applicable (i_satNdx >= 2 & i_pctSat >= 2.0 & Full Width* < 100ns)<br>
3= Sat. Correction is Not Computable effects elevations can not be corrected<br>
4= Sat. Correction model is Not Applicable so data can not be corrected (i_satNdx >= 2 & i_pctSat >= 2.0 & Full Width* >= 100ns) there are errors in the data but the effects on elevations can not be corrected <br>
<br>
values 5-15=TBD

Bits 4-5: i_satNrgCorr flag (2 bits):<br>
0=TBD<br>
1=TBD<br>
2=TBD<br>
3=TBD<br>
<br>
Bits 6-7: TBD:<br>
0=TBD<br>
1=TBD
2=TBD
3=TBD
Comments:

Product Var Name i_satNrgCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Energy Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: .01fJ
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description: Correction to energy for saturated waveforms. This correction has not been applied to the energy. It should be ADDED to any echo pulse energy calculated from the pulse area under the waveform. Also any reflectivity estimates need to be corrected for this error in energy measurement.
Comments:

Product Var Name i_spare13
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spare 13
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: null
Invalid Value/Flag: null
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_gval_rcv
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Gain Value used for Received Pulse
Product Data Type: i2b (40)
Total Bytes: 80
Gain value used for received pulse - uncalibrated.

Description: Gain value used for received pulse - uncalibrated.

Comments: This value is in counts and needs to be calibrated before calculating energy from it. Same as variable in GLA01_Long/i_gainSet1064.

Product Var Name i_RecNrgAll
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Received Energy signal begin to signal end
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 fJoules
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32000
Description: This is a pass through of gla01%d_recNrgAll_EU, but stored in different units on the product. This is calculated by taking the area under the received waveform (referenced to the observed noise) from all responses between the noise crossing before the first threshold crossing and the noise crossing after the last threshold crossing. It is a rescaled value of GLA01 parameter d_recNrgAll_EU and is not recomputed.
Comments:

Product Var Name i_FRir_cldtop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Cloud Top
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1030
Description: Full resolution (40 Hz) cloud top height obtained from the 1064 atmospheric channel. This parameter is for a 1 second record. This parameter is in GLA09.
Comments:
Product Var Name i_FRir_qaFlag
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Quality Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: One byte per data quality flag.
Value 15 = No clouds.
Value 14 = Indicates the likely presence of low clouds (< 150 m) based on elevated signal from the two bins above the ground return bin that were not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (i_Frir_cldtop) is set to a value of 0.10 km.
Value 13 = Indicates the possible presence of a cloud based on the value of the integrated signal parameter (i_FRir_intsig) that was not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (i_Frir_cldtop) is set to a value of 10.0 km.
Value 0 - 12 = Cloud detected by cloud search algorithm with higher numbers indicating a stronger average signal from the region starting at cloud top and extending 500 m below cloud top height. Please see <a href='flags/i_FRir_qaFlag.pdf'>the PDF flag description in the next section</a> for more details. This parameter is extracted from the equivalent parameter on GLA09.
Comments:

Product Var Name i_atm_char_flag
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Characterization Flag
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10
Description: Flag to characterize cloud and blowing snow state of the atmosphere
0 clear
1 high cloud (> 5 km) low optical depth
2 high cloud (> 5 km), high optical depth
3 mid cloud (>2, <=5 km) low optical depth
4 mid cloud (>2, <=5 km) high optical depth
5 low cloud (> 500 m, <=2 km), low optical depth
6 low cloud (> 500 m, <=2 km), high optical depth
7 blowing snow or fog (< 500 m), low optical depth
8 blowing snow or fog (< 500 m), high optical depth
9 not tested
10 data quality insufficient to assign flag

Comments:

Product Var Name i_atm_char_conf
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Characterization Flag Confidence
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Confidence level ascribed to the atmosphere characterization flag
Comments: 0 Not applicable (for contamination flag values of 9 or 10)
1 low confidence
2 reasonable confidence
3 high confidence

Product Var Name i_spare48
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 48
Product Data Type: i1b (36)
Total Bytes: 36
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: Full Resolution 1064 Integrated Signal

Product Data Type: i2b (40)
Total Bytes: 80
Product Units: e7/(m-sr)
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000

Description: Though called 'integrated signal' this is actually an average of all bins in the above-ground portion of the 1064 40 Hz profile with values above the threshold of 1.0e-7 (1/(m-sr) units). This parameter is for a 1 second record. This parameter is extracted from the equivalent parameter on GLA09.

Comments:

Product Var Name: i_spare14
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 14
Product Data Type: i1b (120)
Total Bytes: 120
Product Units: Unknown
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0

Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name: i_Surface_temp
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Surface Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Atmospheric temperature at Earth's surface level measured in degrees Celsius and derived from the meteorological data files.

Comments:

Product Var Name: i_Surface_pres
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Surface Pressure
Product Data Type: i2b
Total Bytes: 2
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000

Description: Atmospheric pressure at Earth's surface level measured in hPa and derived from the meteorological data files.

Comments:

Product Var Name: i_Surface_relh
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Relative Humidity
Product Data Type: i2b
Total Bytes: 2
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000

Description: Atmospheric relative humidity at Earth's surface level measured as a percentage and derived from the meteorological data files.

Comments:

Product Var Name: i_maxRecAmp
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Max Amplitude of Received Echo
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Tenth of millivolts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: Maximum Amplitude of the Received Echo.
Comments: This is calculated after converting the return to voltage. Use for scaling model fit RMS between normalized and un-normalized units.

Product Var Name: i_sDevNsOb1
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Standard deviation of 1064 nm Background noise, (alternate)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.0001 volts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The standard deviation of the background noise (alternative parameters).
Comments: Can be used for computing signal-to-noise ratio along with unsmoothed max amplitude.

Product Var Name: i_pctSAT
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Percent Saturation
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: percent
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: Yes
Is Unsigned?: NA
Product Minimum: -127
Product Maximum: 127
Description: Percent saturation (d_pctSAT) is calculated using the formula: d_pctSAT = 100*(saturation index)/(signal end - signal begin in nanoseconds). The alternate signal end/begin are used for GLA14%d_pctSAT, while the standard fit values are used for GLA06, 12, 13, and 15. The Saturation elevation correction is not applied in the geolocation processing computation of lat, lon and elev. Because the saturation corrections are small and data is acquired within 5 deg off nadir, effects on lat and lon can be ignored. To apply the saturation elevation correction to the elevations on the products it must be ADDED to the elevation estimates. Reported elevations for returns with invalid satElevCorr values and satCorrFlg values of 3 or 4 are likely to have large, uncorrectable errors and should be excluded from analyses.
Comments:
Product Var Name: i_TxNrg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: 1064 nm Laser Transmit Energy
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 millijoules
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32766
Description: The 1064 nm laser pulse transmitted energy in energy units, computed from the digitized outgoing pulse, and the transmit gain.
Comments:

Product Var Name: i_eqElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Equilibrium Tide Elevation (at first & last shot)
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: -10000
Product Maximum: 10000
Description: The equilibrium (long period) tide at first and last valid shot over the ocean.
Comments:

Product Var Name: i_Spare7
Is element of: GLA06 record, GLA12 Record, GLA13 Record
Short Description: Spare 7
Product Data Type: i1b (282)
Total Bytes: 282
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments: GLA06, GLA12, GLA13 spare7.

Product Var Name: \textit{i\_rec\_ndx}

Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01\_Short\_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: GLAS Record Index

Product Data Type: \textit{i4b}

Total Bytes: 4

Product Units: N/A

Invalid Value/Flag: No

Is Correction Flag?: NA

Is Unsigned?: No

Product Minimum: 0

Product Maximum: 2147483647

Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.

Comments:

Product Var Name: \textit{i\_UTCTime}

Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01\_Short\_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: Transmit Time of First Shot in frame in J2000

Product Data Type: \textit{i4b} (2)

Total Bytes: 8

Product Units: seconds, microseconds

Invalid Value/Flag: No

Is Correction Flag?: NA

Is Unsigned?: No

Product Minimum: 0

Product Maximum: 2147483647

Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.

Comments: This is not the ground bounce time, but the transmit time.

Product Var Name: \textit{i\_transtime}

Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: One way transit time
Product Data Type: i2b
Total Bytes: 2
Product Units: microseconds
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4000
Description: One way transit time calculated using the preliminary range offset. This is added to the UTC time tag to get the ground bounce times at which to calculate the orbit
Comments:

Product Var Name i_Spare1
Is element of: GLA13 Record
Short Description: Spare 1
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA13 spare1.

Product Var Name i_deltagpstmcor
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Delta GPS time correction
Product Data Type: i4b
Total Bytes: 4
Product Units: nanoseconds
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000000
Product Maximum: 1000000
Description: The high frequency delta GPS time correction calculated during the precision orbit processing step.
Comments:
Product Var Name i_dShotTime
Is element of: GLA01 Main Record, GLA04 LPA Main Record, GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Laser Shot Time Deltas (shots 2-40)
Product Data Type: i4b (39)
Total Bytes: 156
Product Units: microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1200000
Description: The time deltas of pulses 2 through 40 to i_UTCTime, the UTC time tag of the first pulse in the 1-second data frame. Adding the deltas to i_UTCTime will give the user the time of each individual shot in the frame.
Comments: To calculate the time for shots 2-40, add these deltas to the time of the first shot.

Product Var Name i_lat
Is element of: GLA13 Record
Short Description: Coordinate Data, Latitude, specific to sea ice range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: The geodetic latitude of the 40 laser spots in the 1 second time frame, computed from the Precision orbit determined GLAS laser antenna ground nadir coordinates, PAD, and sea ice specific range after all atmospheric corrections and tides have been applied.
Comments:

Product Var Name i_lon
Is element of: GLA13 Record
Short Description: Coordinate Data, Longitude, specific to sea ice range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000
Description: The longitude of the 40 laser spots in the 1 second time frame, computed from the Precision orbit
determined GLAS laser antenna ground nadir coordinates, PAD, and sea ice specific range after all atmospheric
corrections and tides have been applied. The values are in east longitude.
Comments:

Product Var Name: i_elev
Is element of: GLA13 Record
Short Description: Sea Ice Surface Elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500000
Product Maximum: 1000000
Description: Surface elevation wrt ellipsoid at the spot location determined by range using the sea ice specific fit-
ting procedure after atmospheric delays and tides have been applied.
Comments:

Product Var Name: i_campaign
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Campaign
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: INT(ICHAR(1A))
Product Maximum: INT(ICHAR(3K))
Description: The campaign. ie: for campaign L1A, it will be '1A'.
Comments:

Product Var Name: i_spare40
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 40
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 40.

Product Var Name i_cycTrk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Cycle and Track
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 10001
Product Maximum: 9991354
Description: The track and cycle. On the product, they will be stored as one number: ccctttt.
Comments:

Product Var Name i_localSolarTime
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Local apparent solar time
Product Data Type: i4b
Total Bytes: 4
Product Units: seconds*1000
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 86400000
Description: Local apparent solar time.
Comments:

Product Var Name i_spare41
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 41
Product Data Type: i4b (7)
Total Bytes: 28
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 41.

Product Var Name i_deltaEllip
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Delta Ellipsoid
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -9000
Product Maximum: 9000
Description: Surface Elevation (T/P ellipsoid) minus Surface Elevation(WGS84 ellipsoid).
Comments:

Product Var Name i_beamCoelv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Co-elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: Co-elevation (CE) is direction from vertical of the laser beam as seen by an observer located at the laser ground spot. 40Hz.
Comments:
Product Var Name i_beamAzimuth
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Azimuth
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: The direction, eastwards from north, of the laser beam vector as seen by an observer at the laser ground spot viewing toward the spacecraft (i.e., the vector from the ground to the spacecraft). When the spacecraft is precisely at the geodetic zenith, the value will be 99999 degrees. 40 Hz.
Comments:

Product Var Name i_d2refTrk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Distance to the reference ground track
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: m*1000
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000000
Description: Distance to the reference ground track.
Comments:

Product Var Name i_SigBegOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Signal Begin Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the range in distance to the location on the received echo calculated as the beginning of signal (closest to the spacecraft) using standard parameters.

Comments:

Product Var Name i_DEM_hires_src
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: High Resolution Source Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128

Description: Flag to specify who the source provider was for the high resolution DEM. <br>
0 = no high res source available<br>
1 = unfinished research  Shuttle Radar Topography Mission (SRTM)<br>
&nbsp &nbsp &nbsp &nbsp C-band 90 m DEM produced by JPL (+-1.1km E-W swath)<br>
2 = finished  SRTM C-band 90 m DEM produced by NGA (+-2.1km E-W swath)<br>
3 = ICESat Greenland V1 1km DEM<br>
4 = ICESat Antarctica V1 500m DEM<br>
5 = 90m Canadian Digital Elevation Data (CDED)<br>
6 = 90m Canadian Digital Elevation Data (CDED) if available otherwise finished  SRTM C-band 90 m DEM<br>
Comments: DEM elevations are referenced to the TOPEX/Poseidon ellipsoid and are directly comparable to the elevation on the GLAS products.

Product Var Name i_DEMhiresArElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: DEMhiresArElv
Product Data Type: i2b (9, 40)
Total Bytes: 720
Product Units: meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500
Product Maximum: 1300

Description: d_DEMhiresArElv is a 3 X 3 X 40 array of high resolution DEM values. The 1-40 index corresponds to 1/40 second samples. The 1-9 index corresponds to the position of the DEM value relative to the spot. Given the first 1/40 second of data, positional correspondence of the DEM element to the spot is as follows:<br>
The 9 points on the product correspond to the 3x3 points in the alg variable as follows:

\[
gla06d\_DEMhiresArElv(1,1,k) = gla06\_prod%i\_DEMhiresArElv(1,k) \text{ NW}
gla06d\_DEMhiresArElv(2,1,k) = gla06\_prod%i\_DEMhiresArElv(2,k) \text{ N}
gla06d\_DEMhiresArElv(3,1,k) = gla06\_prod%i\_DEMhiresArElv(3,k) \text{ NE}
gla06d\_DEMhiresArElv(1,2,k) = gla06\_prod%i\_DEMhiresArElv(4,k) \text{ W}
gla06d\_DEMhiresArElv(2,2,k) = gla06\_prod%i\_DEMhiresArElv(5,k) \text{ center}
gla06d\_DEMhiresArElv(3,2,k) = gla06\_prod%i\_DEMhiresArElv(6,k) \text{ E}
gla06d\_DEMhiresArElv(1,3,k) = gla06\_prod%i\_DEMhiresArElv(7,k) \text{ SW}
gla06d\_DEMhiresArElv(2,3,k) = gla06\_prod%i\_DEMhiresArElv(8,k) \text{ S}
gla06d\_DEMhiresArElv(3,3,k) = gla06\_prod%i\_DEMhiresArElv(9,k) \text{ SE}
\]

Comments:

Product Var Name: i\_ElevBiasCorr
- Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
- Short Description: Elevation Bias Correction
- Product Data Type: i2b (40)
- Total Bytes: 80
- Product Units: mm
- Invalid Value/Flag: gi\_invalid\_i2b
- Is Correction Flag?: NA
- Is Unsigned?: NA
- Product Minimum: 0
- Product Maximum: 3000
- Description: Correction to elevation based on post flight analysis for biases determined for each campaign. This bias correction has not been applied to the data so to apply it SUBTRACT the correction from the range estimate. To apply the correction to the elevations it must be ADDED to the elevation estimates.
- Comments: See the altimeter user guide for full description.

Product Var Name: i\_spare42
- Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
- Short Description: Spare 42
- Product Data Type: i2b (4, 40)
- Total Bytes: 320
- Product Units: n/a
- Invalid Value/Flag: n/a
- Is Correction Flag?: NA
- Is Unsigned?: No
- Product Minimum: n/a
- Product Maximum: n/a
The GLAS Standard Data Products Specification - Data Dictionary

Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 42

Product Var Name: i_sigmaatt
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Quality Indicator
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6000
Description: Attitude quality indicator. Values: 0=good; 50=warning; 100=bad.
Comments: This indicator currently has only 3 values: 0, 50, and 100, leaving open the opportunity to use numbers in between for further resolution of the degradation as our knowledge improves.

Product Var Name: i_Azimuth
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Local Azimuth
Product Data Type: i4b
Total Bytes: 4
Product Units: millideg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000
Description: Mean azimuth measured clockwise from north based on latitude, longitude, and elevation of a 1 second interval of the trace of the ground footprint-center.
Comments:

Product Var Name: i_SolAng
Is element of: GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Solar Angle
Product Data Type: i4b
Total Bytes: 4
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Solar Angle above or below the plane tangent to the ellipsoid surface at the laser spot. Positive values mean the sun is above the horizon, while negative values mean it is below the horizon. The effect of atmospheric refraction is not included. This is a low-precision value, with approximately one degree accuracy.
Comments:

Product Var Name i_tpintensity_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse intensity - frame avg
Product Data Type: i4b
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 25500
Description: Transmit pulse intensity as measured by the LPA. Average over the 1-second frame. From ANC09.
Comments:

Product Var Name i_tpaazimuth_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse azimuth - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees*10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Transmit pulse azimuth. Average over the 1-second frame. Angle eastwards from north of the major axis of the transmit pulse, as seen by the LPA. From ANC09.
Comments:

Product Var Name i_tpeccentricity_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse eccentricity - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: Unitless*1000
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: Transmit pulse eccentricity as measured by the LPA. Average over the 1-second frame. From ANC09.
Comments:

Product Var Name i_tpmajoraxis_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse major axis - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: cm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Transmit pulse major axis as measured by the LPA. Average over the 1-second time frame. From ANC09.
Comments:

Product Var Name i_poTide
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Pole Tide
Product Data Type: i2b
Total Bytes: 2
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Pole tide: an ocean tide which is the result of the Chandler wobble (a free nutation of the Earth caused by fluctuating pressure on the bottom of the ocean, caused by temperature
and salinity changes and wind-driven changes in the circulation
of the oceans).

Comments:

Product Var Name i_gdHt
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Geoid
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: cm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -20000
Product Maximum: 20000
Description: The height of the geoid above the ellipsoid for the first and last shot in the record.
Comments:

Product Var Name i_erElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Solid Earth Tide Elevation (at first & last shot)
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The solid earth tide elevation for the first & last shot in the record.
Comments:

Product Var Name i_spElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Tide Elevations, Specific
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: A tide elevation calculated from alternate tide models for specific regions for shots 1, 11, 21, and 31.
Comments:

Product Var Name i_ldElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Load Tide Elevation
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The load tide elevation applied to each shot. Elements 1-4 of the load tide vector are applied to shots 1-10, 11-20, 21-30, and 31-40, respectively.
Comments: The load tide is NOT NECESSARILY the load tide for shots 1,11,21,31. It is calculated for the first valid shot in each group of 10 and applied to all valid shots in the group.

Product Var Name i_spare12
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spares 12
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: None
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_wTrop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Correction_Wet Troposphere
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 0
Description: The range correction due to the wet troposphere at first & last shot.
Comments:

Product Var Name i_dTrop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Range Correction, Dry Troposphere
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -2500
Product Maximum: 0
Description: The range correction due to the dry troposphere; one correction for each shot. Validity is based on results of finding a range with the standard fit.
Comments:

Product Var Name i_surfType
Is element of: GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Region Type
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 15
Description: Describes the region type or types associated with each shot: Ice Sheet, ocean, sea ice, or Land.
Please see <a href='flags/i_surfType.pdf'>the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_spare11
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spare 11
Product Data Type: i1b (3)
Total Bytes: 3
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_DEM_elv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: DEM Elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: cm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -50000
Product Maximum: 1000000
Description: Elevation at the footprint location from the SRTM30 (GTOPO30 + SRTM) Digital Elevation Model (DEM). The reference frame for the DEM elevation was changed to the TOPEX/Poseidon ellipsoid to make it consistent with the GLAS elevations.
Comments:

Product Var Name i_refRng
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Reference Range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 400000000
Product Maximum: 1000000000
Description: Range in distance calculated from the time between the centroid of the transmit pulse and the farthest gate from the spacecraft of the received pulse. See the rngcorrflg to determine any corrections that have been applied.
Comments:

Product Var Name: i_TrshRngOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Threshold Retracker Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the range in distance to the threshold retracker location on the received echo using standard parameters.
Comments:

Product Var Name: i_siRngOff
Is element of: GLA06 record, GLA13 Record
Short Description: Sea Ice Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range offset to be added to i_refRng to calculate the range using the algorithm deemed appropriate for sea ice.
Comments:

Product Var Name: i_SigEndOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Signal End Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0

Description: Offset to be added to i_refRng to give the range in distance to the location on the received echo calculated as the end of signal (farthest from the spacecraft) using standard parameters.

Comments:

Product Var Name i_cntRngOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Centroid Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0

Description: Offset to be added to i_refRng to give the range in distance to the location of the centroid of the received echo from signal begin through signal end defined by the standard parameters.

Comments:

Product Var Name i_reflctUC
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: reflctUC
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: Unitless * 1E06
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000

Description: Reflectivity, not corrected for atmospheric effects, is calculated as \( \text{Refl} = \frac{R}{T} \), where \( R \) is the received energy after it has been scaled for range, and \( T \) is the transmitted energy. \( i\text{_reflctUC} \) has also been calibrated for gain non-linearity (only for non-saturated waveforms), ground truth calibration and boresight shift shadowing (BSS). It is not corrected for saturation effects. If the shot is saturated (satindex above 2) then to correct for saturation the reflectivity estimate needs to be multiplied by the ratio of the corrected energy to the uncorrected energy (sat corrected reflectivity = \( i\text{_reflctUC} \times (i\text{_RecNrgAll} + i\text{_satNrgCorr})/i\text{_RecNrgAll} \)).

The atmospheric corrected reflectivity may be calculated from this uncorrected reflectivity by multiplying it by \( d\text{_reflCor_atm} \).
i_reflctUC is invalid where GLA06%d_satNrgCorr is invalid.

Comments: This uses all signal between signal begin and signal end.

Product Var Name i_reflCor_atm
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Reflectivity Correction Factor For Atmospheric Effects
Product Data Type: i4b
Total Bytes: 4
Product Units: Unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 250
Description: This reflectance correction factor is calculated as $1 / e^{-2(tc+ta+tp+tm)}$, where $tc$ is the cloud (column) integrated optical depth, $ta$ is the aerosol (column) integrated optical depth, $tp$ is the planetary boundary layer optical depth, and $tm$ is the molecular optical depth. $tm$ is a constant equal to $-\log(gd_T_RTatm)/2$, where $gd_T_RTatm = 0.98$ is defined in const_elev_mod.f90 or read from ANC07-03. The attenuation correction factor has been corrected for multiple scattering. The reflectance has been corrected for waveform saturation.

Comments:

Product Var Name i_maxSmAmp
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Peak Amplitude of Smoothed Received Echo
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Tenth of millivolts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: The peak amplitude of the received echo after it has been smoothed to remove high frequency noise (see ATBD).
Comments: This is calculated after converting the return to voltage.

Product Var Name i_ocElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Ocean Tide Elevation
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The ocean tide elevation from the TPX07.1 tide model.
Comments:

Product Var Name i_numPk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Number of Peaks found in the Return
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6
Description: The number of peaks in the return echo found by the Gaussian fitting procedure, using standard parameters.
Comments:

Product Var Name i_kurt2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Kurtosis of the Received Echo (standard)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 1000
Description: Kurtosis of the received echo from signal begin to signal end using standard parameters
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_skew2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Skewness
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The skewness of the received echo from signal begin to signal end using standard parameters.
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_spare4
Is element of: GLA13 Record
Short Description: Spare 4
Product Data Type: i1b (160)
Total Bytes: 160
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_BergElev
Is element of: GLA13 Record
Short Description: Iceberg Elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200000
Description: For waveforms with more than 1 peak, 'iceberg' elevation is calculated using the difference between the range offset of the maximum amplitude peak and the range offset of the first peak. Computations are made after atmospheric and tide corrections have been applied. The elevation computed is relative to the ellipsoid.
Comments: Users should be wary that this parameter is computed for all multiple-peak GLA13 records, even if the elevation is too high to be sea-ice.
Product Var Name: i_spare10
Is element of: GLA13 Record
Short Description: Spare 10
Product Data Type: i1b (160)
Total Bytes: 160
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA13 spare10.

Product Var Name: i_SiRngFst
Is element of: GLA13 Record
Short Description: Sea ice range increment to first peak
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range increment to be added to reference range to compute the sea ice specific range. This was determined from centroid of first peak in sea ice Gaussian fit
Comments:

Product Var Name: i_SeaIceVar
Is element of: GLA13 Record
Short Description: Standard Deviation of the sea ice Gaussian fit
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: millivolts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Data Dictionary

Product Maximum: 25500
Description: The Standard deviation of the difference between the functional fit and the received echo using standard parameters. It is directly taken from GLA05 parameter d_wfFitSDev_2 (standard).
Comments:

Product Var Name i_ElvuseFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation use flag
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating whether the elevations on this record should be used or not (1 bit set/shot). See the &lt;a href='flags/i_ElvuseFlg.pdf'&gt;PDF file&lt;/a&gt; for more information.
Comments:

Product Var Name i_atm_avail
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Availability Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Please see &lt;a href='flags/i_atm_avail.pdf'&gt; the PDF flag description in the next section for more details.
Comments:

Product Var Name i_spare16
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 16
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_cld1_mswf
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Cloud Multiple Scattering Warning Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: The multiple scattering warning flag (MSWF) is based on the total column optical depth (aerosol plus cloud) calculated in GLA11 using 532nm. It is intended as a way to quickly obtain information about the potential severity of multiple scattering with regards to the range-to-surface calculated by the altimetry processing software. It will be output on the GLA11 product for use by the altimetry group. The multiple scattering warning flag will have values ranging from 0-14, based on the total column optical depth as detailed in the PDF.
A warning flag value of 15 will signify ?invalid?. An invalid will be encoded if an optical depth in any of the layers in the 1-second column could not be calculated. This usually occurs in a very optically ?thick? cloud which extinguishes the signal. It could also occur if the extinction-to-backscatter ratio assignment is set too high, causing the transmission calculations in the lidar inversion to go out-of-range. Please see <a href='flags/i_cld1_mswf_elv.pdf'>the PDF flag description in the next section for more details.
Comments:

Product Var Name i_MRC_af
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Medium Resolution Cloud Availability Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Tells how many cloud layers were found at this resolution from the 532 nm channel. Please see <a href='flags/i_MRC_af.pdf'>the PDF flag description in the next section</a> for more details. This parameter is extracted from the i_MRCCL_flag on GLA09.

Comments:

Product Var Name i_spare9
Is element of: GLA13 Record
Short Description: spares
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null

Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_ElvFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation Definition Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 127

Description: Indicates how location on the received echo was determined to calculate the elevation on the record. Please see <a href='flags/i_ElvFlg.pdf'>the PDF flag description in the next section</a> for more details. 'For GLA05, 06 and 12,13,14 and 15, bits are set to reflect the range offset used for that products elevation. Although defined as a pass-thru, the values are different on GLA06/12,13,15 and GLA14.'

Comments:

Product Var Name i_rng_UQF
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Offset Quality/Use Flag
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Data quality flag for the range offsets on this record.
Please see `<a href='flags/i_rng_UQF.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_spare49
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 49
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see `<a href='flags/i_timecorflg.pdf'> the PDF flag description in the next section for more details.
Comments:
Product Var Name i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections.
Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i_AttFlg2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Flag 2
Product Data Type: i1b (20)
Total Bytes: 20
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Denotes at 40/sec rate whether precision attitude was used to determine spot location, and if problems with LPA, etc.
Please see <a href='flags/i_AttFlg2.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_spare5
Is element of: GLA13 Record
Short Description: Spare 5
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_FrameQF
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Altimeter Frame Quality Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Denotes all bad data (no signal in whole frame), or all data good and all science team recommended corrections applied
Please see <a href='flags/i_FrameQF.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_OrbFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: POD flag (Orbit Flag)
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Denotes quality of orbit, whether predicted or precision, loss of GPS data, maneuver-degraded, etc.
Please see <a href='flags/i_OrbFlg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_rngCorrFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Correction Flag
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Denotes which geophysical or instrument corrections have been applied to the range in the calculation of the elevation on this record.
Please see <a href='flags/i_rngCorrFlg.pdf'> the PDF flag description in the next section </a> for more details.
Comments:

Product Var Name i_CorrStatFlg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Correction Status Flag
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: For each geophysical correction that has multiple values denotes which algorithm or model was used.
Please see <a href='flags/i_CorrStatFlg.pdf'> the PDF flag description in the next section </a> for more details.
Comments:

Product Var Name i_spare15
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 15
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name: i_AttFlg1
Is element of: GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Flag 1
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: At 1/sec denotes large off-nadir angle, ocn sweep, target of opportunity, steering to reference track.
Please see <a href='flags/i_AttFlg1.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name: i_Spare6
Is element of: GLA13 Record
Short Description: Spare 6
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA13 spare6.

Product Var Name: i_Spare44
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spare 44
Product Data Type: i1b (120)
Total Bytes: 120
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_satNdx
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Index
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: ns
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 126
Description: The count of the number of gates in a waveform which have an amplitude greater than or equal to i_satNdxTh (set in anc07_0004). The value 126 means 126 or more gates are above the saturation index threshold (i_satNdxth).
Comments:

Product Var Name i_satElevCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Elevation Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description: Correction to elevation for saturated waveforms. This correction has not been applied to the data so to apply it SUBTRACT the correction from the range estimate. To apply the correction to the elevations it must be ADDED to the elevation estimates.
Comments:

Product Var Name i_satCorrFlg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Correction Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: Yes
Is Unsigned?: NA
Product Minimum: NA
Product Maximum: NA
Description: Please see <a href='flags/i_satCorrFlg.pdf'> the PDF flag description in the next section for more details.</a><br><br>
Bits 0-3: i_satElevCorr flag (4 bits); values indicated below:<br><br>
0= Not Saturated (i_satNdx < 2) or No Signal<br>1= Sat. Correction is Inconsequential (i_satNdx >= 2 & i_pctSat < 2.0)<br>2= Sat. Correction is Applicable (i_satNdx >= 2 & i_pctSat >= 2.0 & Full Width* < 100ns)<br>3= Sat. Correction is Not Computable effects elevations can not be corrected<br>4= Sat. Correction model is Not Applicable so data can not be corrected (i_satNdx >= 2 & i_pctSat >= 2.0 & Full Width* >= 100ns) there are errors in the data but the effects on elevations can not be corrected<br><br>values 5-15=TBD

Bits 4-5: i_satNrgCorr flag (2 bits):<br>
0=TBD<br>1=TBD<br>2=TBD<br>3=TBD<br><br>Bits 6-7: TBD:<br>
0=TBD<br>1=TBD<br>2=TBD<br>3=TBD<br><br>Comments:

Product Var Name i_satNrgCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Energy Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Var Name i_spare13
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spare 13
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: null
Invalid Value/Flag: null
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_gval_rcv
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Gain Value used for Received Pulse
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: counts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Gain value used for received pulse - uncalibrated.
Comments: This value is in counts and needs to be calibrated before calculating energy from it. Same as variable in GLA01_Long/i_gainSet1064.

Product Var Name i_RecNrgAll
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Received Energy signal begin to signal end
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 fJoules
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32000
Description: This is a pass through of gla01%d_recNrgAll_EU, but stored in different units on the product. This is calculated by taking the area under the received waveform (referenced to the observed noise) from all responses between the noise crossing before the first threshold crossing and the noise crossing after the last threshold crossing. It is a rescaled value of GLA01 parameter d_recNrgAll_EU and is not recomputed.
Comments:

Product Var Name i_FRir_cldtop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Cloud Top
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1030
Description: Full resolution (40 Hz) cloud top height obtained from the 1064 atmospheric channel. This parameter is for a 1 second record. This parameter is in GLA09.
Comments:

Product Var Name i_FRir_qaFlag
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Quality Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: One byte per data quality flag.

Value 15 = No clouds.

Value 14 = Indicates the likely presence of low clouds (< 150 m) based on elevated signal from the two bins above the ground return bin that were not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (i_Frir_cldtop) is set to a value of 0.10 km.

Value 13 = Indicates the possible presence of a cloud based on the value of the integrated signal parameter (i_FRir_intsig) that was not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (i_Frir_cldtop) is set to a value of 10.0 km.

Value 0 - 12 = Cloud detected by cloud search algorithm with higher numbers indicating a stronger average signal from the region starting at cloud top and extending 500 m below cloud top height. Please see <a href='flags/i_FRir_qaFlag.pdf'>the PDF flag description in the next section</a> for more details. This parameter is extracted from the equivalent parameter on GLA09.

Comments:

Product Var Name: i_atm_char_flag
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Characterization Flag
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10
Description: Flag to characterize cloud and blowing snow state of the atmosphere
0 clear
1 high cloud (> 5 km) low optical depth
2 high cloud (> 5 km), high optical depth
3 mid cloud (>2, <=5 km) low optical depth
4 mid cloud (>2, <=5 km) high optical depth
5 low cloud (> 500 m, <=2 km), low optical depth
6 low cloud (> 500 m, <=2 km), high optical depth
7 blowing snow or fog (< 500 m), low optical depth
8 blowing snow or fog (< 500 m), high optical depth
9 not tested
10 data quality insufficient to assign flag

Comments:

Product Var Name: i_atm_char_conf
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Characterization Flag Confidence
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Confidence level ascribed to the atmosphere characterization flag
Comments: 0 Not applicable (for contamination flag values of 9 or 10)
1 low confidence
2 reasonable confidence
3 high confidence

Product Var Name i_spare48
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 48
Product Data Type: i1b (36)
Total Bytes: 36
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_FRir_intsig
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Integrated Signal
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: e7/(m-sr)
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Though called 'integrated signal' this is actually an average of all bins in the above-ground portion of the 1064 40 Hz profile with values above the threshold of 1.0e-7 (1/(m-sr) units). This parameter is for a 1 second record. This parameter is extracted from the equivalent parameter on GLA09.

Comments:

Product Var Name i_spare14
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 14
Product Data Type: i1b (120)
Total Bytes: 120
Product Units: Unknown
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_Surface_temp
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Surface Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Atmospheric temperature at Earth's surface level measured in degrees Celsius and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_pres
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Surface Pressure
Product Data Type: i2b
Total Bytes: 2
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Atmospheric pressure at Earth's surface level measured in hPa and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_relh
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Relative Humidity
Product Data Type: i2b
Total Bytes: 2
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Atmospheric relative humidity at Earth's surface level measured as a percentage and derived from the meteorological data files.
Comments:

Product Var Name i_maxRecAmp
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Max Amplitude of Received Echo
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Tenth of millivolts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: Maximum Amplitude of the Received Echo.
Comments: This is calculated after converting the return to voltage. Use for scaling model fit RMS between normalized and un-normalized units.

Product Var Name i_sDevNsOb1
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Standard deviation of 1064 nm Background noise, (alternate)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.0001 volts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The standard deviation of the background noise (alternative parameters).
Comments: Can be used for computing signal-to-noise ratio along with unsmoothed max amplitude.

Product Var Name i_pctSAT
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Percent Saturation
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: percent
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: Yes
Is Unsigned?: NA
Product Minimum: -127
Product Maximum: 127
Description: Percent saturation (d_pctSAT) is calculated using the formula: 
\[ d\text{\_pctSAT} = 100 \left( \frac{\text{saturation index}}{\text{signal end} - \text{signal begin in nanoseconds}} \right) \]
The alternate signal end/begin are used for GLA14\%d_pctSAT, while the standard fit values are used for GLA06, 12, 13, and 15. The Saturation elevation correction is not applied in the geolocation processing computation of lat, lon and elev. Because the saturation corrections are small and data is acquired within 5 deg off nadir, effects on lat and lon can be ignored. To apply the saturation elevation correction to the elevations on the products it must be ADDED to the elevation estimates. Reported elevations for returns with invalid satElevCorr values and satCorrFlg values of 3 or 4 are likely to have large, uncorrectable errors and should be excluded from analyses.
Comments:

Product Var Name i_TxNrg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: 1064 nm Laser Transmit Energy
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 millijoules
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32766
Description: The 1064 nm laser pulse transmitted energy in energy units, computed from the digitized outgoing pulse, and the transmit gain.
Comments:

Product Var Name i_eqElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Equilibrium Tide Elevation (at first & last shot)
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: -10000
Product Maximum: 10000
Description: The equilibrium (long period) tide at first and last valid shot over the ocean.
Comments:

Product Var Name i_Spare7
Is element of: GLA06 record, GLA12 Record, GLA13 Record
Short Description: Spare 7
Product Data Type: i1b (282)
Total Bytes: 282
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA06, GLA12, GLA13 spare7.

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Data Dictionary

Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name: i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name: i_transtime
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: One way transit time
Product Data Type: i2b
Total Bytes: 2
Product Units: microseconds
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4000
Description: One way transit time calculated using the preliminary range offset. This is added to the UTC time tag to get the ground bounce times at which to calculate the orbit
Comments:
Product Var Name i_Spare1
Is element of: GLA14 Record
Short Description: Spare 1
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA14 spare1.

Product Var Name i_deltagpstmcor
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Delta GPS time correction
Product Data Type: i4b
Total Bytes: 4
Product Units: nanoseconds
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000000
Product Maximum: 1000000
Description: The high frequency delta GPS time correction calculated during the precision orbit processing step.
Comments:

Product Var Name i_dShotTime
Is element of: GLA01 Main Record, GLA04 LPA Main Record, GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Laser Shot Time Deltas (shots 2-40)
Product Data Type: i4b (39)
Total Bytes: 156
Product Units: microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1200000
Description: The time deltas of pulses 2 through 40 to i_UTCTime, the UTC time tag of the first pulse in the 1-second data frame. Adding the deltas to i_UTCTime will give the user the time of each individual shot in the frame.
Comments: To calculate the time for shots 2-40, add these deltas to the time of the first shot.

Product Var Name: i_lat
Is element of: GLA14 Record
Short Description: Coordinate Data, Latitude, specific to land range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: The geodetic latitude of the forty laser spots in the 1 second time frame, computed from the Precision orbit determined GLAS laser antenna ground nadir coordinates, precision attitude, and land-specific range after all instrument corrections, atmospheric delays and tides have been applied. The values are in degrees North.
Comments:

Product Var Name: i_lon
Is element of: GLA14 Record
Short Description: Coordinate Data, Longitude, specific to land range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000
Description: The longitude of the forty laser spots in the 1 second time frame, computed from the Precision orbit determined GLAS laser antenna ground nadir coordinates, precision attitude, and land-specific range after all instrument corrections, atmospheric delays and tides have been applied. The values are in east longitude.
Comments:

Product Var Name: i_elev
Is element of: GLA14 Record
Short Description: Land surface Elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500000
Product Maximum: 1000000
Description: Surface elevation with respect to the ellipsoid at the spot location determined by range using the land-specific fitting procedure after all instrument corrections, atmospheric delays and tides have been applied.
Comments:

Product Var Name i_campaign
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Campaign
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: INT(ICHAR(1A))
Product Maximum: INT(ICHAR(3K))
Description: The campaign. ie: for campaign L1A, it will be '1A'. Comments: for campaign L1A, it will be '1A'.

Product Var Name i_spare40
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 40
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 40.

Product Var Name i_cycTrk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Cycle and Track
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 10001
Product Maximum: 9991354
Description: The track and cycle. On the product, they will be stored as one number: cccctttt.
Comments:

Product Var Name  i_localSolarTime
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Local apparent solar time
Product Data Type: i4b
Total Bytes: 4
Product Units: seconds*1000
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 86400000
Description: Local apparent solar time.
Comments:

Product Var Name  i_spare41
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 41
Product Data Type: i4b (7)
Total Bytes: 28
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 41.
Product Var Name: i_deltaEllip
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Delta Ellipsoid
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -9000
Product Maximum: 9000
Description: Surface Elevation (T/P ellipsoid) minus Surface Elevation(WGS84 ellipsoid).
Comments:

Product Var Name: i_beamCoelv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Co-elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: Co-elevation (CE) is direction from vertical of the laser beam as seen by an observer located at the laser ground spot. 40Hz.
Comments:

Product Var Name: i_beamAzimuth
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Azimuth
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: The direction, eastwards from north, of the laser beam vector as seen by an observer at the laser ground spot viewing toward the spacecraft (i.e., the vector from the ground to the spacecraft). When the spacecraft is precisely at the geodetic zenith, the value will be 99999 degrees. 40 Hz.

Comments:

Product Var Name: i_d2refTrk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Distance to the reference ground track
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: m*1000
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000000
Description: Distance to the reference ground track.

Comments:

Product Var Name: i_SigBegOff
Is element of: GLA14 Record
Short Description: Signal Begin Range Increment
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range increment to be added to reference range to obtain signal begin as computed in ground process using the alternate parameterization.

Comments:

Product Var Name: i_DEM_hires_src
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: High Resolution Source Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Flag to specify who the source provider was for the high resolution DEM. <br>0 = no high res source available<br>1 = unfinished research Shuttle Radar Topography Mission (SRTM)<br>&nbsp &nbsp &nbsp &nbsp C-band 90 m DEM produced by JPL (+-1.1km E-W swath)<br>2 = finished SRTM C-band 90 m DEM produced by NGA (+-2.1km E-W swath)<br>3 = ICESat Greenland V1 1km DEM<br>4 = ICESat Antarctica V1 500m DEM<br>5 = 90m Canadian Digital Elevation Data (CDED)<br>6 = 90m Canadian Digital Elevation Data (CDED) if available otherwise finished SRTM C-band 90 m DEM<br>Comments: DEM elevations are referenced to the TOPEX/Poseidon ellipsoid and are directly comparable to the elevation on the GLAS products.

Product Var Name i_DEMhiresArElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: DEMhiresArElv
Product Data Type: i2b (9, 40)
Total Bytes: 720
Product Units: meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500
Product Maximum: 1300
Description: d_DEMhiresArElv is a 3 X 3 X 40 array of high resolution DEM values. The 1-40 index corresponds to 1/40 second samples. The 1-9 index corresponds to the position of the DEM value relative to the spot. Given the first 1/40 second of data, positional correspondence of the DEM element to the spot is as follows:<br><br>The 9 points on the product correspond to the 3x3 points in the alg variable as follows:<br><br>gla06%d_DEMhiresArElv(1,1,k) = gla06_prod%i_DEMhiresArElv(1,k) NW<br>gla06%d_DEMhiresArElv(2,1,k) = gla06_prod%i_DEMhiresArElv(2,k) N<br>gla06%d_DEMhiresArElv(3,1,k) = gla06_prod%i_DEMhiresArElv(3,k) NE<br>gla06%d_DEMhiresArElv(1,2,k) = gla06_prod%i_DEMhiresArElv(4,k) W<br>gla06%d_DEMhiresArElv(2,2,k) = gla06_prod%i_DEMhiresArElv(5,k) center<br>gla06%d_DEMhiresArElv(3,2,k) = gla06_prod%i_DEMhiresArElv(6,k) E<br>gla06%d_DEMhiresArElv(1,3,k) = gla06_prod%i_DEMhiresArElv(7,k) SW<br>gla06%d_DEMhiresArElv(2,3,k) = gla06_prod%i_DEMhiresArElv(8,k) S
gla06%d_DEMhiresArElv(3,3,k) = gla06_prod%i_DEMhiresArElv(9,k) SE
<br>
Comments:

Product Var Name i_ElevBiasCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation Bias Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 3000
Description: Correction to elevation based on post flight analysis for biases determined for each campaign. This bias correction has not been applied to the data so to apply it SUBTRACT the correction from the range estimate. To apply the correction to the elevations it must be ADDED to the elevation estimates.
Comments: See the altimeter user guide for full description.

Product Var Name i_spare42
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 42
Product Data Type: i2b (4, 40)
Total Bytes: 320
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 42

Product Var Name i_sigmaatt
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Quality Indicator
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6000
Description: Attitude quality indicator. Values: 0=good; 50=warning; 100=bad.
Comments: This indicator currently has only 3 values: 0, 50, and 100, leaving open the opportunity to use numbers in between for further resolution of the degradation as our knowledge improves.

Product Var Name i_Azimuth
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Local Azimuth
Product Data Type: i4b
Total Bytes: 4
Product Units: millideg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000
Description: Mean azimuth measured clockwise from north based on latitude, longitude, and elevation of a 1 second interval of the trace of the ground footprint-center.
Comments:

Product Var Name i_SolAng
Is element of: GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Solar Angle
Product Data Type: i4b
Total Bytes: 4
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Solar Angle above or below the plane tangent to the ellipsoid surface at the laser spot. Positive values mean the sun is above the horizon, while negative values mean it is below the horizon. The effect of atmospheric refraction is not included. This is a low-precision value, with approximately one degree accuracy.
Comments:

Product Var Name i_tpintensity_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse intensity - frame avg
Product Data Type: i4b
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 25500
Description: Transmit pulse intensity as measured by the LPA. Average over the 1-second frame. From ANC09.
Comments:

Product Var Name i_tpazimuth_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse azimuth - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees*10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Transmit pulse azimuth. Average over the 1-second frame. Angle eastwards from north of the major axis of the transmit pulse, as seen by the LPA. From ANC09.
Comments:

Product Var Name i_tpeccentricity_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse eccentricity - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: Unitless*1000
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: Transmit pulse eccentricity as measured by the LPA. Average over the 1-second frame. From ANC09.
Comments:
Product Var Name: i_tpmajoraxis_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse major axis - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: cm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Transmit pulse major axis as measured by the LPA. Average over the 1-second time frame. From ANC09.
Comments:

Product Var Name: i_poTide
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Pole Tide
Product Data Type: i2b
Total Bytes: 2
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Pole tide: an ocean tide which is the result of the Chandler wobble (a free nutation of the Earth caused by fluctuating pressure on the bottom of the ocean, caused by temperature and salinity changes and wind-driven changes in the circulation of the oceans).
Comments:

Product Var Name: i_gdHt
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Geoid
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: cm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -20000
Product Maximum: 20000
Description: The height of the geoid above the ellipsoid for the first and last shot in the record.
Comments:

Product Var Name i_erElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Solid Earth Tide Elevation (at first & last shot)
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The solid earth tide elevation for the first & last shot in the record.
Comments:

Product Var Name i_spElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Tide Elevations, Specific
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: A tide elevation calculated from alternate tide models for specific regions for shots 1, 11, 21, and 31.
Comments:

Product Var Name i_ldElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Load Tide Elevation
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The load tide elevation applied to each shot. Elements 1-4 of the load tide vector are applied to shots 1-10, 11-20, 21-30, and 31-40, respectively.
Comments: The load tide is NOT NECESSARILY the load tide for shots 1,11,21,31. It is calculated for the first valid shot in each group of 10 and applied to all valid shots in the group.

Product Var Name i_spare12
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spares 12
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: None
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_wTrop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Correction_Wet Troposphere
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 0
Description: The range correction due to the wet troposphere at first & last shot.
Comments:

Product Var Name i_dTrop
Is element of: GLA14 Record
Short Description: Range Correction, Dry Troposphere
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -2500
Product Maximum: 0
Description: Atmospheric dry tropospheric delay correction added to the elevation. Validity is based on results of finding a range with the alternate fit.
Comments:

Product Var Name i_surfType
Is element of: GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Region Type
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 15
Description: Describes the region type or types associated with each shot Ice Sheet, ocean, sea ice, or Land.
Please see <a href='flags/i_surfType.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_spare11
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spare 11
Product Data Type: i1b (3)
Total Bytes: 3
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name: i_DEM_elv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: DEM Elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: cm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -50000
Product Maximum: 1000000

Description: Elevation at the footprint location from the SRTM30 (GTOPO30 + SRTM) Digital Elevation Model (DEM). The reference frame for the DEM elevation was changed to the TOPEX/Poseidon ellipsoid to make it consistent with the GLAS elevations.

Comments:

Product Var Name: i_refRng
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Reference Range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 400000000
Product Maximum: 1000000000

Description: Range in distance calculated from the time between the centroid of the transmit pulse and the farthest gate from the spacecraft of the received pulse. See the rngcorrflg to determine any corrections that have been applied.

Comments:

Product Var Name: i_spare47
Is element of: GLA06 record, GLA14 Record
Short Description: Spare 47
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information

Comments:

Product Var Name i_ldRngOff
Is element of: GLA06 record, GLA14 Record
Short Description: Land Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range offset to be added to i_refRng to calculate the range using the algorithm deemed appropriate for land.
Comments:

Product Var Name i_SigEndOff
Is element of: GLA14 Record
Short Description: Signal End Range Increment
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range increment to be added to reference range to signal end as computed in ground process using the alternate parameterization.
Comments:

Product Var Name i_gpCntRngOff
Is element of: GLA14 Record
Short Description: Centroid Range Increment for all 6 peaks
Product Data Type: i4b (6, 40)
Total Bytes: 960
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: (Centroid Range Increment for all 6 peaks) is the array that contains the offsets of the Gaussian peaks with respect to the centroid range (Peak 6 to Peak 1, if you want from highest to lowest, first one is closest to the ground).
Centroid Range is the sum of reference range and Land range offset (which should be same as the centroid range offset).
Comments:

Product Var Name i_reflctUC
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: reflctUC
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: Unitless*1E06
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000
Description: Reflectivity, not corrected for atmospheric effects, is calculated as \( \text{Refl} = \frac{R}{T} \), where \( R \) is the received energy after it has been scaled for range, and \( T \) is the transmitted energy. \( i\_\text{reflctUC} \) has also been calibrated for gain non-linearity (only for non-saturated waveforms), ground truth calibration and boresight shift shadowing (BSS). It is not corrected for saturation effects. If the shot is saturated (satindex above 2) then to correct for saturation the reflectivity estimate needs to be multiplied by the ratio of the corrected energy to the uncorrected energy (sat corrected reflectivity = \( i\_\text{reflctUC} \times \frac{i\_\text{RecNrgAll} + i\_\text{satNrgCorr}}{i\_\text{RecNrgAll}} \)).
The atmospheric corrected reflectivity may be calculated from this uncorrected reflectivity by multiplying it by \( d\_\text{reflCor_atm} \).
i_reflctUC is invalid where GLA06%d_satNrgCorr is invalid.
Comments: This uses all signal between signal begin and signal end.

Product Var Name i_reflCor_atm
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Reflectivity Correction Factor For Atmospheric Effects
Product Data Type: i4b
Total Bytes: 4
Product Units: Unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 250
Description: This reflectance correction factor is calculated as 1 / e^(-2(tc+ta+tp+tm)), where tc is the cloud (column) integrated optical depth, ta is the aerosol (column) integrated optical depth, tp is the planetary boundary layer optical depth, and tm is the molecular optical depth. tm is a constant equal to -log(gd_T_RTatm)/2, where gd_T_RTatm = 0.98 is defined in const_elev_mod.f90 or read from ANC07-03. The attenuation correction factor has been corrected for multiple scattering. The reflectance has been corrected for waveform saturation.
Comments:

Product Var Name: i_maxSmAmp
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Peak Amplitude of Smoothed Received Echo
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Tenth of millivolts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: The peak amplitude of the received echo after it has been smoothed to remove high frequency noise (see ATBD).
Comments: This is calculated after converting the return to voltage.

Product Var Name: i_ocElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Ocean Tide Elevation
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The ocean tide elevation from the TPX07.1 tide model.
Comments:

Product Var Name i_numPk
Is element of: GLA14 Record
Short Description: Number of Peaks found in the Return
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6
Description: The number of peaks in the waveform produced by the Gaussian filtering, using alternate parameters.
Comments:

Product Var Name i_kurt1
Is element of: GLA05 record, GLA14 Record
Short Description: Kurtosis of Received Echo (alternative)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 1000
Description: Kurtosis of the received echo from signal begin to signal end using alternative parameters
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_skew1
Is element of: GLA05 record, GLA14 Record
Short Description: Skewness of Received Echo (alternative)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Skewness of the received echo from signal begin to signal end using alternative parameters
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_spare4
Is element of: GLA06 record, GLA12 Record, GLA14 Record, GLA15 Record
Short Description: Spare 4
Product Data Type: i1b (160)
Total Bytes: 160
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_Gamp
Is element of: GLA14 Record
Short Description: Amplitudes of Gaussians
Product Data Type: i4b (6, 40)
Total Bytes: 960
Product Units: 0.01 volts
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 300
Description: Amplitude of each Gaussian solved for (up to six), using the alternate parameters.
Comments:

Product Var Name i_Garea
Is element of: GLA14 Record
Short Description: Area under Gaussian
Product Data Type: i4b (6, 40)
Total Bytes: 960
Product Units: 0.01 volts * ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 348457
Description: Area under each of the Gaussians solved for (up to six), using alternate parameters.
Comments:

Product Var Name i_Gsigma
Is element of: GLA14 Record
Short Description: Sigma of Gaussians
Product Data Type: i4b (6, 40)
Total Bytes: 960
Product Units: 0.001 ns
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 327660
Description: Width (sigma) of each Gaussian solved for (up to six), using alternate parameters.
Comments:

Product Var Name i_nPeaks1
Is element of: GLA05 record, GLA06 record, GLA14 Record
Short Description: Initial Number of Peaks in received echo (alternate)
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 50
Description: The initial number of peaks of the received echo; determined from the smoothed waveform, using alternative parameters
Comments:

Product Var Name i_LandVar
Is element of: GLA14 Record
Short Description: Standard Deviation of the land Gaussian Fit
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless
Data Dictionary

Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The Standard deviation of the difference between the functional fit and the received echo using alternative parameters. It is directly taken from GLA05 parameter d_wFltSDev_1 (alternative).
Comments:

Product Var Name i_ElvuseFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation use flag
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating whether the elevations on this record should be used or not (1 bit set/shot). See the <a href='flags/i_ElvuseFlg.pdf'>PDF file</a> for more information.
Comments:

Product Var Name i_atm_avail
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Availability Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Please see <a href='flags/i_atm_avail.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_spare16
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 16
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_cld1_mswf
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Cloud Multiple Scattering Warning Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: The multiple scattering warning flag (MSWF) is based on the total column optical depth (aerosol plus cloud) calculated in GLA11 using 532nm. It is intended as a way to quickly obtain information about the potential severity of multiple scattering with regards to the range-to-surface calculated by the altimetry processing software. It will be output on the GLA11 product for use by the altimetry group. The multiple scattering warning flag will have values ranging from 0-14, based on the total column optical depth as detailed in the PDF.
A warning flag value of 15 will signify ?invalid?. An invalid will be encoded if an optical depth in any of the layers in the 1-second column could not be calculated. This usually occurs in a very optically ?thick? cloud which extinguishes the signal. It could also occur if the extinction-to-backscatter ratio assignment is set too high, causing the transmission calculations in the lidar inversion to go out-of-range. Please see <a href='flags/i_cld1_mswf_elv.pdf'>the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_MRC_af
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Medium Resolution Cloud Availability Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Tells how many cloud layers were found at this resolution from the 532 nm channel. Please see <a href='flags/i_MRC_af.pdf'> the PDF flag description in the next section </a> for more details. This parameter is extracted from the i_MRCL_flag on GLA09.

Comments:

Product Var Name i_spare9
Is element of: GLA06 record, GLA12 Record, GLA14 Record
Short Description: Spare 9
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: null
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_ElvFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation Definition Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 127
Description: Indicates how location on the received echo was determined to calculate the elevation on the record. Please see <a href='flags/i_ElvFlg.pdf'> the PDF flag description in the next section </a> for more details. 'For GLA05, 06 and 12,13,14 and 15, bits are set to reflect the range offset used for that products elevation. Although defined as a pass-thru, the values are different on GLA06/12,13,15 and GLA14.'

Comments:

Product Var Name i_rng_UQF
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Offset Quality/Use Flag
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Data quality flag for the range offsets on this record.
Please see <a href='flags/i_rng_UQF.pdf'> the PDF flag description in the next section  for more details.
Comments:

Product Var Name i_spare49
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 49
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767

Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href='flags/i_timecorflg.pdf'>the PDF flag description in the next section</a> for more details.

Comments:

Product Var Name i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127

Description: Flag indicating which packets (APIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections.

Please see <a href='flags/i_AttFlg2.pdf'>the PDF flag description in the next section</a> for more details.

Comments:

Product Var Name i_AttFlg2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: Attitude Flag 2
Product Data Type: i1b (20)
Total Bytes: 20
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15

Description: Denotes at 40/sec rate whether precision attitude was used to determine spot location, and if problems with LPA, etc.

Please see <a href='flags/i_AttFlg2.pdf'>the PDF flag description in the next section</a> for more details.

Comments:

Product Var Name i_spare5
Is element of: GLA14 Record

Short Description: Spare 5
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_FrameQF
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Altimeter Frame Quality Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Denotes all bad data (no signal in whole frame), or all data good and all science team recommended corrections applied
Please see `<a href="flags/i_FrameQF.pdf"> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_OrbFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: POD flag (Orbit Flag)
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Denotes quality of orbit, whether predicted or precision, loss of GPS data, maneuver-degraded, etc.
Please see <a href='flags/i_rngCorrFlg.pdf'> the PDF flag description in the next section  for more details.

Comments:

Product Var Name i_rngCorrFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Correction Flag
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Denotes which geophysical or instrument corrections have been applied to the range in the calculation of the elevation on this record.
Please see <a href='flags/i_rngCorrFlg.pdf'> the PDF flag description in the next section  for more details.
Comments:

Product Var Name i_CorrStatFlg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Correction Status Flag
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: For each geophysical correction that has multiple values denotes which algorithm or model was used.
Please see <a href='flags/i_CorrStatFlg.pdf'> the PDF flag description in the next section  for more details.
Comments:

Product Var Name i_spare15
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 15
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_AttFlg1
Is element of: GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Flag 1
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: At 1/sec denotes large off-nadir angle, ocn sweep, target of opportunity, steering to reference track. Please see <a href='flags/i_AttFlg1.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_Spare6
Is element of: GLA14 Record
Short Description: Spare 6
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA14 spare6.

Product Var Name i_spare44
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spare 44
Product Data Type: i1b (120)
Total Bytes: 120
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_satNdx
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Index
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: ns
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 126
Description: The count of the number of gates in a waveform which have an amplitude greater than or equal to i_satNdxTh (set in anc07_0004). The value 126 means 126 or more gates are above the saturation index threshold (i_satNdxth).
Comments:

Product Var Name i_satElevCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Elevation Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description: Correction to elevation for saturated waveforms. This correction has not been applied to the data so to apply it SUBTRACT the correction from the range estimate. To apply the correction to the elevations it must be ADDED to the elevation estimates.

Comments:

Product Var Name i_satCorrFlg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Correction Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: Yes
Is Unsigned?: NA
Product Minimum: NA
Product Maximum: NA
Description: Please see <a href='flags/i_satCorrFlg.pdf'> the PDF flag description in the next section for more details</a>.

Bits 0-3: i_satElevCorr flag (4 bits); values indicated below:

0= Not Saturated (i_satNdx < 2) or No Signal
1= Sat. Correction is Inconsequential (i_satNdx >= 2 & i_pctSat < 2.0)
2= Sat. Correction is Applicable (i_satNdx >= 2 & i_pctSat >= 2.0 & Full Width* < 100ns)
3= Sat. Correction is Not Computable effects elevations can not be corrected
4= Sat. Correction model is Not Applicable so data can not be corrected (i_satNdx >= 2 & i_pctSat >= 2.0 & Full Width* >= 100ns) there are errors in the data but the effects on elevations can not be corrected

Values 5-15 = TBD

Bits 4-5: i_satNrgCorr flag (2 bits):
0= TBD
1= TBD
2= TBD
3= TBD

Values 6-7: TBD

Comments:
Product Var Name i_satNrgCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Energy Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: .01fJ
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description: Correction to energy for saturated waveforms. This correction has not been applied to the energy. It should be ADDED to any echo pulse energy calculated from the pulse area under the waveform. Also any reflectivity estimates need to be corrected for this error in energy measurement.
Comments:

Product Var Name i_spare13
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record
Short Description: Spare 13
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: null
Invalid Value/Flag: null
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_gval_rcv
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Gain Value used for Received Pulse
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: counts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Gain value used for received pulse - uncalibrated.
Comments: This value is in counts and needs to be calibrated before calculating energy from it. Same as variable in GLA01_Long/i_gainSet1064.

Product Var Name i_RecNrgAll
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Received Energy signal begin to signal end
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 fJoules
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32000
Description: This is a pass through of gla01%d_recNrgAll_EU, but stored in different units on the product. This is calculated by taking the area under the received waveform (referenced to the observed noise) from all responses between the noise crossing before the first threshold crossing and the noise crossing after the last threshold crossing. It is a rescaled value of GLA01 parameter d_recNrgAll_EU and is not recomputed.
Comments:

Product Var Name i_FRir_cldtop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Cloud Top
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1030
Description: Full resolution (40 Hz) cloud top height obtained from the 1064 atmospheric channel. This parameter is for a 1 second record. This parameter is in GLA09.
Comments:

Product Var Name i_FRir_qaFlag
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Quality Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: One byte per data quality flag.
Value 15 = No clouds.
Value 14 = Indicates the likely presence of low clouds (< 150 m) based on elevated signal from the two bins above the ground return bin that were not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (i_Frir_cldtop) is set to a value of 0.10 km.
Value 13 = Indicates the possible presence of a cloud based on the value of the integrated signal parameter (i_FRir_intsig) that was not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (i_Frir_cldtop) is set to a value of 10.0 km.
Value 0 - 12 = Cloud detected by cloud search algorithm with higher numbers indicating a stronger average signal from the region starting at cloud top and extending 500 m below cloud top height. Please see the PDF flag description in the next section for more details. This parameter is extracted from the equivalent parameter on GLA09.
Comments:

Product Var Name i_atm_char_flag
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Characterization Flag
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10
Description: Flag to characterize cloud and blowing snow state of the atmosphere
0 clear
1 high cloud (> 5 km) low optical depth
2 high cloud (> 5 km), high optical depth
3 mid cloud (>2, <=5 km) low optical depth
4 mid cloud (>2, <=5 km) high optical depth
5 low cloud (> 500 m, <=2 km), low optical depth
6 low cloud (> 500 m, <=2 km), high optical depth
7 blowing snow or fog (< 500 m), low optical depth
8 blowing snow or fog (< 500 m), high optical depth
9 not tested
10 data quality insufficient to assign flag
Comments:

Product Var Name i_atm_char_conf
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Characterization Flag Confidence
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Confidence level ascribed to the atmosphere characterization flag
Comments: 0 Not applicable (for contamination flag values of 9 or 10)
1 low confidence
2 reasonable confidence
3 high confidence

Product Var Name i_spare48
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 48
Product Data Type: i1b (36)
Total Bytes: 36
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_FRir_intsig
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Integrated Signal
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: e7/(m-sr)
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000

Description: Though called 'integrated signal' this is actually an average of all bins in the above-ground portion of the 1064 40 Hz profile with values above the threshold of 1.0e-7 (1/(m-sr) units). This parameter is for a 1 second record. This parameter is extracted from the equivalent parameter on GLA09.

Comments:

Product Var Name i_spare14
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 14
Product Data Type: i1b (120)
Total Bytes: 120
Product Units: Unknown
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0

Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_Surface_temp
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Surface Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000

Description: Atmospheric temperature at Earth's surface level measured in degrees Celsius and derived from the meteorological data files.

Comments:

Product Var Name i_Surface_pres
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Surface Pressure
Product Data Type: i2b
Total Bytes: 2
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Atmospheric pressure at Earth's surface level measured in hPa and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_relh
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Relative Humidity
Product Data Type: i2b
Total Bytes: 2
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Atmospheric relative humidity at Earth's surface level measured as a percentage and derived from the meteorological data files.
Comments:

Product Var Name i_maxRecAmp
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Max Amplitude of Received Echo
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Tenth of millivolts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: Maximum Amplitude of the Received Echo.
Comments: This is calculated after converting the return to voltage. Use for scaling model fit RMS between normalized and un-normalized units.
Product Var Name i_sDevNsOb1
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Standard deviation of 1064 nm Background noise, (alternate)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.0001 volts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The standard deviation of the background noise (alternative parameters).
Comments: Can be used for computing signal-to-noise ratio along with unsmoothed max amplitude.

Product Var Name i_spare8
Is element of: GLA14 Record
Short Description: i_Spare8
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_isRngOff
Is element of: GLA06 record, GLA12 Record, GLA14 Record
Short Description: Ice Sheet Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range offset to be added to \textit{i\_refRng} to calculate the range using the algorithm deemed appropriate for ice sheets.

Comments: Can be used for comparing elevations computed from results standard and alternate fitting.

Product Var Name \textit{i\_pctSAT}
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Percent Saturation
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: percent
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: Yes
Is Unsigned?: NA
Product Minimum: -127
Product Maximum: 127

Description: Percent saturation (d\_pctSAT) is calculated using the formula: \(d\_pctSAT = 100^\circ \frac{\text{saturation index}}{\text{signal end} - \text{signal begin in nanoseconds}}\). The alternate signal end/begin are used for GLA14\_d\_pctSAT; while the standard fit values are used for GLA06, 12, 13, and 15. The Saturation elevation correction is not applied in the geolocation processing computation of lat, lon and elev. Because the saturation corrections are small and data is acquired within 5 deg off nadir, effects on lat and lon can be ignored. To apply the saturation elevation correction to the elevations on the products it must be ADDED to the elevation estimates. Reported elevations for returns with invalid satElevCorr values and satCorrFlg values of 3 or 4 are likely to have large, uncorrectable errors and should be excluded from analyses.

Comments:

Product Var Name \textit{i\_TxNrg}
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: 1064 nm Laser Transmit Energy
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 millijoules
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32766

Description: The 1064 nm laser pulse transmitted energy in energy units, computed from the digitized outgoing pulse, and the transmit gain.

Comments:

Product Var Name \textit{i\_eqElv}
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Equilibrium Tide Elevation (at first & last shot)
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: -10000
Product Maximum: 10000
Description: The equilibrium (long period) tide at first and last valid shot over the ocean.
Comments:

Product Var Name i_Spare7
Is element of: GLA14 Record
Short Description: Spare 7
Product Data Type: i1b (120)
Total Bytes: 120
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA14 spare7.

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_transtime
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: One way transit time
Product Data Type: i2b
Total Bytes: 2
Product Units: microseconds
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4000
Description: One way transit time calculated using the preliminary range offset. This is added to the UTC time tag to get the ground bounce times at which to calculate the orbit.
Comments:

Product Var Name i_Spare1
Is element of: GLA15 Record
Short Description: Spare 1
Product Data Type: Spare 1
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA15 spare1.

Product Var Name i_deltagpstmcor
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Delta GPS time correction
Product Data Type: i4b
Total Bytes: 4
Product Units: nanoseconds
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000000
Product Maximum: 1000000
Description: The high frequency delta GPS time correction calculated during the precision orbit processing step.
Comments:

Product Var Name i_dShotTime
Is element of: GLA01 Main Record, GLA04 LPA Main Record, GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Laser Shot Time Deltas (shots 2-40)
Product Data Type: i4b (39)
Total Bytes: 156
Product Units: microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1200000
Description: The time deltas of pulses 2 through 40 to i_UTCTime, the UTC time tag of the first pulse in the 1-second data frame. Adding the deltas to i_UTCTime will give the user the time of each individual shot in the frame.
Comments: To calculate the time for shots 2-40, add these deltas to the time of the first shot.

Product Var Name i_lat
Is element of: GLA15 Record
Short Description: Coordinate Data, Latitude, specific to ocean range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -9000000
Product Maximum: 9000000
Description: The geodetic latitude of the forty laser spots in the 1 second time frame, computed from the Precision orbit determined GLAS laser antenna ground nadir coordinates, precision attitude, and ocean-specific range after all instrument corrections, atmospheric delays and tides have been applied. The values are in degrees North.
Comments:

Product Var Name i_lon
Is element of: GLA15 Record
Short Description: Coordinate Data, Longitude, specific to ocean range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000000
Description: The longitude of the forty laser spots in the 1 second time frame, computed from the Precision orbit determined GLAS laser antenna ground nadir coordinates, precision attitude, and ocean-specific range after all instrument corrections, atmospheric delays and tides have been applied. The values are in east longitude.
Comments:

Product Var Name i_elev
Is element of: GLA15 Record
Short Description: Ocean Surface Elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500000
Product Maximum: 10000000
Description: Surface elevation with respect to the ellipsoid at the spot location determined by range using the fitting algorithm after instrument corrections, atmospheric delays and tides have been applied.

Comments:

Product Var Name: i_campaign
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Campaign
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: INT(ICHAR(1A))
Product Maximum: INT(ICHAR(3K))
Description: The campaign. i.e: for campaign L1A, it will be '1A'.
Comments:

Product Var Name: i_spare40
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 40
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 40.

Product Var Name: i_cycTrk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Cycle and Track
Product Data Type: i4b
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 10001
Product Maximum: 9991354
Description: The track and cycle. On the product, they will be stored as one number: ccctttt.
Comments:

Product Var Name: i_localSolarTime
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Local apparent solar time
Product Data Type: i4b
Total Bytes: 4
Product Units: seconds*1000
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 86400000
Description: Local apparent solar time.
Comments:

Product Var Name: i_spare41
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 41
Product Data Type: i4b (7)
Total Bytes: 28
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 41.

Product Var Name: i_deltaEllip
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Delta Ellipsoid
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -9000
Product Maximum: 9000
Description: Surface Elevation (T/P ellipsoid) minus Surface Elevation(WGS84 ellipsoid).
Comments:

Product Var Name i_beamCoelv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Co-elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: Co-elevation (CE) is direction from vertical of the laser beam as seen by an observer located at the laser ground spot. 40Hz.
Comments:

Product Var Name i_beamAzimuth
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Azimuth
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: degrees*100
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 36000
Description: The direction, eastwards from north, of the laser beam vector as seen by an observer at the laser ground spot viewing toward the spacecraft (i.e., the vector from the ground to the spacecraft). When the spacecraft is precisely at the geodetic zenith, the value will be 99999 degrees. 40 Hz.
Comments:

Product Var Name i_d2refTrk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Distance to the reference ground track
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: m*1000
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000000
Description: Distance to the reference ground track.
Comments:

Product Var Name i_SigBegOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Signal Begin Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the range in distance to the location on the received echo calculated as the beginning of signal (closest to the spacecraft) using standard parameters.
Comments:

Product Var Name i_spare45
Is element of: GLA15 Record
Short Description: Spare 45
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name: i_spare46
Is element of: GLA15 Record
Short Description: Spare 46
Product Data Type: i2b (9, 40)
Total Bytes: 720
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name: i_ElevBiasCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation Bias Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: 0
Product Maximum: 3000
Description: Correction to elevation based on post flight analysis for biases determined for each campaign. This bias correction has not been applied to the data so to apply it SUBTRACT the correction from the range estimate. To apply the correction to the elevations it must be ADDED to the elevation estimates.
Comments: See the altimeter user guide for full description.

Product Var Name: i_spare42
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 42
Product Data Type: i2b (4, 40)
Total Bytes: 320
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Product Var Name i_sigmaatt
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Quality Indicator
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Unitless
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6000
Description: Attitude quality indicator. Values: 0=good; 50=warning; 100=bad.
Comments: This indicator currently has only 3 values: 0, 50, and 100, leaving open the opportunity to use numbers in between for further resolution of the degradation as our knowledge improves.

Product Var Name i_Azimuth
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Local Azimuth
Product Data Type: i4b
Total Bytes: 4
Product Units: millideg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000
Description: Mean azimuth measured clockwise from north based on latitude, longitude, and elevation of a 1 second interval of the trace of the ground footprint-center.
Comments:

Product Var Name i_SolAng
Is element of: GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Solar Angle
Product Data Type: i4b
Total Bytes: 4
Product Units: microdeg
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90000000
Product Maximum: 90000000
Description: Solar Angle above or below the plane tangent to the ellipsoid surface at the laser spot. Positive values mean the sun is above the horizon, while negative values mean it is below the horizon. The effect of atmospheric refraction is not included. This is a low-precision value, with approximately one degree accuracy.
Comments:

Product Var Name i_tpintensity_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse intensity - frame avg
Product Data Type: i4b
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 25500
Description: Transmit pulse intensity as measured by the LPA. Average over the 1-second frame. From ANC09.
Comments:

Product Var Name i_tpazimuth_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse azimuth - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees*10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Transmit pulse azimuth. Average over the 1-second frame. Angle eastwards from north of the major axis of the transmit pulse, as seen by the LPA. From ANC09.
Comments:
Product Var Name i_tpeccentricity_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse eccentricity - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: Unitless*1000
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: Transmit pulse eccentricity as measured by the LPA. Average over the 1-second frame. From ANC09.
Comments:

Product Var Name i_tpmajoraxis_avg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Pulse major axis - frame avg
Product Data Type: i2b
Total Bytes: 2
Product Units: cm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Transmit pulse major axis as measured by the LPA. Average over the 1-second time frame. From ANC09.
Comments:

Product Var Name i_poTide
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Pole Tide
Product Data Type: i2b
Total Bytes: 2
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Pole tide: an ocean tide which is the result of the Chandler wobble (a free nutation of the Earth caused by fluctuating pressure on the bottom of the ocean, caused by temperature and salinity changes and wind-driven changes in the circulation of the oceans).

Comments:

Product Var Name: i_gdHt
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Geoid
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: cm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -20000
Product Maximum: 20000
Description: The height of the geoid above the ellipsoid for the first and last shot in the record.
Comments:

Product Var Name: i_erElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Solid Earth Tide Elevation (at first & last shot)
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The solid earth tide elevation for the first & last shot in the record.
Comments:

Product Var Name: i_spElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Tide Elevations, Specific
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: A tide elevation calculated from alternate tide models for specific regions for shots 1, 11, 21, and 31.
Comments:

Product Var Name i_ldElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Load Tide Elevation
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The load tide elevation applied to each shot. Elements 1-4 of the load tide vector are applied to shots 1-10, 11-20, 21-30, and 31-40, respectively.
Comments: The load tide is NOT NECESSARILY the load tide for shots 1,11,21,31. It is calculated for the first valid shot in each group of 10 and applied to all valid shots in the group.

Product Var Name i_bathyElv
Is element of: GLA15 Record
Short Description: Bathymetry Elevation
Product Data Type: i4b
Total Bytes: 4
Product Units: cm
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500000
Product Maximum: 1000000
Description: Bathymetry Elevation
Comments:

Product Var Name i_wTrop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Correction_Wet Troposphere
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 0
Description: The range correction due to the wet troposphere at first & last shot.
Comments:

Product Var Name i_dTrop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record

Short Description: Range Correction, Dry Troposphere
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -2500
Product Maximum: 0
Description: The range correction due to the dry troposphere; one correction for each shot. Validity is based on results of finding a range with the standard fit.
Comments:

Product Var Name i_surfType
Is element of: GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: Region Type
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1
Product Maximum: 15
Description: Describes the region type or types associated with each shot: Ice Sheet, ocean, sea ice, or Land.
Please see <a href='flags/i_surfType.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_Spare3
Is element of: GLA15 Record
Short Description: Spare 3
Product Data Type: i1b (3)
Total Bytes: 3
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA15 spare3.

Product Var Name i_MSS_elv
Is element of: GLA15 Record
Short Description: Mean Sea Surface Elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: cm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -50000
Product Maximum: 100000
Description: The mean sea surface elevation from GSFC's data file DNSS08MSS_1min.mss.gz This is in reference to the TOPEX/Poseidon ellipsoid.
Comments:

Product Var Name i_refRng
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Reference Range
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 400000000
Product Maximum: 1000000000
Description: Range in distance calculated from the time between the centroid of the transmit pulse and the farthest gate from the spacecraft of the received pulse. See the rngcorrflg to determine any corrections that have been applied.
Comments:

Product Var Name i_TrshRngOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Threshold Retracker Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the range in distance to the threshold retracker location on the received echo using standard parameters.
Comments:

Product Var Name i_ocRngOff
Is element of: GLA06 record, GLA15 Record
Short Description: Ocean Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Range offset to be added to i_refRng to calculate the range using the algorithm deemed appropriate for oceans.
Comments:

Product Var Name i_SigEndOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Signal End Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the range in distance to the location on the received echo calculated as the end of signal (farthest from the spacecraft) using standard parameters.
Comments:

Product Var Name i_cntRngOff
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Centroid Range Offset
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -150000
Product Maximum: 0
Description: Offset to be added to i_refRng to give the range in distance to the location of the centroid of the received echo from signal begin through signal end defined by the standard parameters.
Comments:

Product Var Name i_reflctUC
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: reflctUC
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: Unitless*1E06
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000
Description: Reflectivity, not corrected for atmospheric effects, is calculated as $\text{Refl} = \frac{R}{T}$, where $R$ is the received energy after it has been scaled for range, and $T$ is the transmitted energy. $i_{\text{recltUC}}$ has also been calibrated for gain non-linearity (only for non-saturated waveforms), ground truth calibration and boresight shift shadowing (BSS). It is not corrected for saturation effects. If the shot is saturated (satindex above 2) then to correct for saturation the reflectivity estimate needs to be multiplied by the ratio of the corrected energy to the uncorrected energy ($\text{sat corrected reflectivity} = \frac{i_{\text{reflctUC}} \times (i_{\text{RecNrgAll}} + i_{\text{satNrgCorr}})}{i_{\text{RecNrgAll}}}$).<br>
The atmospheric corrected reflectivity may be calculated from this uncorrected reflectivity by multiplying it by d_reflCor_atm.<br><br>i_reflctUC is invalid where GLA06%d_satNrgCorr is invalid.<br><br>Comments: This uses all signal between signal begin and signal end.

**Product Var Name**: i_reflCor_atm  
**Is element of**: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record  
**Short Description**: Reflectivity Correction Factor For Atmospheric Effects  
**Product Data Type**: i4b  
**Total Bytes**: 4  
**Product Units**: Unitless  
**Invalid Value/Flag**: gi_invalid_i2b  
**Is Correction Flag?**: NA  
**Is Unsigned?**: No  
**Product Minimum**: 1  
**Product Maximum**: 250  
**Description**: This reflectance correction factor is calculated as \( \frac{1}{e^{-2(tc+ta+tp+tm)}} \), where tc is the cloud (column) integrated optical depth, ta is the aerosol (column) integrated optical depth, tp is the planetary boundary layer optical depth, and tm is the molecular optical depth. tm is a constant equal to \(-\log(gd_T_RTatm)/2\), where \( gd_T_RTatm = 0.98 \) is defined in const_elev_mod.f90 or read from ANC07-03. The attenuation correction factor has been corrected for multiple scattering. The reflectance has been corrected for waveform saturation.  
**Comments**:  

**Product Var Name**: i_maxSmAmp  
**Is element of**: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record  
**Short Description**: Peak Amplitude of Smoothed Received Echo  
**Product Data Type**: i2b (40)  
**Total Bytes**: 80  
**Product Units**: Tenth of millivolts  
**Invalid Value/Flag**: No  
**Is Correction Flag?**: NA  
**Is Unsigned?**: No  
**Product Minimum**: -300  
**Product Maximum**: 30000  
**Description**: The peak amplitude of the received echo after it has been smoothed to remove high frequency noise (see ATBD).  
**Comments**: This is calculated after converting the return to voltage.  

**Product Var Name**: i_ocElv  
**Is element of**: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Ocean Tide Elevation
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The ocean tide elevation from the TPX07.1 tide model.
Comments:

Product Var Name i_numPk
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Number of Peaks found in the Return
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6
Description: The number of peaks in the return echo found by the Gaussian fitting procedure, using standard parameters.
Comments:

Product Var Name i_skew2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Skewness
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: The skewness of the received echo from signal begin to signal end using standard parameters.
Comments: Note that the received echo was calibrated and converted to voltage before calculation.
Product Var Name i_OcRufRMS
Is element of: GLA15 Record
Short Description: RMS of elevations used for 1-sec mean elevation
Product Data Type: i4b
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 120000
Description: The standard deviation of the up to 40 GLA15 ocean elevations measurements.
Comments:

Product Var Name i_OcMeanElev
Is element of: GLA15 Record
Short Description: Mean elevation over 1 sec
Product Data Type: i4b
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500000
Product Maximum: 10000000
Description: 1-sec mean elevation of the up to 40 GLA15 ocean elevations.
Comments:

Product Var Name i_lowElev
Is element of: GLA15 Record
Short Description: Lowest Elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500000
Product Maximum: 10000000
Description: Lowest elevation in footprint, with all corrections applied (corresponds to signal end) using standard parameters.
Comments:
Product Var Name i_highElev
Is element of: GLA15 Record
Short Description: Highest Elevation
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: mm
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500000
Product Maximum: 1000000
Description: Highest elevation in footprint, with all corrections applied (corresponds to signal begin) using standard parameters.
Comments:

Product Var Name i_OceanVar
Is element of: GLA15 Record
Short Description: Standard Deviation of the ocean Gaussian Fit
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: microvolts*10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The Standard deviation of the difference between the functional fit and the received echo using standard parameters. It is directly taken from GLA05 parameter d_wfFitSDev_2 (standard).
Comments:

Product Var Name i_ElvuseFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Elevation use flag
Product Data Type: i1b (5)
Total Bytes: 5
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating whether the elevations on this record should be used or not (1 bit set/shot). See the <a href='flags/i_ElvuseFlg.pdf'>PDF file</a> for more information.

Comments:

Product Var Name i_atm_avail
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Availability Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Please see <a href='flags/i_atm_avail.pdf'>the PDF flag description in the next section</a> for more details.

Comments:

Product Var Name i_spare16
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 16
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_cld1_mswf
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Cloud Multiple Scattering Warning Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15

Description: The multiple scattering warning flag (MSWF) is based on the total column optical depth (aerosol plus cloud) calculated in GLA11 using 532nm. It is intended as a way to quickly obtain information about the potential severity of multiple scattering with regards to the range-to-surface calculated by the altimetry processing software. It will be output on the GLA11 product for use by the altimetry group. The multiple scattering warning flag will have values ranging from 0-14, based on the total column optical depth as detailed in the PDF.

A warning flag value of 15 will signify ?invalid?. An invalid will be encoded if an optical depth in any of the layers in the 1-second column could not be calculated. This usually occurs in a very optically ?thick? cloud which extinguishes the signal. It could also occur if the extinction-to-backscatter ratio assignment is set too high, causing the transmission calculations in the lidar inversion to go out-of-range. Please see $\langle$a href='flags/i_cld1_mswf_elv.pdf'>$\rangle$ for more details in the PDF flag description in the next section for more details.

Comments:

Product Var Name i_MRC_af
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Medium Resolution Cloud Availability Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15

Description: Tells how many cloud layers were found at this resolution from the 532 nm channel. Please see $\langle$a href='flags/i_MRC_af.pdf'>$\rangle$ for more details in the PDF flag description in the next section for more details. This parameter is extracted from the i_MRCL_flag on GLA09.

Comments:

Product Var Name i_spare9
Is element of: GLA15 Record
Short Description: spares
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name: i_ElvFlg
Is element of: GLA05 record, GLA06 record, GLA12 record, GLA13 Record, GLA14 record, GLA15 record
Short Description: Elevation Definition Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 127

Description: Indicates how location on the received echo was determined to calculate the elevation on the record. Please see <a href='flags/i_ElvFlg.pdf'>the PDF flag description in the next section</a> for more details. 'For GLA05, 06 and 12,13,14 and 15, bits are set to reflect the range offset used for that products elevation. Although defined as a pass-thru, the values are different on GLA06/12,13,15 and GLA14.'

Comments:

Product Var Name: i_rng_UQF
Is element of: GLA06 record, GLA12 record, GLA13 Record, GLA14 record, GLA15 record
Short Description: Range Offset Quality/Use Flag
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767

Description: Data quality flag for the range offsets on this record. Please see <a href='flags/i_rng_UQF.pdf'>the PDF flag description in the next section</a> for more details.

Comments:

Product Var Name: i_spare49
Is element of: GLA05 record, GLA06 record, GLA12 record, GLA13 Record, GLA14 record, GLA15 record
Short Description: Spare 49
Product Data Type: i1b (10)
Total Bytes: 10
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name _i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href='flags/i_timecorflg.pdf'>the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name _i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections.
Please see the PDF flag description in the next section for more details.

Comments:

Product Var Name: i_AttFlg2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Flag 2
Product Data Type: i1b (20)
Total Bytes: 20
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: Denotes at 40/sec rate whether precision attitude was used to determine spot location, and if problems with LPA, etc.

Please see <a href='flags/i_AttFlg2.pdf'>the PDF flag description in the next section</a> for more details.

Comments:

Product Var Name: i_spare5
Is element of: GLA15 Record
Short Description: Spare 5
Product Data Type: i1b
Total Bytes: 1
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name: i_FrameQF
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Altimeter Frame Quality Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Denotes all bad data (no signal in whole frame), or all data good and all science team recommended corrections applied
Please see <a href='flags/i_FrameQF.pdf' > the PDF flag description in the next section for more details.
Comments:

Product Var Name i_OrbFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: POD flag (Orbit Flag)
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: Denotes quality of orbit, whether predicted or precision, loss of GPS data, maneuver-degraded, etc.
Please see <a href='flags/i_OrbFlg.pdf' > the PDF flag description in the next section for more details.
Comments:

Product Var Name i_rngCorrFlg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Range Correction Flag
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Denotes which geophysical or instrument corrections have been applied to the range in the calculation of the elevation on this record.
Please see <a href='flags/i_rngCorrFlg.pdf' > the PDF flag description in the next section for more details.
Comments:
Product Var Name i_CorrStatFlg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Correction Status Flag
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: For each geophysical correction that has multiple values denotes which algorithm or model was used.
Please see <a href="flags/i_CorrStatFlg.pdf"> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_spare15
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 15
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_AttFlg1
Is element of: GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Attitude Flag 1
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: At 1/sec denotes large off-nadir angle, ocn sweep, target of opportunity, steering to reference track.
Please see <a href='flags/i_AttFlg1.pdf'>the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_Spare6
Is element of: GLA15 Record
Short Description: Spare 6
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
 Is Correction Flag?: NA
 Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA15 spare6.

Product Var Name i_satNdx
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Index
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: ns
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 126
Description: The count of the number of gates in a waveform which have an amplitude greater than or equal to i_satNdxTh (set in anc07_0004). The value 126 means 126 or more gates are above the saturation index threshold (i_satNdxth).
Comments:

Product Var Name i_satElevCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Elevation Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description: Correction to elevation for saturated waveforms. This correction has not been applied to the data so to apply it SUBTRACT the correction from the range estimate. To apply the correction to the elevations it must be ADDED to the elevation estimates.
Comments:

Product Var Name i_satCorrFlg
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Correction Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: Yes
Is Unsigned?: NA
Product Minimum: NA
Product Maximum: NA
Description: Please see <a href='flags/i_satCorrFlg.pdf'> the PDF flag description in the next section for more details.</a>

Bits 0-3: i_satElevCorr flag (4 bits); values indicated below:

0= Not Saturated (i_satNdx < 2) or No Signal
1= Sat. Correction is Inconsequential (i_satNdx >= 2 & i_pctSat < 2.0)
2= Sat. Correction is Applicable (i_satNdx >= 2 & i_pctSat >= 2.0 & Full Width* < 100ns)
3= Sat. Correction is Not Computable effects elevations can not be corrected
4= Sat. Correction model is Not Applicable so data can not be corrected (i_satNdx >= 2 & i_pctSat >= 2.0 & Full Width* >= 100ns) there are errors in the data but the effects on elevations can not be corrected
values 5-15=TBD

Bits 4-5: i_satNrgCorr flag (2 bits):
0=TBD
1=TBD
2=TBD
3=TBD

Bits 6-7: TBD

0=TBD
1=TBD
2=TBD
3=TBD

Comments:

Product Var Name i_satNrgCorr
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Saturation Energy Correction
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: .01fJ
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description: Correction to energy for saturated waveforms. This correction has not been applied to the energy. It should be ADDED to any echo pulse energy calculated from the pulse area under the waveform. Also any reflectivity estimates need to be corrected for this error in energy measurement.
Comments:

Product Var Name i_kurt2
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA15 Record
Short Description: Kurtosis of the Received Echo (standard)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: unitless * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 1000
Description: Kurtosis of the received echo from signal begin to signal end using standard parameters
Comments: Note that the received echo was calibrated and converted to voltage before calculation.

Product Var Name i_gval_rcv
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Gain Value used for Received Pulse
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: counts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Gain value used for received pulse - uncalibrated.
Comments: This value is in counts and needs to be calibrated before calculating energy from it. Same as variable in GLA01_Long/i_gainSet1064.

Product Var Name i_RecNrgAll
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Received Energy signal begin to signal end
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 fJoules
Invalid Value/Flag: i_APIID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32000
Description: This is a pass through of gla01%d_recNrgAll_EU, but stored in different units on the product. This is calculated by taking the area under the received waveform (referenced to the observed noise) from all responses between the noise crossing before the first threshold crossing and the noise crossing after the last threshold crossing. It is a rescaled value of GLA01 parameter d_recNrgAll_EU and is not recomputed.
Comments:

Product Var Name i_FRir_cldtop
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Cloud Top
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: deka-meters
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1030
Description: Full resolution (40 Hz) cloud top height obtained from the 1064 atmospheric channel. This parameter is for a 1 second record. This parameter is in GLA09.

Comments:

Product Var Name: i_FRir_qaFlag
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Quality Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: One byte per data quality flag.

Value 15 = No clouds.
Value 14 = Indicates the likely presence of low clouds (< 150 m) based on elevated signal from the two bins above the ground return bin that were not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (i_FRir_cldtop) is set to a value of 0.10 km.
Value 13 = Indicates the possible presence of a cloud based on the value of the integrated signal parameter (i_FRir_intsig) that was not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (i_FRir_cldtop) is set to a value of 10.0 km.
Value 0 - 12 = Cloud detected by cloud search algorithm with higher numbers indicating a stronger average signal from the region starting at cloud top and extending 500 m below cloud top height. Please see <a href='flags/i_FRir_qaFlag.pdf'>the PDF flag description in the next section</a> for more details. This parameter is extracted from the equivalent parameter on GLA09.

Comments:

Product Var Name: i_atm_char_flag
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Characterization Flag
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10
Description: Flag to characterize cloud and blowing snow state of the atmosphere

0 clear
1 high cloud (> 5 km) low optical depth
2 high cloud (> 5 km), high optical depth
3 mid cloud (>2, <=5 km) low optical depth
4 mid cloud (>2, <=5 km) high optical depth
5 low cloud (> 500 m, <=2 km), low optical depth
6 low cloud (> 500 m, <=2 km), high optical depth
7 blowing snow or fog (< 500 m), low optical depth
8 blowing snow or fog (< 500 m), high optical depth
9 not tested
10 data quality insufficient to assign flag

Comments:

Product Var Name i_atm_char_conf
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Atmosphere Characterization Flag Confidence
Product Data Type: i2b
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Confidence level ascribed to the atmosphere characterization flag
Comments: 0 Not applicable (for contamination flag values of 9 or 10)
1 low confidence
2 reasonable confidence
3 high confidence

Product Var Name i_spare48
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 48
Product Data Type: i1b (36)
Total Bytes: 36
Product Units: n/a
Invalid Value/Flag: n/a
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: n/a
Product Maximum: n/a
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_FRir_intsig
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Full Resolution 1064 Integrated Signal
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: e7/(m-sr)
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Though called 'integrated signal' this is actually an average of all bins in the above-ground portion of the 1064 40 Hz profile with values above the threshold of 1.0e-7 (1/(m-sr) units). This parameter is for a 1 second record. This parameter is extracted from the equivalent parameter on GLA09.

Comments:

Product Var Name i_spare14
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Spare 14
Product Data Type: i1b (120)
Total Bytes: 120
Product Units: Unknown
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name i_Surface_temp
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Surface Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees Celsius * 100
Invalid Value/Flag: gi_invalid_i2b
Data Dictionary

Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 10000
Description: Atmospheric temperature at Earth's surface level measured in degrees Celsius and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_pres
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Surface Pressure
Product Data Type: i2b
Total Bytes: 2
Product Units: hPa * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Atmospheric pressure at Earth's surface level measured in hPa and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_relh
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Relative Humidity
Product Data Type: i2b
Total Bytes: 2
Product Units: percentage * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Atmospheric relative humidity at Earth's surface level measured as a percentage and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_wind
Is element of: GLA07 Record, GLA15 Record
Short Description: Surface Wind Speed
Product Data Type: i2b
Total Bytes: 2
Product Units: meters/second * 100
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 20000
Description: Wind speed at Earth's surface level measured in km/hour and derived from the meteorological data files.
Comments:

Product Var Name i_Surface_wdir
Is element of: GLA07 Record, GLA15 Record
Short Description: Surface Wind Direction Azimuth from North
Product Data Type: i2b
Total Bytes: 2
Product Units: degrees * 10
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Wind direction at Earth's surface level measured in degrees of azimuth from North and derived from the meteorological data files.
Comments:

Product Var Name i_maxRecAmp
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Max Amplitude of Received Echo
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: Tenth of millivolts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: 30000
Description: Maximum Amplitude of the Received Echo.
Comments: This is calculated after converting the return to voltage. Use for scaling model fit RMS between normalized and un-normalized units.
Product Var Name i_sDevNsOb1
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Standard deviation of 1064 nm Background noise, (alternate)
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.0001 volts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 30000
Description: The standard deviation of the background noise (alternative parameters).
Comments: Can be used for computing signal-to-noise ratio along with unsmoothed max amplitude.

Product Var Name i_spare4
Is element of: GLA06 record, GLA12 Record, GLA14 Record, GLA15 Record
Short Description: Spare 4
Product Data Type: i1b (160)
Total Bytes: 160
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_pctSAT
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Percent Saturation
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: percent
Invalid Value/Flag: gi_invalid_i1b
Is Correction Flag?: Yes
Is Unsigned?: NA
Product Minimum: -127
Product Maximum: 127
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Description: Percent saturation (d_pctSAT) is calculated using the formula: 
\[ d\_pctSAT = \frac{100 \times \text{saturation index}}{(\text{signal end} - \text{signal begin in nanoseconds})} \] 
The alternate signal end/begin are used for GLA14\_d\_pctSAT, while the standard fit values are used for GLA06, 12, 13, and 15. The Saturation elevation correction is not applied in the geolocation processing computation of lat, lon and elev. Because the saturation corrections are small and data is acquired within 5 deg off nadir, effects on lat and lon can be ignored. To apply the saturation elevation correction to the elevations on the products it must be ADDED to the elevation estimates. Reported elevations for returns with invalid satElevCorr values and satCorrFlg values of 3 or 4 are likely to have large, uncorrectable errors and should be excluded from analyses.

Comments:

Product Var Name i\_TxNrg
Is element of: GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: 1064 nm Laser Transmit Energy
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: 0.01 millijoules
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32766
Description: The 1064 nm laser pulse transmitted energy in energy units, computed from the digitized outgoing pulse, and the transmit gain.
Comments:

Product Var Name i\_eqElv
Is element of: GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Equilibrium Tide Elevation (at first & last shot)
Product Data Type: i2b (2)
Total Bytes: 4
Product Units: mm
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: NA
Is Unsigned?: NA
Product Minimum: -10000
Product Maximum: 10000
Description: The equilibrium (long period) tide at first and last valid shot over the ocean.
Comments:

Product Var Name i\_spare2
Is element of: GLA15 Record
Short Description: Spare 2
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA15 spare2.

Product Var Name i_gASP
Is element of: GLA15 Record
Short Description: Global Mean Atmospheric Pressure
Product Data Type: i4b
Total Bytes: 4
Product Units: .001 Pa
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 10000000
Product Maximum: 120000000
Description:
Comments:

Product Var Name i_Spare7
Is element of: GLA15 Record
Short Description: Spare 7
Product Data Type: i1b (144)
Total Bytes: 144
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA15 spare7.

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: GLAS Record Index

Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647

Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.

Comments:

Product Var Name i_UTCTime

Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: Transmit Time of First Shot in frame in J2000

Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647

Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.

Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_phdr_20

Is element of: GLA03 Main Record

Short Description: Primary Header APID 20

Product Data Type: i1b (6, 4)
Total Bytes: 24
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Primary Header APID 20
Comments:

Product Var Name i_shdr_20
Is element of: GLA03 Main Record
Short Description: Secondary Header APID 20 (time stamp)
Product Data Type: i1b (8, 4)
Total Bytes: 32
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Secondary Header APID 20 (time stamp)
Comments:

Product Var Name i_g_nrg
Is element of: GLA03 Main Record
Short Description: 532 Energy Throughput
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Percent X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description: 532 Energy
Comments:

Product Var Name i_Lsr1Osc_t
Is element of: GLA03 Main Record
Short Description: Laser Oscillator Temperature
Product Data Type: i2b (4)
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Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description: Laser Oscillator Temperature
Comments:

Product Var Name i_Lsr1Dblr_t
Is element of: GLA03 Main Record
Short Description: Laser Doubler Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description: Laser Doubler Temperature
Comments:

Product Var Name i_LMB1Ref_t
Is element of: GLA03 Main Record
Short Description: LMB Reference Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description: Laser Monitor Board (LMB) Reference Temperature
Comments:

Product Var Name i_L1Elec_t
Is element of: GLA03 Main Record
Short Description: Electronics Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description: Electronics Temperature (MEU)
Comments:

Product Var Name i_LsrOsc_c
Is element of: GLA03 Main Record
Short Description: Laser Oscillator Current
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Amps
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 105
Product Maximum: 145
Description: Laser Osc Current
Comments:

Product Var Name i_LsrAmp_c
Is element of: GLA03 Main Record
Short Description: Laser Amplifier Current
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Amps
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 105
Product Maximum: 145
Description: Laser Amp Current
Comments:
Product Var Name i_LsrDr_pw
Is element of: GLA03 Main Record
Short Description: Laser Drive Pulse Width
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: pw in microsec
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 105
Product Maximum: 145
Description: Laser Dr Pulse Width
Comments:

Product Var Name i_Lsr2Osc_t
Is element of: GLA03 Main Record
Short Description: Oscillator Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description:
Comments:

Product Var Name i_Lsr2Dblr_t
Is element of: GLA03 Main Record
Short Description: Laser Doubler Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description:
Comments:

Product Var Name i_LMB2Ref_t
Is element of: GLA03 Main Record
Short Description: LMB Reference Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description:

Comments:

Product Var Name i_L2Elect_t
Is element of: GLA03 Main Record
Short Description: Electronics Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description:

Comments:

Product Var Name i_Lsr3Osc_t
Is element of: GLA03 Main Record
Short Description: Oscillator Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description:
Comments:

Product Var Name i_Lsr3Dblr_t
Is element of: GLA03 Main Record
Short Description: Laser Doubler Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description:
Comments:

Product Var Name i_LMB3Ref_t
Is element of: GLA03 Main Record
Short Description: LMB Reference Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description:
Comments:

Product Var Name i_L3Elect_t
Is element of: GLA03 Main Record
Short Description: Electronics Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description:
Comments:

Product Var Name: i_PrimAD550v
Is element of: GLA03 Main Record
Short Description: Primary Altimeter Detector 550V Voltage
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 53500
Product Maximum: 56500
Description: Primary Altimeter Detector 550 V
Comments:

Product Var Name: i_SecAD550v
Is element of: GLA03 Main Record
Short Description: Secondary Altimeter Detector 550V Voltage
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 53500
Product Maximum: 56500
Description: Secondary Altimeter Detector 550 V
Comments:

Product Var Name: i_spcm1_550v
Is element of: GLA03 Main Record
Short Description: SPCM Detector #1 550V Voltage
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 53500
Product Maximum: 56500
Description: SPCM Detector #1 550 V
Comments:

Product Var Name i_spcm2_550v
Is element of: GLA03 Main Record
Short Description: SPCM Detector #2 550V Voltage
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 53500
Product Maximum: 56500
Description: SPCM Detector #2 550 V
Comments:

Product Var Name i_spcm3_550v
Is element of: GLA03 Main Record
Short Description: SPCM Detector #3 550V Voltage
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 53500
Product Maximum: 56500
Description: SPCM Detector #3 550 V
Comments:

Product Var Name i_spcm4_550v
Is element of: GLA03 Main Record
Short Description: SPCM Detector #4 550V Voltage
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 53500
Product Maximum: 56500
Description: SPCM Detector #4 550 V
Comments:

Product Var Name i_spcm5_550v
Is element of: GLA03 Main Record
Short Description: SPCM Detector #5 550V Voltage
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 53500
Product Maximum: 56500
Description: SPCM Detector #5 550 V
Comments:

Product Var Name i_spcm6_550v
Is element of: GLA03 Main Record
Short Description: SPCM Detector #6 550V Voltage
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 53500
Product Maximum: 56500
Description: SPCM Detector #6 550 V
Comments:

Product Var Name i_spcm7_550v
Is element of: GLA03 Main Record
Short Description: SPCM Detector #7 550V Voltage  
Product Data Type: i4b (4)  
Total Bytes: 16  
Product Units: Volts X 100  
Invalid Value/Flag: i_APID_AvFlg  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 53500  
Product Maximum: 56500  
Description: SPCM Detector #7 550 V  
Comments:  

Product Var Name i_spcm8_550v  
Is element of: GLA03 Main Record  
Short Description: SPCM Detector #8 550V Voltage  
Product Data Type: i4b (4)  
Total Bytes: 16  
Product Units: Volts X 100  
Invalid Value/Flag: i_APID_AvFlg  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 53500  
Product Maximum: 56500  
Description: SPCM Detector #8 550 V  
Comments:  

Product Var Name i_Int1_t  
Is element of: GLA03 Main Record  
Short Description: Internal Temperature #1  
Product Data Type: i2b (4)  
Total Bytes: 8  
Product Units: Celsius  
Invalid Value/Flag: i_APID_AvFlg  
Is Correction Flag?: NA  
Is Unsigned?: No  
Product Minimum: 105  
Product Maximum: 145  
Description: Internal Temp #1  
Comments:
Product Var Name i_ct_prail_v
Is element of: GLA03 Main Record
Short Description: C & T Positive Rail
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -10000
Product Maximum: 20000
Description:
Comments:

Product Var Name i_Int3_t
Is element of: GLA03 Main Record
Short Description: Internal Temperature #3
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 105
Product Maximum: 145
Description: Internal Temp #3
Comments:

Product Var Name i_VCXmtr_c
Is element of: GLA03 Main Record
Short Description: VC X Motor Current
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: milliAmps
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 150
Product Maximum: 200
Description: VC X Motor Current
Comments:

Product Var Name i_VCYmtr_c
Is element of: GLA03 Main Record
Short Description: VC Y Motor Current
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: milliAmps
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 150
Product Maximum: 200
Description: VC Y Motor Current
Comments:

Product Var Name i_Xpos
Is element of: GLA03 Main Record
Short Description: X Position
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: X Position
Comments:

Product Var Name i_Ypos
Is element of: GLA03 Main Record
Short Description: Y Position
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3600
Description: Y Position

Comments:

Product Var Name i_ADdetOutGn
Is element of: GLA03 Main Record
Short Description: Transmitted Gain
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: The transmitted gain value. The AD Detector Outgoing Gain readback. Commanded value; repeats for 4 seconds. From APID 20, Offset 29.
Comments:

Product Var Name i_ADdetRetGn
Is element of: GLA03 Main Record
Short Description: AD Detector Return Gain readback
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: AD Detector Return Gain readback
Comments:

Product Var Name i_DPinA
Is element of: GLA03 Main Record
Short Description: Dual Pin -A Throughput
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Percent X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Dual Pin -A
Comments:

Product Var Name: i_DPinB
Is element of: GLA03 Main Record
Short Description: Dual Pin -B Throughput
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Percent X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: Dual Pin -B
Comments:

Product Var Name: i_Laser1_stat
Is element of: GLA03 Main Record
Short Description: Laser 1 Status
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Indicates whether Laser 1 is enabled or disabled. Value of 0 = enabled; 1 = disabled.
Comments:

Product Var Name: i_Laser2_stat
Is element of: GLA03 Main Record
Short Description: Laser 2 Status
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Indicates whether Laser 2 is enabled or disabled. Value of 0 = enabled; 1 = disabled.
Comments:

Product Var Name i_Laser3_stat
Is element of: GLA03 Main Record
Short Description: Laser 3 Status
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Indicates whether Laser 3 is enabled or disabled. Value of 0 = enabled; 1 = disabled.
Comments:

Product Var Name i_OTS_stat
Is element of: GLA03 Main Record
Short Description: OTS Enable Status
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Indicates whether OTS is enabled or disabled. Value of 0 = enabled; 1 = disabled.
Comments:

Product Var Name i_phdr_21
Is element of: GLA03 Main Record
Short Description: Primary Header APID 21
Product Data Type: i1b (6, 4)
Total Bytes: 24
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Primary Header APID 21
Comments:

Product Var Name i_shdr_21
Is element of: GLA03 Main Record
Short Description: Secondary Header APID 21 (time stamp)
Product Data Type: i1b (8, 4)
Total Bytes: 32
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Secondary Header APID 21 (time stamp)
Comments:

Product Var Name i_BusAInst_28v
Is element of: GLA03 Main Record
Short Description: +28V Bus A Instrument Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 2400
Product Maximum: 3200
Description: +28V Bus A Instrument
Comments:

Product Var Name i_HBSupp_c
Is element of: GLA03 Main Record
Short Description: Hybrid Supplies Current
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1200
Product Maximum: 1500
Description: Hybrid Supplies
Comments:

Product Var Name i_HVPSDetSup_c
Is element of: GLA03 Main Record
Short Description: HVPS Detector Supplies Current
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 2200
Product Maximum: 2800
Description: HVPS Detector Supplies
Comments:

Product Var Name i_OpHtr_c
Is element of: GLA03 Main Record
Short Description: Operational Heaters Current
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 400
Product Maximum: 600
Description: Operational Heaters
Comments:
Product Var Name: i_MechSys_c
Is element of: GLA03 Main Record
Short Description: Mechanical System Current
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 800
Product Maximum: 1200
Description: Mechanical System
Comments:

Product Var Name: i_BusBL1_v
Is element of: GLA03 Main Record
Short Description: +28V Bus B Laser 1 Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 2400
Product Maximum: 3200
Description: +28V Bus B Laser 1
Comments:

Product Var Name: i_BusBL1_c
Is element of: GLA03 Main Record
Short Description: +28V Bus B Laser 1 Current
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 800
Product Maximum: 1200
Description: +28V Bus B Laser 1
Comments:

Product Var Name i_BusCL2_v
Is element of: GLA03 Main Record
Short Description: +28V Bus C   Laser 2 Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 2400
Product Maximum: 3200
Description: +28V Bus C   Laser 2
Comments:

Product Var Name i_BusCL2_c
Is element of: GLA03 Main Record
Short Description: +28V Bus C   Laser 2 Current
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 800
Product Maximum: 1200
Description: +28V Bus C   Laser 2
Comments:

Product Var Name i_BusDL3_v
Is element of: GLA03 Main Record
Short Description: +28V Bus D   Laser 3 Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 2400
Product Maximum: 3200
Description: +28V Bus D  Laser 3
Comments:

Product Var Name i_BusDL3_c
Is element of: GLA03 Main Record
Short Description: +28V Bus D  Laser 3 Voltage
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 800
Product Maximum: 1200
Description: +28V Bus D  Laser 3
Comments:

Product Var Name i_5VHb1_v
Is element of: GLA03 Main Record
Short Description: + 5 V Hybrid # 1 Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 400
Product Maximum: 600
Description: + 5 V Hybrid # 1
Comments:

Product Var Name i_5VHb1_c
Is element of: GLA03 Main Record
Short Description: + 5 V Hybrid # 1 Current
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 50
Product Maximum: 150
Description: + 5 V Hybrid # 1
Comments:

Product Var Name i_12VHb2_v
Is element of: GLA03 Main Record
Short Description: +12 V Hybrid # 2 Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1100
Product Maximum: 1300
Description: +12 V Hybrid # 2
Comments:

Product Var Name i_12VHb2_c
Is element of: GLA03 Main Record
Short Description: + 12 V Hybrid # 2 Current
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 150
Product Maximum: 250
Description: + 12 V Hybrid # 2
Comments:

Product Var Name i_n12VHb3_v
Is element of: GLA03 Main Record
Short Description: - 12 V Hybrid # 3 Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1300
Product Maximum: -1100
Description: - 12 V Hybrid # 3
Comments:

Product Var Name i_n12VHb3_c
Is element of: GLA03 Main Record
Short Description: - 12 V Hybrid # 3 Current
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 250
Description: - 12 V Hybrid # 3
Comments:

Product Var Name i_5VHb4_v
Is element of: GLA03 Main Record
Short Description: + 5 V Hybrid # 4 Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 400
Product Maximum: 600
Description: + 5 V Hybrid # 4
Comments:

Product Var Name i_5VHb4_c
Is element of: GLA03 Main Record
Short Description: + 5 V Hybrid # 4 Current
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 50
Product Maximum: 150
Description: + 5 V Hybrid # 4
Comments:

Product Var Name: i_n5VHb5_v
Is element of: GLA03 Main Record
Short Description: - 5 V Hybrid # 5 Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -600
Product Maximum: -400
Description: - 5 V Hybrid # 5
Comments:

Product Var Name: i_n5VHb5_c
Is element of: GLA03 Main Record
Short Description: - 5 V Hybrid # 5 Current
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 150
Description: - 5 V Hybrid # 5
Comments:

Product Var Name: i_n5VHb6_v
Is element of: GLA03 Main Record
Short Description: - 5 V Hybrid # 6 Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -600
Product Maximum: -400
Description: - 5 V Hybrid # 6
Comments:

Product Var Name i_n5VHb6_c
Is element of: GLA03 Main Record

Short Description: - 5 V Hybrid # 6 Current
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 150
Description: - 5 V Hybrid # 6
Comments:

Product Var Name i_15VBPR_v
Is element of: GLA03 Main Record

Short Description: + 15 V Boost Post Register Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 1400
Product Maximum: 1600
Description: + 15 V Boost Post Reg
Comments:
Product Var Name i_n15VBPR_v
Is element of: GLA03 Main Record
Short Description: - 15 V Boost Post Register Current
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1600
Product Maximum: -1400
Description: - 15 V Boost Post Reg
Comments:

Product Var Name i_12VPOscTC_c
Is element of: GLA03 Main Record
Short Description: 12V Prim Osc Thermal Control
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 150
Product Maximum: 250
Description: +12 V Prim Osc Thermal Control
Comments:

Product Var Name i_12VSOscTC_c
Is element of: GLA03 Main Record
Short Description: 12V Sec Osc Thermal Control
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 150
Product Maximum: 250
Description: +12 V Sec Osc Thermal Control
Comments:

Product Var Name i_n2VDV_v
Is element of: GLA03 Main Record
Short Description: -2 V Discrete Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -300
Product Maximum: -100
Description: -2 V Discrete Voltage
Comments:

Product Var Name i_HbHS_t
Is element of: GLA03 Main Record
Short Description: Hybrid Heatsink Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description: Hybrid Heatsink
Comments:

Product Var Name i_FETSbHS_t
Is element of: GLA03 Main Record
Short Description: FET Switch Bank Heatsink Temperature
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3000
Description: FET Switch Bank Heatsink
Comments:

Product Var Name i_PrimOsc_Stat
Is element of: GLA03 Main Record
Short Description: Primary Oscillator Status
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Status of Primary Oscillator from FET switch bank status. Value of 0 indicates off; value of 1 indicates on.
Comments:

Product Var Name i_SecOsc_Stat
Is element of: GLA03 Main Record
Short Description: Secondary Oscillator Status
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Status of secondary Oscillator from FET switch bank status. Value of 0 indicates off; value of 1 indicates on.
Comments:

Product Var Name i_PrimAD_Stat
Is element of: GLA03 Main Record
Short Description: Primary Altimeter Digitizer Status
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Status of Primary altimeter digitizer from FET switch bank status. Value of 0 indicates off; value of 1 indicates on.
Comments:

Product Var Name i_SecAD_Stat
Is element of: GLA03 Main Record
Short Description: Secondary Altimeter Digitizer Status
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Status of secondary altimeter digitizer from FET switch bank status. Value of 0 indicates off; value of 1 indicates on.
Comments:

Product Var Name i_0VHVPSRef_v
Is element of: GLA03 Main Record
Short Description: HVPS +0 Volts Reference Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -500
Product Maximum: 500
Description: HVPS +0 Volts Reference
Comments:

Product Var Name i_5VHVPSRef_v
Is element of: GLA03 Main Record
Short Description: HVPS +5 V Reference Voltage
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Volts X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000
Description: HVPS +5 V Reference
Comments:

Product Var Name i_OptSensSt
Is element of: GLA03 Main Record
Short Description: Optical Sensor Status
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4095
Description: Indicates status of primary and secondary laser select mechanisms and altimeter digitizer detectors.
Comments:

Product Var Name i_CmdTlmStat
Is element of: GLA03 Main Record
Short Description: Command Telemetry Status
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 65535
Description: Status of MCS board commandable telemetry.
Comments:

Product Var Name i_PDUPMonCal1
Is element of: GLA03 Main Record
Short Description: Primary Monitor Calibration
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Primary Monitor Calibration
Comments:

Product Var Name i_PDUPMonCal2
Is element of: GLA03 Main Record
Short Description: Primary Monitor Calibration
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Primary Monitor Calibration
Comments:

Product Var Name i_PDUSMonCal1
Is element of: GLA03 Main Record
Short Description: Secondary Monitor Calibration
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Secondary Monitor Calibration
Comments:

Product Var Name i_PDUSMonCal2
Is element of: GLA03 Main Record
Short Description: Secondary Monitor Calibration
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Secondary Monitor Calibration
Comments:

Product Var Name i_ctrinfo
Is element of: GLA03 Main Record
Short Description: Counter info
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: Counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 15
Description: MCS MUX Counter (only uses 4 lower bits).
Comments:

Product Var Name i_phdr_22
Is element of: GLA03 Main Record
Short Description: Primary Header APID 22
Product Data Type: i1b (6)
Total Bytes: 6
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Primary Header APID 22
Comments:
Product Var Name: i_shdr_22
Is element of: GLA03 Main Record
Short Description: Secondary Header APID 22 (time stamp)
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Secondary Header APID 22 (time stamp)
Comments:

Product Var Name: i_HkBdC0_t
Is element of: GLA03 Main Record
Short Description: Housekeeping Board Temperature, Ch 0
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Housekeeping Board Temperature, Ch 0
Comments:

Product Var Name: i_IPSBdC1_t
Is element of: GLA03 Main Record
Short Description: Instrument Processor System Board Temperature, Ch 1
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Instrument Processor System Board Temperature, Ch 1
Comments:

Product Var Name i_PCBdC2_t
Is element of: GLA03 Main Record
Short Description: Photon Counter Board Temperature, Ch 2
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000

Description: Photon Counter Board Temperature, Ch 2
Comments:

Product Var Name i_CDFTBdC3_t
Is element of: GLA03 Main Record
Short Description: Cloud Digitizer/Frequency & Time Board Temperature, Ch 3
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000

Description: Cloud Digitizer/Frequency & Time Board Temperature, Ch 3
Comments:

Product Var Name i_AD1DSPC4_t
Is element of: GLA03 Main Record
Short Description: Altimeter Digitizer 1 DSP Temperature, Ch 4
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
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<tr>
<th>Product Var Name</th>
<th>Is element of: GLA03 Main Record</th>
<th>Short Description</th>
<th>Product Data Type</th>
<th>Total Bytes</th>
<th>Product Units</th>
<th>Invalid Value/Flag</th>
<th>Is Correction Flag?</th>
<th>Is Unsigned?</th>
<th>Product Minimum</th>
<th>Product Maximum</th>
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<td>i_AD2DSPC5_t</td>
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<td>Altimeter Digitizer 1 Board Temperature, Ch 4</td>
<td>i2b</td>
<td>2</td>
<td>Celsius X 100</td>
<td>i_APID_AvFlg</td>
<td>NA</td>
<td>No</td>
<td>-1000</td>
<td>4000</td>
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<td>i_DCHBdC6_t</td>
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<td>Data Collection &amp; Handling Board Temperature, Ch 6</td>
<td>i2b</td>
<td>2</td>
<td>Celsius X 100</td>
<td>i_APID_AvFlg</td>
<td>NA</td>
<td>No</td>
<td>-1000</td>
<td>4000</td>
</tr>
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<td>i_LMBdC7_t</td>
<td></td>
<td>Laser Monitor Board Temperature, Ch 7</td>
<td>i2b</td>
<td>2</td>
<td>Celsius X 100</td>
<td>i_APID_AvFlg</td>
<td>NA</td>
<td>No</td>
<td>-1000</td>
<td>4000</td>
</tr>
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Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Altimeter Digitizer 2 Board Temperature 2, Ch 7
Comments:

Product Var Name i_TCMBdC8_t
Is element of: GLA03 Main Record
Short Description: Temperature Controller Monitor Board Temperature, Ch 8
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Data Collection & Handling Board Temperature, Ch 8
Comments:

Product Var Name i_OXCO1BdC9_t
Is element of: GLA03 Main Record
Short Description: Oven-crystal-controlled Oscillator (OXCO) 1 Board Temperature, Ch 9
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Laser Monitor Board Temperature, Ch 9
Comments:

Product Var Name i_OXCO2BdC10_t
Is element of: GLA03 Main Record
Short Description: Oven-crystal-controlled Oscillator (OXCO) 2 Board Temperature, Ch 10
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Temperature Controller Monitor Board Temperature, Ch 10
Comments:

Product Var Name i_OscBdC11_t
Is element of: GLA03 Main Record
Short Description: Oscillator Board Temperature, Ch 11
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Oven-crystal-controlled Oscillator (OXCO) 1 Board Temperature, Ch 11
Comments:

Product Var Name i_OTSBdC12_t
Is element of: GLA03 Main Record
Short Description: Optical Test Source (OTS) Board Temperature, Ch 12
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Oven-crystal-controlled Oscillator (OXCO) 2 Board Temperature, Ch 12
Comments:

Product Var Name i_LPAC13_t1
Is element of: GLA03 Main Record, GLA04 LRS Main Record
Short Description: Laser Profiler Array (LPA) Temperature 1, Ch 13
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Oscillator Board Temperature, Ch 13
Comments:

Product Var Name i_LPAC14_t2
Is element of: GLA03 Main Record
Short Description: Laser Profiler Array (LPA) Temperature 2, Ch 14

Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Optical Test Source (OTS) Board Temperature, Ch 14
Comments:

Product Var Name i_AD1eclaC15_t
Is element of: GLA03 Main Record
Short Description: Altimeter Digitizer 1 ECLA Temperature, Ch 15

Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Laser Profiler Array (LPA) Temperature 1, Ch 15
Comments:

Product Var Name i_AD2eclaC16_t
Is element of: GLA03 Main Record
Short Description: Altimeter Digitizer 2 ECLA Temperature, Ch 16
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Laser Profiler Array (LPA) Temperature 2, Ch 16
Comments:

Product Var Name i_AD1eclbC17_t
Is element of: GLA03 Main Record
Short Description: Altimeter Digitizer 1 ECLB Temperature, Ch 17
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Altimeter Digitizer 1 Board Temperature 3, Ch 17
Comments:

Product Var Name i_AD2eclbC18_t
Is element of: GLA03 Main Record
Short Description: Altimeter Digitizer 2 ECLB Temperature, Ch 18
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Altimeter Digitizer 2 Board Temperature 3, Ch 18
Comments:
Product Var Name i_AD1ADCC19_t
Is element of: GLA03 Main Record
Short Description: Altimeter Digitizer 1 ADC Temperature, Ch 19
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value.Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Altimeter Digitizer 1 Board Temperature 4, Ch 19
Comments:

Product Var Name i_AD2ADCC20_t
Is element of: GLA03 Main Record
Short Description: Altimeter Digitizer 2 ADC Temperature, Ch 20
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value.Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Altimeter Digitizer 2 Board Temperature 4, Ch 20
Comments:

Product Var Name i_lid_box_t
Is element of: GLA03 Main Record
Short Description: Lidar Box Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value.Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Lidar Box Temperature

Comments:

Product Var Name: i_PRTtelmtC22t
Is element of: GLA03 Main Record
Short Description: PRT, Telescope Mount Temperature, Ch 22
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000

Description: Altimeter Digitizer 2 Board Temperature 5, Ch 22
Comments:

Product Var Name: i_PRTtelbfC23t
Is element of: GLA03 Main Record
Short Description: PRT, Telescope Baffle Temperature, Ch 23
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000

Description: HK Tlm Channel 23- Spare
Comments:

Product Var Name: i_PRTad1C24_t
Is element of: GLA03 Main Record
Short Description: PRT, Altimeter Detector 1 Temperature, Ch 24
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT, Gyro Temperature, Ch 24
Comments:

Product Var Name i_PRTad2C25_t
Is element of: GLA03 Main Record
Short Description: PRT, Altimeter Detector 2 Temperature, Ch 25
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT, Star Camera Temperature, Ch 25
Comments:

Product Var Name iF1LTRSRSC26_t
Is element of: GLA03 Main Record, GLA04 LRS Main Record
Short Description: PRT, Face 1 LTR to SRS Temperature, Ch26
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT, Stellar Reference System (SRS) Temperature, Ch 26
Comments:

Product Var Name iF2LTRSRSC27_t
Is element of: GLA03 Main Record, GLA04 LRS Main Record
Short Description: PRT, Face 2 LTR to SRS Temperature, Ch27
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT, Lidar Detector Pkg? Temperature, Ch 27
Comments:

Product Var Name i_srs_ff_optio_t
Is element of: GLA03 Main Record, GLA04 LRS Main Record
Short Description: SRS First Fold Optics Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg

Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: SRS First Fold Optics Temperature
Comments:

Product Var Name i_PRTfboxC29_t
Is element of: GLA03 Main Record
Short Description: PRT, Fiber Box Temperature, Ch 29
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg

Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT, Altimeter Detector 2 Temperature, Ch 29
Comments:

Product Var Name i_F1fabC30_t
Is element of: GLA03 Main Record
Short Description: PRT, Face 1 Fold Around Bench Temperature, Ch 30
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT, Spacecraft Interface Temperature, Ch 30
Comments:

Product Var Name i_F2fabC31_t
Is element of: GLA03 Main Record
Short Description: PRT, Face 2 Fold Around Bench Temperature, Ch 31
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT, Telescope Mount Temperature, Ch 31
Comments:

Product Var Name iF1LTRCRSC32_t
Is element of: GLA03 Main Record
Short Description: PRT, Face 1 LTR CRS Temperature, Ch 32
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT, Telescope Baffle Temperature, Ch 32
Comments:

Product Var Name iF2LTRCRSC33_t
Is element of: GLA03 Main Record
Short Description: PRT, Face 2 LTR CRS Temperature, Ch 33
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT Temperature Region 10, Ch 33, Spare
Comments:

Product Var Name i_SRSparC34_t
Is element of: GLA03 Main Record
Short Description: PRT, Stellar Reference System (SRS) Parabola Temperature, Ch 34
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT Temperature Region 11, Ch 34, Spare
Comments:

Product Var Name i_PRTCalLC35_t
Is element of: GLA03 Main Record
Short Description: PRT Cal Low Temperature, Ch 35
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT Cal Low Temperature, Ch 35
Comments:

Product Var Name i_PRTCalHC36_t
Is element of: GLA03 Main Record
Short Description: PRT Cal High Temperature, Ch 36
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: _APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT Cal High Temperature, Ch 36
Comments:

Product Var Name i_PDBiasC38_v
Is element of: GLA03 Main Record
Short Description: Pin Diode Bias Voltage, Ch 38
Product Data Type: i2b
Total Bytes: 2
Product Units: Volt X 100
Invalid Value/Flag: _APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1200
Description: Pin Diode Bias Voltage, Ch 38
Comments:

Product Var Name iAD1HSRamC39_t
Is element of: GLA03 Main Record
Short Description: AD1 High Speed Ram Temperature, Ch 39
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: _APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1200
Description: AD1 High Speed Ram Temperature, Ch 39
Comments:
Product Var Name: i_spare22_1
Is element of: GLA03 Main Record
Short Description: Spare22 1
Product Data Type: i1b (12)
Total Bytes: 12
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spares in telemetry packet. 3 1-byte spares: GHKSPARE1-GHKSPARE5.

Product Var Name: i_phdr_23
Is element of: GLA03 Main Record
Short Description: Primary Header APID 23
Product Data Type: i1b (6)
Total Bytes: 6
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Primary Header APID 23
Comments:

Product Var Name: i_shdr_23
Is element of: GLA03 Main Record
Short Description: Secondary Header APID 23 (time stamp)
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Secondary Header APID 23 (time stamp)
Comments:

Product Var Name i_tlm_spare1
Is element of: GLA03 Main Record
Short Description: TLM Spare1
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_ism1_t
Is element of: GLA03 Main Record
Short Description: Laser Select Mechanism #1 Temperature
Product Data Type: i4b
Total Bytes: 4
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 2000
Product Maximum: 6000
Description: Laser Select Mechanism #1 Temperature
Comments:

Product Var Name i_ism2_t
Is element of: GLA03 Main Record
Short Description: Laser Select Mechanism #2 Temperature
Product Data Type: i4b
Total Bytes: 4
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 2000
Product Maximum: 6000
Description: Laser Select Mechanism #2 Temperature
Comments:

Product Var Name i_adsm_t
Is element of: GLA03 Main Record
Short Description: Altimeter Detector Select Mechanism Temperature
Product Data Type: i4b
Total Bytes: 4
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 2000
Product Maximum: 6000
Description: Altimeter Detector Select Mechanism Temperature
Comments:

Product Var Name i_lbsme_t
Is element of: GLA03 Main Record
Short Description: Laser Beam Select Mech Electronics Temperature
Product Data Type: i4b
Total Bytes: 4
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 2000
Product Maximum: 6000
Description: Laser Beam Select Mech Electronics Temperature
Comments:

Product Var Name i_lbsmm_t
Is element of: GLA03 Main Record
Short Description: Laser Beam Select Mechanism Mirror Temperature
Product Data Type: i4b
Total Bytes: 4
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 2000
Product Maximum: 6000
Description: Laser Beam Select Mechanism Mirror Temperature
Comments:

Product Var Name i_HOP1ActH1_c
Is element of: GLA03 Main Record
Short Description: HOP 1 Actuator Current - Heater 1
Product Data Type: i4b
Total Bytes: 4
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 800
Product Maximum: 1000
Description: HOP 1 Actuator Current - Heater 1
Comments:

Product Var Name i_HOP1ActH2_c
Is element of: GLA03 Main Record
Short Description: HOP 1 Actuator Current - Heater 2
Product Data Type: i4b
Total Bytes: 4
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 800
Product Maximum: 1000
Description: HOP 1 Actuator Current - Heater 2
Comments:

Product Var Name i_HOP2ActH1_c
Is element of: GLA03 Main Record
Short Description: HOP 2 Actuator Current - Heater 1
Product Data Type: i4b
Total Bytes: 4
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 800
Product Maximum: 1000
Description: HOP 2 Actuator Current - Heater 1
Comments:

Product Var Name i_HOP2ActH2_c
Is element of: GLA03 Main Record
Short Description: HOP 2 Actuator Current - Heater 2
Product Data Type: i4b
Total Bytes: 4
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 800
Product Maximum: 1000
Description: HOP 2 Actuator Current - Heater 2
Comments:

Product Var Name i_HOP3ActH1_c
Is element of: GLA03 Main Record
Short Description: HOP 3 Actuator Current - Heater 1
Product Data Type: i4b
Total Bytes: 4
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 800
Product Maximum: 1000
Description: HOP 3 Actuator Current - Heater 1
Comments:

Product Var Name i_HOP3ActH2_c
Is element of: GLA03 Main Record
Short Description: HOP 3 Actuator Current - Heater 2
Product Data Type: i4b
Total Bytes: 4
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 800
Product Maximum: 1000
Description: HOP 3 Actuator Current - Heater 2
Comments:

Product Var Name iTsPMirHtrStPt
Is element of: GLA03 Main Record
Short Description: Telescope Primary Mirror Heater Temperature Setpoint
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 5000
Description: Telescope Primary Mirror Heater Temp Setpoint Readback
Comments:

Product Var Name iTsTwrHtrStPt
Is element of: GLA03 Main Record
Short Description: Telescope Tower Heater Temperature Setpoint
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 5000
Description: Telescope Tower Heater Temperature Setpoint Readback
Comments:

Product Var Name i_EtHtr_StPt
Is element of: GLA03 Main Record
Short Description: Etalon Heater Temperature Setpoint
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 5000
Description: Etalon Heater Temperature Setpoint Readback
Comments:

Product Var Name i_LHP1_StPt
Is element of: GLA03 Main Record
Short Description: Loop Heat Pipe 1 Temperature Setpoint
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 5000
Description: Loop Heat Pipe 1 Temperature Setpoint Readback
Comments:

Product Var Name i_LHP2_StPt
Is element of: GLA03 Main Record
Short Description: Loop Heat Pipe 2 Temperature Setpoint
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 5000
Description: Loop Heat Pipe 2 Temperature Setpoint Readback
Comments:
Product Var Name i_TsPMirHtr_St
Is element of: GLA03 Main Record
Short Description: Telescope Primary Mirror Heater Status
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Telescope Primary Mirror Heater Enable Readback. 0 = Disabled; 0xFF = Enabled.
Comments:

Product Var Name i_TsTwrHtr_St
Is element of: GLA03 Main Record
Short Description: Telescope Tower Heater Status
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Telescope Tower Heater Enable Readback. 0 = Disabled; 0xFF = Enabled.
Comments:

Product Var Name i_EtHtr_St
Is element of: GLA03 Main Record
Short Description: Etalon Heater Status
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Etalon Heater Enable Readback. 0 = Disabled; 0xFF = Enabled.
Comments:

Product Var Name i_LHP1_St
Is element of: GLA03 Main Record
Short Description: Loop Heat Pipe 1 Status
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Loop Heat Pipe 1 Enable Readback. 0 = Disabled; 0xFF = Enabled.
Comments:

Product Var Name i_LHP2_St
Is element of: GLA03 Main Record
Short Description: Loop Heat Pipe 2 Status
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Loop Heat Pipe 2 Enable Readback. 0 = Disabled; 0xFF = Enabled.
Comments:

Product Var Name i_TsPMir_sTh
Is element of: GLA03 Main Record
Short Description: Telescope Primary Mirror Selected Thermistor
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Thermistor Select - Telescope Primary Mirror - Status Readback. 0 = Thermistor 1; 0xFF = Thermistor 2.
Comments:

Product Var Name i_TsSecSS_sTh
Is element of: GLA03 Main Record
Short Description: Telescope Secondary Support Structure Selected Thermistor
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Thermistor Select Telescope Secondary Support Structure Status Readback. 0 = Thermistor 1; 0xFF = Thermistor 2.
Comments:

Product Var Name i_TsSMir_sTh
Is element of: GLA03 Main Record
Short Description: Telescope Secondary Mirror Selected Thermistor
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Thermistor Select - Telescope Secondary Mirror - Status Readback. 0 = Thermistor 1; 0xFF = Thermistor 2.
Comments:

Product Var Name i_LHP1_sTh
Is element of: GLA03 Main Record
Short Description: LHP1 Selected Thermistor
Product Data Type: i1b
Total Bytes: 1
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Thermistor Select LHP1 (lasers) Status Readback. 0 = Thermistor 1; 0xFF = Thermistor 2.
Comments:

Product Var Name i_LHP2_sTh
Is element of: GLA03 Main Record
Short Description: LHP2 Selected Thermistor
Product Data Type: i1b
Total Bytes: 1
Product Minimum: 0
Product Maximum: 255
Description: Thermistor Select LHP2 (rest of instrument) Status Readback. 0 = Thermistor 1; 0xFF = Thermistor 2.
Comments:

Product Var Name i_Et_sTh
Is element of: GLA03 Main Record
Short Description: Etalon Selected Thermistor
Product Data Type: i1b
Total Bytes: 1
Product Minimum: 0
Product Maximum: 255
Description: Thermistor Select Etalon Status Readback. 0 = Thermistor 1; 0xFF = Thermistor 2.
Comments:

Product Var Name i_tlm_spare2
Is element of: GLA03 Main Record
Short Description: TLM Spare2
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_LHIP12_St
Is element of: GLA03 Main Record
Short Description: Loop Heat Pipe 1 & 2 Heater Status
Product Data Type: i1b
Total Bytes: 1
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Loop Heat Pipe 1 & 2 Heater Status; Pipe 1 -> Bit 0, LSB, Pipe 2 -> Bit 1; 0=OFF, 1=ON; spares -> Bits 2-7
Comments:

Product Var Name i_spare23_1
Is element of: GLA03 Main Record
Short Description: Spare23 1
Product Data Type: i1b
Total Bytes: 1
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spares in telemetry packet. 3 1-byte spares: GHKSPARE1-GHKSPARE5.
Product Var Name i_phdr_50
Is element of: GLA03 Main Record
Short Description: Primary Header APID 50
Product Data Type: i1b (6)
Total Bytes: 6
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Primary Header APID 50
Comments:

Product Var Name i_shdr_50
Is element of: GLA03 Main Record
Short Description: Secondary Header APID 50 (time stamp)
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Secondary Header APID 50 (time stamp)
Comments:

Product Var Name i_TsPMir_t
Is element of: GLA03 Main Record, GLA04 LRS Main Record
Short Description: Telescope Region 0 Primary Mirror Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 3000
Description: Telescope Region 0 Primary Mirror
Comments:

Product Var Name i_TsSMir_t
Is element of: GLA03 Main Record, GLA04 LRS Main Record
Short Description: Telescope Region 1 Secondary Mirror Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 3000
Description: Telescope Region 1 Secondary Mirror
Comments:

Product Var Name i_TsTwr_t
Is element of: GLA03 Main Record
Short Description: Telescope Region 2 Tower Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 3000
Description: Telescope Region 2 Tower
Comments:

Product Var Name i_EtC37d_t
Is element of: GLA02 Record, GLA03 Main Record
Short Description: Etalon Temperature, Ch 37d
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 3000
Description: Etalon Temperature, Ch 37d
Comments:

Product Var Name i_LHP1C37e_t
Is element of: GLA03 Main Record
Short Description: Loop Heat Pipe 1 Temperature, Ch 37e
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 3000
Description: Loop Heat Pipe 1 Temperature, Ch 37e
Comments:

Product Var Name i_LHP2C37f_t
Is element of: GLA03 Main Record
Short Description: Loop Heat Pipe 2 Temperature, Ch 37f
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 3000
Description: Loop Heat Pipe 2 Temperature, Ch 37f
Comments:

Product Var Name i_TsPMirHDr_c
Is element of: GLA03 Main Record
Short Description: Telescope Primary Mirror Heater drive current
Product Data Type: i2b
Total Bytes: 2
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2500
Description: Telescope Primary Mirror Heater drive current
Comments:

Product Var Name i_TsTwrHDr_c
Is element of: GLA03 Main Record
Short Description: Telescope Tower Heater drive current
Product Data Type: i2b
Total Bytes: 2
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2500
Description: Telescope Tower Heater drive current
Comments:

Product Var Name i_EtHtrC37j_c
Is element of: GLA02 Record, GLA03 Main Record
Short Description: Etalon Heater Current, Ch 37j
Product Data Type: i2b
Total Bytes: 2
Product Units: Amps X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2500
Description: Etalon Heater Current, Ch 37j
Comments:

Product Var Name i_DlyLineAll_t
Is element of: GLA03 Main Record
Short Description: Delay Line All Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 3000
Description: Delay Line All Temperature from Laser Monitor Board.
Comments:

Product Var Name i_DlyLineMid_t
Is element of: GLA03 Main Record
Short Description: Delay Line Mid Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 3000
Description: Delay Line Mid Temperature from Laser Monitor Board.
Comments:

Product Var Name i_DlyLineHi_t
Is element of: GLA03 Main Record
Short Description: Delay Line Hi Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 3000
Description: Delay Line Hi Temperature from Laser Monitor Board.
Comments:

Product Var Name i_OTSL1_rb
Is element of: GLA03 Main Record
Short Description: OTS Level1 readback
Product Data Type: i1b
Product Var Name i_OTSL2_rb
Is element of: GLA03 Main Record
Short Description: OTS Level 2 readback
Product Data Type: i1b
Total Bytes: 1
Product Units: Counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description:
Comments:

Product Var Name i_OTSL3_rb
Is element of: GLA03 Main Record
Short Description: OTS Level 3 readback
Product Data Type: i1b
Total Bytes: 1
Product Units: Counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description:
Comments:

Product Var Name i_OTSL4_rb
Is element of: GLA03 Main Record
Short Description: OTS Level 4 readback
Product Data Type: i1b
Total Bytes: 1
Product Units: Counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100
Description: 
Comments:

Product Var Name i_OTS_tc1
Is element of: GLA03 Main Record
Short Description: OTS Trigger Count 1 readback
Product Data Type: i2b
Total Bytes: 2
Product Units: Counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: The OTS trigger count 1 readback upper and lower byte. 1st item is the lower byte, 2nd item is the upper byte.
Comments:

Product Var Name i_OTS_tc2
Is element of: GLA03 Main Record
Short Description: OTS Trigger Count 2 readback
Product Data Type: i2b
Total Bytes: 2
Product Units: Counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 10000
Description: The OTS trigger count 2 readback upper and lower byte. 1st item is the lower byte, 2nd item is the upper byte.
Comments:
**Product Var Name** i_tlm_spare501
Is element of: GLA03 Main Record
Short Description: TLM Spare501
Product Data Type: i1b
Total Bytes: 1
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

**Product Var Name** i_spare50
Is element of: GLA03 Main Record
Short Description: Spare 50
Product Data Type: i1b (21)
Total Bytes: 21
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Spares in telemetry packet. 29 1-byte spares: GHW5SPR[29].
Comments:

**Product Var Name** i_phdr_24
Is element of: GLA03 Main Record
Short Description: Primary Header APID 24
Product Data Type: i1b (6, 4)
Total Bytes: 24
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Primary Header APID 23
Comments:

Product Var Name i_shdr_24
Is element of: GLA03 Main Record
Short Description: Secondary Header APID 24 (time stamp)
Product Data Type: i1b (8, 4)
Total Bytes: 32
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Secondary Header APID 23 (time stamp)
Comments:

Product Var Name iHS_CmdProc
Is element of: GLA03 Main Record
Short Description: HS Task Cmd Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: HS Task Cmd Processed Counter
Comments:

Product Var Name iHS_CmdRej
Is element of: GLA03 Main Record
Short Description: HS Task Cmd Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: HS Task Cmd Rejected (or Error) Counter

Comments:

Product Var Name iCS_CmdProc
Is element of: GLA03 Main Record
Short Description: CS Task Cmd Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CS Task Cmd Processed Counter
Comments:

Product Var Name iCS_CmdRej
Is element of: GLA03 Main Record
Short Description: CS Task Cmd Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CS Task Cmd Rejected (or Error) Counter
Comments:

Product Var Name iTC_CmdProc
Is element of: GLA03 Main Record
Short Description: TC Task Cmd Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: TC Task Cmd Processed Counter
Comments:

Product Var Name iTC_CmdRej
Is element of: GLA03 Main Record
Short Description: TC Task Cmd Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: TC Task Cmd Rejected (or Error) Counter
Comments:

Product Var Name iSB_CmdProc
Is element of: GLA03 Main Record
Short Description: SB Task Cmd Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SB Task Cmd Processed Counter
Comments:

Product Var Name iSB_CmdRej
Is element of: GLA03 Main Record
Short Description: SB Task Cmd Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SB Task Cmd Rejected (or Error) Counter
Comments:

Product Var Name iSM_CmdProc
Is element of: GLA03 Main Record
Short Description: SM Task Cmd Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SM Task Cmd Processed Counter
Comments:

Product Var Name iSM_CmdRej
Is element of: GLA03 Main Record
Short Description: SM Task Cmd Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SM Task Cmd Rejected (or Error) Counter
Comments:

Product Var Name iRT_CmdProc
Is element of: GLA03 Main Record
Short Description: RT Task Cmd Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: RT Task Cmd Processed Counter
Comments:

Product Var Name iRT_CmdRej
Is element of: GLA03 Main Record
Short Description: RT Task Cmd Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: RT Task Cmd Rejected (or Error) Counter
Comments:

Product Var Name iRT_RCH3CmdRcv
Is element of: GLA03 Main Record
Short Description: RT Task RCH3 Commands Received
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: RT Task RCH3 (SA22-25, CSA 26) Commands Received. Does not count spacecraft position and command packet.
Comments:
Product Var Name: iRT_RCH3CmdRej
Is element of: GLA03 Main Record
Short Description: RT Task RCH3 Commands Rejected
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: RT Task RCH3 (SA22-25, CSA 26) Commands Rejected. Commands are rejected for checksum problems.
Comments:

Product Var Name: iMD_CmdProc
Is element of: GLA03 Main Record
Short Description: MD Task Cmd Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: MD Task Cmd Processed Counter
Comments:

Product Var Name: iMD_CmdRej
Is element of: GLA03 Main Record
Short Description: MD Task Cmd Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: MD Task Cmd Rejected (or Error) Counter
Comments:

Product Var Name: iAD_CmdProc
Is element of: GLA03 Main Record
Short Description: AD Task Cmd Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: AD Task Cmd Processed Counter
Comments:

Product Var Name: iAD_CmdRej
Is element of: GLA03 Main Record
Short Description: AD Task Cmd Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: AD Task Cmd Rejected (or Error) Counter
Comments:

Product Var Name: iAD_StatFlag
Is element of: GLA03 Main Record
Short Description: AD Target Status and Mode Flags
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: AD Target Status and Mode Flags. 0 = Not present; 1 = Present.
Comments:

Product Var Name: i_tlm_spare24
Is element of: GLA03 Main Record
Short Description: TLM Spare24
Product Data Type: i1b (3, 4)
Total Bytes: 12
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name: iCD_CCDProc
Is element of: GLA03 Main Record
Short Description: CD Task CCD Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: CD Task CCD Processed Counter
Comments:

Product Var Name: iCD_CCDRej
Is element of: GLA03 Main Record
Short Description: CD Task CCD Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: CD Task CCD Rejected (or Error) Counter
Comments:
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 128
Description: CD Task CCD Rejected (or Error) Counter
Comments:

Product Var Name iCD_StatusFlag
Is element of: GLA03 Main Record
Short Description: CD Status Flags
Product Data Type: i1b (2, 4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: CD Status Flags. Bits 0-2 indicate CD Mode; 1 = Idle, 2=Engineering, 4=Science, Other values invalid. Bits 3 indicates CD Data Ready Interrupt; 0=Enabled, 1=Disabled. Bits 4 - 5 indicate CD Idle Mode Interrupt Source; 0=Clear Mem, 1=Fire Cmd, 2=Fire Ack, Other values invalid. Bit 6 indicates CD Range Gate Offset Source; 0=Fire Ack, 1= Fire Cmd. Bit 7 is spare.
Comments:

Product Var Name iDC_CmdProc
Is element of: GLA03 Main Record
Short Description: DC Task Cmd Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: DC Task Cmd Processed Counter
Comments:

Product Var Name iDC_CmdRej
Is element of: GLA03 Main Record
Short Description: DC Task Cmd Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: DC Task Cmd Rejected (or Error) Counter
Comments:

Product Var Name iDC_StatFlag
Is element of: GLA03 Main Record
Short Description: DC Status Flags
Product Data Type: i1b (2, 4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32768
Description: DC Status Flags
Comments:

Product Var Name iGP_CmdProc
Is element of: GLA03 Main Record
Short Description: GP Task Cmd Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: GP Task Cmd Processed Counter
Comments:

Product Var Name iGP_CmdRej
Is element of: GLA03 Main Record
Short Description: GP Task Cmd Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: GP Task Cmd Rejected (or Error) Counter
Comments:

Product Var Name iGP_StatFlag
Is element of: GLA03 Main Record
Short Description: GP Status Flags
Product Data Type: i1b (2, 4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32768
Description: GP Status Flags
Comments:

Product Var Name iPC_CmdProc
Is element of: GLA03 Main Record
Short Description: PC Task Cmd Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: PC Task Cmd Processed Counter
Comments:
Product Var Name: iPC_CmdRej
Is element of: GLA03 Main Record
Short Description: PC Task Cmd Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: PC Task Cmd Rejected (or Error) Counter
Comments:

Product Var Name: iPC_StatFlag
Is element of: GLA03 Main Record
Short Description: PC Status Flags
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: PC Status Flags
Comments:

Product Var Name: iCT_CmdProc
Is element of: GLA03 Main Record
Short Description: CT Task Cmd Processed Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT Task Cmd Processed Counter
Comments:

Product Var Name iCT_CmdRej
Is element of: GLA03 Main Record
Short Description: CT Task Cmd Rejected (or Error) Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT Task Cmd Rejected (or Error) Counter
Comments:

Product Var Name iCT_Mode
Is element of: GLA03 Main Record
Short Description: CT Task Mode
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CT Task mode. Bit 0 indicates CT Task Software Mode; 0=Manual, 1=Auto. Bit 1 indicates CT Task C&T Control Hardware Mode, Register bit; 0=Manual, 1=Auto. Bit 2 indicates CT Task Startup Mode, Discrete cmd; 0=Manual, 1=Auto Power Up Osc/AD. Bit 3 indicates CT Task Startup AD/OSC, Discrete cmd; 0=Primary, 1=Secondary. Bits 4 - 5 indicate CT Etalon Tracking Mode; 0=Off, 1=Acquire, 2=Tracking, 3=Invalid. Bits 6 - 7 are spares.
Comments:

Product Var Name i_phdr_25
Is element of: GLA03 Main Record
Short Description: Primary Header APID 25
Product Data Type: i1b (6, 4)
Total Bytes: 24
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Primary Header APID 25
Comments:

Product Var Name i_shdr_25
Is element of: GLA03 Main Record
Short Description: Secondary Header APID 25 (time stamp)
Product Data Type: i1b (8, 4)
Total Bytes: 32
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Secondary Header APID 25 (time stamp)
Comments:

Product Var Name i_HS_PrevMode
Is element of: GLA03 Main Record
Short Description: HS Processor Previous Mode
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: HS Processor Previous Mode; 0=Unknown, 2=PROM, 3=EEPROM
Comments:

Product Var Name i_HS_CurMode
Is element of: GLA03 Main Record
Short Description: HS Processor Current Mode
Product Data Type: i1b (4)
Total Bytes: 4
Product Var Name: i_SubSysPres
Is element of: GLA03 Main Record
Short Description: Subsystem Present Flags
Product Data Type: i2b (4)
Total Bytes: 8
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: Subsystem Present Bit Flags. Value of 0 = subsystem not present; value of 1 = subsystem present in small and large telemetry packets. Bit 0 = HS; Bit 1 = CS; Bit 2 = TC; Bit 3 = SB; Bit 4 = SM; Bit 5 = RT; Bit 6 = AD; Bit 7 = MD; Bit 8 = CD; Bit 9 = DC; Bit 10 = GP; Bit 11 = PC; Bit 12 = CT. Bits 13-15 are spares.
Comments:

Product Var Name: iHS_WarmRCt
Is element of: GLA03 Main Record
Short Description: HS Warm Restart Count
Product Data Type: i2b (4)
Total Bytes: 8
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS Warm Restart Count
Comments:

Product Var Name: iHS_ColdRCt
Is element of: GLA03 Main Record
Short Description: HS Cold Restart Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS Cold Restart Count
Comments:

Product Var Name iHS_MxWarmRCt
Is element of: GLA03 Main Record
Short Description: HS Max Warm Restart Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS Max Warm Restart Count
Comments:

Product Var Name iHS_ColdWarmF
Is element of: GLA03 Main Record
Short Description: HS Cold-Warm Flag
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: HS Cold-Warm Flag
Comments:
Product Var Name: iHS_OSResetF
Is element of: GLA03 Main Record
Short Description: HS OS Caused Reset Flag
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: HS OS Caused Reset Flag
Comments:

Product Var Name: iHS_OSTickCt
Is element of: GLA03 Main Record
Short Description: HS OS Tick Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS OS Tick Count
Comments:

Product Var Name: iHS_HSExecCt
Is element of: GLA03 Main Record
Short Description: HS HS Exec Count
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: HS HS Exec Count
Comments:

Product Var Name iHS_CSExecCt
Is element of: GLA03 Main Record
Short Description: HS CS Exec Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS CS Exec Count
Comments:

Product Var Name iHS_TCExecCt
Is element of: GLA03 Main Record
Short Description: HS TC Exec Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS TC Exec Count
Comments:

Product Var Name iHS_SBExecCt
Is element of: GLA03 Main Record
Short Description: HS SB Exec Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS SB Exec Count
Comments:

Product Var Name iHS_SMExecCt
Is element of: GLA03 Main Record
Short Description: HS SM Exec Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS SM Exec Count
Comments:

Product Var Name iHS_RTExecCt
Is element of: GLA03 Main Record
Short Description: HS RT Exec Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS RT Exec Count
Comments:

Product Var Name iHS_MDExecCt
Is element of: GLA03 Main Record
Short Description: HS MD Exec Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS MD Exec Count
Comments:

Product Var Name iHS_ADExecCt
Is element of: GLA03 Main Record
Short Description: HS AD Exec Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS AD Exec Count
Comments:

Product Var Name iHS_CDExecCt
Is element of: GLA03 Main Record
Short Description: HS CD Exec Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS CD Exec Count
Comments:

Product Var Name iHS_DCExecCt
Is element of: GLA03 Main Record
Short Description: HS DC Exec Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS DC Exec Count
Comments:

Product Var Name: iHS_GPExecCt
Is element of: GLA03 Main Record
Short Description: HS GP Exec Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS GP Exec Count
Comments:

Product Var Name: iHS_PCExecCt
Is element of: GLA03 Main Record
Short Description: HS PC Exec Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS PC Exec Count
Comments:

Product Var Name: iHS_CTExecCt
Is element of: GLA03 Main Record
Short Description: HS CT Exec Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS CT Exec Count
Comments:

Product Var Name iHSFPU_Uflw_Ct
Is element of: GLA03 Main Record
Short Description: HS FPU Underflow Count
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: HS FPU Underflow Count
Comments:

Product Var Name iHS_spare1
Is element of: GLA03 Main Record
Short Description: HS spare 1
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: HS spares.

Product Var Name iHS_spare2
Is element of: GLA03 Main Record
Short Description: HS Spare 2
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: HS spares.

Product Var Name: iHSTCfireISRCt
Is element of: GLA03 Main Record
Short Description: HS TC Fire Cmd ISR Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS TC Fire Cmd ISR Count
Comments:

Product Var Name: iHS_RTISRCtLo
Is element of: GLA03 Main Record
Short Description: HS RT ISR Count - Low Priority
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS RT ISR Count - Low Priority
Comments:
Product Var Name iHS_spare3
Is element of: GLA03 Main Record
Short Description: HS Spare 3
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: HS spares.

Product Var Name iHS_CTISRCt
Is element of: GLA03 Main Record
Short Description: HS CT ISR Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS CT ISR Count
Comments: 

Product Var Name iHS_spare4
Is element of: GLA03 Main Record
Short Description: HS Spare 4
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: HS spare.

Product Var Name: iHS_spare5
Is element of: GLA03 Main Record
Short Description: HS Spare 5
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0

Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: HS spare.

Product Var Name: iHS_ppsISRCt
Is element of: GLA03 Main Record
Short Description: HS GPS 10 Sec ISR Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768

Description: HS GPS 10 Sec ISR Count
Comments:

Product Var Name: iHS_DC_ISRCt
Is element of: GLA03 Main Record
Short Description: HS DC ISR Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS DC ISR Count
Comments:

Product Var Name iHS_PC_ISRCt
Is element of: GLA03 Main Record
Short Description: HS PC ISR Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS PC ISR Count
Comments:

Product Var Name iHS_CD_ISRCt
Is element of: GLA03 Main Record
Short Description: HS CD ISR Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS CD ISR Count
Comments:

Product Var Name iHS_AD_ISRCt
Is element of: GLA03 Main Record
Short Description: HS AD ISR Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS AD ISR Count
Comments:

Product Var Name iHS_spare6
Is element of: GLA03 Main Record
Short Description: HS Spare 6
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: HS spare.

Product Var Name iHS_OSEventSeq
Is element of: GLA03 Main Record
Short Description: HS OS Event Seq Number
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: HS OS Event Seq Number
Comments:

Product Var Name iHS_PeakCPU
Is element of: GLA03 Main Record
Short Description: HS Peak CPU Utilization
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: HS Peak CPU Utilization
Comments:

Product Var Name iHS_LastCPU
Is element of: GLA03 Main Record
Short Description: HS Last CPU Utilization
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: HS Last CPU Utilization
Comments:

Product Var Name iHSPCI_Bus_st
Is element of: GLA03 Main Record
Short Description: HS OS PCI Bus Target Enable and Interrupt status
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: HS OS PCI Bus Target Enable and Interrupt status
Comments:

Product Var Name iHSOS_Plog_st
Is element of: GLA03 Main Record
Short Description: HS OS Performance Log Enable Flag
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: _APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: HS OS Performance Log Enable Flag
Comments:

Product Var Name iHSOS_Plog_ct
Is element of: GLA03 Main Record
Short Description: HS OS Performance Log Item Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: _APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: HS OS Performance Log Item Count
Comments:

Product Var Name iHS_Plog_stAdd
Is element of: GLA03 Main Record
Short Description: HS OS Performance Log Filter Start Address
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: _APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32000
Description: HS OS Performance Log Filter Start Address
Comments:
Product Var Name: iHS_Plog_mask
Is element of: GLA03 Main Record
Short Description: HS OS Performance Log Filter Mask
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32000
Description: HS OS Performance Log Filter Mask
Comments:

Product Var Name: i_spare25_2
Is element of: GLA03 Main Record
Short Description: Spare25 2
Product Data Type: i1b (6, 4)
Total Bytes: 24
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name: iCS_StatFlag
Is element of: GLA03 Main Record
Short Description: CS Status Flags
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: CS Status Flags. Bits 0-1 indicate CS Enable/Disabled Status; value of 0=Disabled, 1=Enabled. Bits 2-3 indicate CS Code Memory Checksum Status; value of 0=Disabled, 1=Enabled, 2=Disabled and Recomputing, 3=Enabled and Recomputing. Bits 4-5 indicate CS Table Memory Checksum Status; value of 0=Disabled, 1=Enabled, 2=Disabled and Recomputing, 3=Enabled and Recomputing. Bits 6-7 indicate CS EEPROM Checksum status; value of 0=Disabled, 1=Enabled, 2=Disabled and Recomputing, 3=Enabled and Recomputing.

Comments:

Product Var Name iCS_codeErr_ct
Is element of: GLA03 Main Record
Short Description: CS Code Segment Error Count
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CS Code Segment Error Count
Comments:

Product Var Name iCSEPROMerr_ct
Is element of: GLA03 Main Record
Short Description: CS EEPROM Segment Error Count
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CS EEPROM Segment Error Count
Comments:

Product Var Name iCSTblRamerr_ct
Is element of: GLA03 Main Record
Short Description: CS Table Ram Segment Error Count
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CS Table Ram Segment Error Count
Comments:

Product Var Name iCS_codeErr_ID
Is element of: GLA03 Main Record
Short Description: CS Table ID of last Code Error
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CS Table ID of last Code Error
Comments:

Product Var Name iCSEPROMerr_ID
Is element of: GLA03 Main Record
Short Description: CS Table ID of last EEPROM Error
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CS Table ID of last EEPROM Error
Comments:

Product Var Name iCSTblRamErrID
Is element of: GLA03 Main Record
Short Description: CS Table ID of last Table RAM Error
Product Data Type: i2b (4)
Total Bytes: 8
Product Var Name iCS_code_mstrcs
Is element of: GLA03 Main Record
Short Description: CS Code Segment Master Checksum
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CS Code Segment Master Checksum
Comments:

Product Var Name iCSRam_mstrcs
Is element of: GLA03 Main Record
Short Description: CS Table RAM Master Checksum
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CS Table RAM Master Checksum
Comments:

Product Var Name iCSEEPROMmstrcs
Is element of: GLA03 Main Record
Short Description: CS EEPROM Master Checksum

Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CS EEPROM Master Checksum
Comments:

Product Var Name: iEPROM_bmem_cs
Is element of: GLA03 Main Record
Short Description: CS Checksum of EEPROM Boot Memory

Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CS Checksum of EEPROM Boot Memory
Comments:

Product Var Name: iEPROM_mem_cs
Is element of: GLA03 Main Record
Short Description: CS Checksum of EEPROM Memory

Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CS Checksum of EEPROM Memory
Comments:

Product Var Name: iPROM_mem_cs
Is element of: GLA03 Main Record
Short Description: CS Checksum of PROM Memory
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CS Checksum of PROM Memory
Comments:

Product Var Name iCS_spare
Is element of: GLA03 Main Record
Short Description: CS Spare
Product Data Type: i1b (18, 4)
Total Bytes: 72
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: CS Spare - 18 bytes.

Product Var Name iTC_MET_u2
Is element of: GLA03 Main Record
Short Description: TC GLAS MET Upper 2 bytes
Product Data Type: i1b (2, 4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: TC GLAS MET Upper 2 bytes
Comments:
Product Var Name: iTC_MET_l4
Is element of: GLA03 Main Record
Short Description: TC GLAS MET Lower 4 bytes
Product Data Type: i1b (4, 4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: TC GLAS MET Lower 4 bytes
Comments:

Product Var Name: iTC_FcmdInc_u2
Is element of: GLA03 Main Record
Short Description: TC Fire Command Time Increment Upper 2 bytes
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: TC Fire Command Time Increment Upper 2 bytes
Comments:

Product Var Name: iTC_FcmdInc_l4
Is element of: GLA03 Main Record
Short Description: TC Fire Command Time Increment Lower 4 bytes
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 157680000
Description: TC Fire Command Time Increment Lower 4 bytes

Comments:

Product Var Name: iTCworkMET_sec
Is element of: GLA03 Main Record
Short Description: TC GLAS MET Working Time seconds
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: seconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 157680000

Description: TC GLAS MET Working Time seconds

Comments:

Product Var Name: iTCworkMET_us
Is element of: GLA03 Main Record
Short Description: TC GLAS MET Working Time microseconds
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000

Description: TC GLAS MET Working Time micro-seconds

Comments:

Product Var Name: i_spare25_3
Is element of: GLA03 Main Record
Short Description: Spare25 3
Product Data Type: i1b (18, 4)
Total Bytes: 72
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Data Dictionary

Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare 25 3

Product Var Name: i_SB_SndErrCnt
Is element of: GLA03 Main Record
Short Description: SB Send Error Count
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SB Send Error Count
Comments:

Product Var Name: i_SB_RcvErrCnt
Is element of: GLA03 Main Record
Short Description: SB Receive Error Count
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SB Receive Error Count
Comments:

Product Var Name: i_SB_OSErrCnt
Is element of: GLA03 Main Record
Short Description: SB OS Error Count
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SB OS Error Count
Comments:

Product Var Name iSB_QFullErrCt
Is element of: GLA03 Main Record
Short Description: SB Queue Full Error Count
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SB Queue Full Error Count
Comments:

Product Var Name iSB_BOverErrCt
Is element of: GLA03 Main Record
Short Description: SB Buffer overrun Error Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: SB Buffer overrun Error Count
Comments:

Product Var Name i_SB_LBO_Strm
Is element of: GLA03 Main Record
Short Description: SB last buffer overrun - Stream Id
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: SB last buffer overrun - Stream Id
Comments:

Product Var Name i_SB_LBO_Pipe
Is element of: GLA03 Main Record
Short Description: SB last buffer overrun - Pipeline Id
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: SB last buffer overrun - Pipeline Id
Comments:

Product Var Name i_SB_LBO_Task
Is element of: GLA03 Main Record
Short Description: SB last buffer overrun - Sender Task ID
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: SB last buffer overrun - Sender Task ID
Comments:

Product Var Name i_SB_LQF_Strm
Is element of: GLA03 Main Record
Short Description: SB last queue full - Stream Id
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: SB last queue full - Stream Id
Comments:

Product Var Name i_SB_LQF_Pipe
Is element of: GLA03 Main Record
Short Description: SB last queue full - Pipeline Id
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: SB last queue full - Pipeline Id
Comments:

Product Var Name i_SB_LQF_Task
Is element of: GLA03 Main Record
Short Description: SB last queue full - Sender Task ID
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: SB last queue full - Sender Task ID
Comments:

Product Var Name i_SB_Spare
Is element of: GLA03 Main Record
Short Description: SB Spare
Product Data Type: i1b (8, 4)
Total Bytes: 32
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: SB Spare

Product Var Name iSMRemDumpCopy
Is element of: GLA03 Main Record
Short Description: SM num of remaining copies to be dumped
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: _APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SM num of remaining copies to be dumped
Comments:

Product Var Name iSM_Dump_flag
Is element of: GLA03 Main Record
Short Description: SM dump in progress flag
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: _APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: SM tbl/mem dump in progress flag. Value of 0 = false, 1 = true.
Comments:
Product Var Name iSM_TblOps_fg
Is element of: GLA03 Main Record
Short Description: SM table operations flag
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SM table operations flag. Bits 0 - 5 indicate SM Table Session Type; value of 0=None, 5=DUMPONLY, 6=REP_EEPROM, 7=REP_RAM, 8=APPD_ACTV. Bit 6 indicates table operations; value of 0 = Inactive, 1 = Active. Bit 7 is spare.
Comments:

Product Var Name iSM_TOp_ImgTyp
Is element of: GLA03 Main Record
Short Description: SM table operations from image type
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: SM table operations from image type. Value of 0=None, 1=EEPROM, 2=RAM, 3=NULL.
Comments:

Product Var Name iSM_TblID_sel
Is element of: GLA03 Main Record
Short Description: SM table id selected
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: SM table id selected
Comments:

Product Var Name: iSM_TblSize
Is element of: GLA03 Main Record
Short Description: SM currently selected table size in words
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: SM currently selected tbl size in words
Comments:

Product Var Name: iSM_TblCksum
Is element of: GLA03 Main Record
Short Description: SM currently selected table checksum
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: SM currently selected table checksum
Comments:

Product Var Name: iSM_success_ct
Is element of: GLA03 Main Record
Short Description: SM table commit success count
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SM table commit success count
Comments:

Product Var Name iSM_fail_ct
Is element of: GLA03 Main Record
Short Description: SM table commit failure count
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SM table commit failure count
Comments:

Product Var Name iSM_TblWdLd_ct
Is element of: GLA03 Main Record
Short Description: SM table num. of words loaded
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: SM table num. of words loaded
Comments:

Product Var Name iSM_FSW_BldNum
Is element of: GLA03 Main Record
Short Description: SM FSW build number
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SM FSW build number
Comments:

Product Var Name iSM_FSW_VerNum
Is element of: GLA03 Main Record
Short Description: SM FSW version number
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: SM FSW version number
Comments:

Product Var Name iSM_Spares
Is element of: GLA03 Main Record
Short Description: SM spares
Product Data Type: i1b (10, 4)
Total Bytes: 40
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: SM Spare

Product Var Name iBCRT_CntrlRWd
Is element of: GLA03 Main Record
Short Description: BCRT CONTROL REGISTER WORD
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 384
Description: BCRT CONTROL REGISTER WORD. Bit 7 indicates RT Channel A Select; value of 0 = off, 1 = on. Bit 8 indicates RT Channel B Select; value of 0 = off, 1 = on. All other bits are unused.
Comments:

Product Var Name iBCRT_StatReg
Is element of: GLA03 Main Record
Short Description: BCRT Status Register
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: BCRT Status Register. Bit 0 indicates RT Status, RT Mode Enabled Flag; value of 0 = Disabled, 1 = Enabled. All other bits are unused.
Comments:

Product Var Name iBCRT_IntStReg
Is element of: GLA03 Main Record
Short Description: BCRT INTERRUPT STATUS REGISTER
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: BCRT INTERRUPT STATUS REGISTER
Comments:

Product Var Name iRT_MsgErr
Is element of: GLA03 Main Record
Short Description: RT 1553 MESSAGE ERRORS
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: RT 1553 MESSAGE ERRORS
Comments:

Product Var Name iRT_RtryCt
Is element of: GLA03 Main Record
Short Description: RT 1553 RETRY COUNT
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: RT 1553 RETRY COUNT
Comments:

Product Var Name iRT_InvCmd
Is element of: GLA03 Main Record
Short Description: RT 1553 INVALID COMMANDS
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: RT 1553 INVALID COMMANDS
Comments:
Product Var Name: iRT_InvBCCmd
Is element of: GLA03 Main Record
Short Description: RT 1553 INVALID BROADCAST CMDS
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: RT 1553 INVALID BROADCAST CMDS
Comments:

Product Var Name: iRT_ModeCodeCt
Is element of: GLA03 Main Record
Short Description: RT MODE CODES RECEIVED
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: RT MODE CODES RECEIVED
Comments:

Product Var Name: i_spare25_4
Is element of: GLA03 Main Record
Short Description: Spare25 4
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name: iRT_RcvRCH1_ct
Is element of: GLA03 Main Record
Short Description: RT PACKETS RECEIVED ON RCH1
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: RT PACKETS RECEIVED ON RCH1
Comments:

Product Var Name: iRT_RejRCH1_ct
Is element of: GLA03 Main Record
Short Description: RT PACKETS Rejected ON RCH1
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: RT PACKETS Rejected ON RCH1
Comments:

Product Var Name: iRT_SentXCH1ct
Is element of: GLA03 Main Record
Short Description: RT PACKETS SENT ON XCH1
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: RT PACKETS SENT ON XCH1; HK channel.
Comments:

Product Var Name iRT_SentXCH2ct
Is element of: GLA03 Main Record
Short Description: RT PACKETS SENT ON XCH2
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: RT PACKETS SENT ON XCH2; Diagnostic channel.
Comments:

Product Var Name iRT_CmdHist_ct
Is element of: GLA03 Main Record
Short Description: RT Number of Command History Packets Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: RT Number of Command History Packets Sent
Comments:

Product Var Name iRT_cksum_st
Is element of: GLA03 Main Record
Short Description: RT Checksum Status
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: RT Checksum Status. Value of 0 = CMD Checksum Disabled; 1 = CMD Checksum enabled.
Comments:

Product Var Name i_spare25_5
Is element of: GLA03 Main Record
Short Description: Spare25 5
Product Data Type: i1b (8, 4)
Total Bytes: 32
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name iMD_Tbl_flg
Is element of: GLA03 Main Record
Short Description: MD Table Enable Flag
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description:
Comments:

Product Var Name iMD_spare
Is element of: GLA03 Main Record
Short Description: MD spare
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: MD spare

Product Var Name: iMD_T1addct
Is element of: GLA03 Main Record
Short Description: MD Table #1 Address Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Counts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description:
Comments:

Product Var Name: iMD_T2addct
Is element of: GLA03 Main Record
Short Description: MD Table #2 Address Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description:
Comments:

Product Var Name: iMD_T1rate
Is element of: GLA03 Main Record
Short Description: MD Table #1 Rate
Product Var Name: iMD_T2rate
Is element of: GLA03 Main Record
Short Description: MD Table #2 Rate
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description:
Comments:

Product Var Name: iMD_spare2
Is element of: GLA03 Main Record
Short Description: MD Spare 2
Product Data Type: i1b (12, 4)
Total Bytes: 48
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: MD spare

Product Var Name: i_phdr_55
Is element of: GLA03 Main Record
Short Description: Primary Header APID 55
Product Data Type: i1b (6, 4)
Total Bytes: 24
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Primary Header APID 55
Comments:

Product Var Name i_shdr_55
Is element of: GLA03 Main Record
Short Description: Secondary Header 55 (time stamp)
Product Data Type: i1b (8, 4)
Total Bytes: 32
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Secondary Header for APID 55 (time stamp)
Comments:

Product Var Name iAD_SWErr_ct
Is element of: GLA03 Main Record
Short Description: AD Software Error Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD Software Error Count. Number of software errors detected.
Comments:
Product Var Name iAD_HWErr_ct
Is element of: GLA03 Main Record
Short Description: AD Hardware Error Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD Hardware Error Count. Number of hardware errors detected.
Comments:

Product Var Name iAD_Shot_ct
Is element of: GLA03 Main Record
Short Description: AD Shot Count Value
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: AD Shot Count Value
Comments:

Product Var Name iAD_ShotCtSkip
Is element of: GLA03 Main Record
Short Description: AD Shot Count Skip Detected
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: AD Shot Count Skip Detected flag; 0 = no skip, 1 = skip.

Comments:

Product Var Name iAD_Sync_flag
Is element of: GLA03 Main Record
Short Description: AD Synchronized Flag
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: AD Synchronized Flag; 0 = not in sync, 1 = in sync.

Comments:

Product Var Name iAD_spare1
Is element of: GLA03 Main Record
Short Description: AD Spare 1
Product Data Type: i1b (5, 4)
Total Bytes: 20
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name iAD_DSPfire_ct
Is element of: GLA03 Main Record
Short Description: AD DSP Laser Fire Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD DSP Laser Fire Count. Indicates the number of laser fire commands detected.
Comments:

Product Var Name iADDSPalive_ct
Is element of: GLA03 Main Record
Short Description: AD DSP Alive Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD DSP Alive Count. Increments once every 75ms when laser fire command fails.
Comments:

Product Var Name iAD_AncPkt_ct
Is element of: GLA03 Main Record
Short Description: AD Ancillary Packets Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD Ancillary Packets Sent
Comments:

Product Var Name iAD_EngPkt_ct
Is element of: GLA03 Main Record
Short Description: AD Engineering Packets Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD Engineering Packets Sent
Comments:

Product Var Name iAD_SmSci_ct
Is element of: GLA03 Main Record
Short Description: AD Science Small Packets Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD Science Small Packets Sent
Comments:

Product Var Name iAD_LgSci_ct
Is element of: GLA03 Main Record
Short Description: AD Science Large Packets Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD Science Large Packets Sent
Comments:

Product Var Name iDSPLoadProcCt
Is element of: GLA03 Main Record
Short Description: AD DSP Load Packets Processed Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD DSP Load Packets Processed Count
Comments:

Product Var Name: iDSPMDump_ct
Is element of: GLA03 Main Record
Short Description: AD DSP Memory Dump Packets Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD DSP Memory Dump Packets Sent
Comments:

Product Var Name: iADMLoadCmdErr
Is element of: GLA03 Main Record
Short Description: AD Memory Load Command Errors
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD Memory Load Command Errors
Comments:

Product Var Name: iADMDumpCmdErr
Is element of: GLA03 Main Record
Short Description: AD Memory Dump Command Errors
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD Memory Dump Command Errors
Comments:

Product Var Name iDSPcksumRate
Is element of: GLA03 Main Record
Short Description: AD DSP Checksum Rate
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD DSP Checksum Rate. Number of 48-bit words checked in each of 3 memory types of DSP memory each shot (40 Hz).
Comments:

Product Var Name iDSPcksumSW_st
Is element of: GLA03 Main Record
Short Description: AD DSP Checksum S/W Enable Status
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: AD DSP Checksum S/W Enable Status; 0 = Disable, 1 = Enable.
Comments:

Product Var Name iDSP_cksum_ct
Is element of: GLA03 Main Record
Short Description: AD DSP # of times all of memory has been checksumed
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD DSP # of times all of memory has been checksumed
Comments:

Product Var Name iDSP_BScksum_l
Is element of: GLA03 Main Record
Short Description: AD DSP Bootstrap Checksum Lower 16 bits
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD DSP Bootstrap Checksum Lower 16 bits
Comments:

Product Var Name iDSPEPROMcs_l
Is element of: GLA03 Main Record
Short Description: AD DSP EPROM Checksum Lower 16 bits
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD DSP EPROM Checksum Lower 16 bits
Comments:
Product Var Name iDSPRAMcksum_l
Is element of: GLA03 Main Record
Short Description: AD DSP RAM Checksum Lower 16 bits
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD DSP RAM Checksum Lower 16 bits
Comments:

Product Var Name iDSP_BScksum_u
Is element of: GLA03 Main Record
Short Description: AD DSP Bootstrap Checksum Upper 32 bits
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: AD DSP Bootstrap Checksum Upper 32 bits
Comments:

Product Var Name iDSPEPROMcs_u
Is element of: GLA03 Main Record
Short Description: AD DSP EPROM Checksum Upper 32 bits
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: AD DSP EPROM Checksum Upper 32 bits
Comments:

Product Var Name: iDSPRAMcksum_u
Is element of: GLA03 Main Record
Short Description: AD DSP RAM Checksum Upper 32 bits
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: AD DSP RAM Checksum Upper 32 bits
Comments:

Product Var Name: iAD_DSPsw_bnum
Is element of: GLA03 Main Record
Short Description: AD DSP S/W Build Number
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: AD DSP S/W Build Number
Comments:

Product Var Name: iAD_DSPsw_vnum
Is element of: GLA03 Main Record
Short Description: AD DSP S/W Version Number
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: AD DSP S/W Version Number
Comments:

Product Var Name iAD_GPSrwin_ct
Is element of: GLA03 Main Record
Short Description: AD GPS Range Window Packets received
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: AD GPS Range Window Packets received
Comments:

Product Var Name iDSP_Pcksuml
Is element of: GLA03 Main Record
Short Description: AS DSP Patch Checksum Bits 15..0
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description:
Comments:

Product Var Name iDSP_Pcksumu
Is element of: GLA03 Main Record
Short Description: AS DSP Patch Checksum bits 47..16
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description:
Comments:

Product Var Name: iDSP_autoreset
Is element of: GLA03 Main Record
Short Description: AD Auto Reset DSP Flag
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description:
Comments:

Product Var Name: iAD_SWenable
Is element of: GLA03 Main Record
Short Description: AD Software Enable Flags
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description:
Comments:

Product Var Name: iAD_DSPtroub
Is element of: GLA03 Main Record
Short Description: AD DSP Trouble Indicator Status Word
Product Data Type: i1b (2, 4)
Total Bytes: 8
Product Var Name: iADmemTLoaderr
Is element of: GLA03 Main Record
Short Description: AD DSP Memory Table Load Error Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description:
Comments:

Product Var Name: iAD_FixGain
Is element of: GLA03 Main Record
Short Description: AD Fixed Return Gain Setting
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description:
Comments:

Product Var Name: iAD_spare2
Is element of: GLA03 Main Record
Short Description: AD Spare 2
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name iCD_Swerr_ct
Is element of: GLA03 Main Record
Short Description: CD Software Error Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CD Software Error Count
Comments:

Product Var Name iCD_shot_ct
Is element of: GLA03 Main Record
Short Description: CD Shot Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CD Shot Count
Comments:

Product Var Name iCD_SciPkt_ct
Is element of: GLA03 Main Record
Short Description: CD Science Mode Packets Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CD Science Mode Packets Sent
Comments:

Product Var Name iCD_EngPkt_ct
Is element of: GLA03 Main Record
Short Description: CD Engineering Mode Packets Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CD Engineering Mode Packets Sent
Comments:

Product Var Name iCD_AncPkt_ct
Is element of: GLA03 Main Record
Short Description: CD Ancillary Packet Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CD Ancillary Packet Sent
Comments:
Product Var Name: iCDRGateRcv_ct
Is element of: GLA03 Main Record
Short Description: CD Range Gate Pkts Received
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CD Range Gate Pkts Received
Comments:

Product Var Name: iCD40ctrPkt_ct
Is element of: GLA03 Main Record
Short Description: CD 40-bit Counter Packets Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CD 40-bit Counter Packets Sent
Comments:

Product Var Name: i_spare55_1
Is element of: GLA03 Main Record
Short Description: Spare 55_1
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Spare in telemetry.
Comments:

Product Var Name: iCD_BG1delay
Is element of: GLA03 Main Record
Short Description: CD Background #1 Delay
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CD Background #1 Delay
Comments:

Product Var Name: iCD_BG2delay
Is element of: GLA03 Main Record
Short Description: CD Background #2 Delay
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CD Background #2 Delay
Comments:

Product Var Name: iCD_Rgatedelay
Is element of: GLA03 Main Record
Short Description: CD Range Gate Delay
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: CD Range Gate Delay
Comments:

Product Var Name i_spare55_2
Is element of: GLA03 Main Record
Short Description: Spare 55_2
Product Data Type: i1b (2, 4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Spare in telemetry.
Comments:

Product Var Name iCD_rawADout
Is element of: GLA03 Main Record
Short Description: CD Raw A/D Output Data Structure
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: CD Raw A/D Output Data Structure. Bits 0 - 7 are the raw Cloud digitizer A/D output data. Bit 8 is the CD Raw A/D Overflow Flag. Bits 9 - 13 indicate the CD Attenuation Setting; value of 1=1/1, 2=1/1.77, 4=1/3.16, 8=1/5.6, 16=1/10. All other bits are unused.
Comments:

Product Var Name iCD_GPSLch_32l
Is element of: GLA03 Main Record
Short Description: CD GPS 40 bit Latch Value 32 lsb
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: CD GPS 40 bit Latch Value 32 lsb
Comments:

Product Var Name: iCDfackLch_32l
Is element of: GLA03 Main Record
Short Description: CD Fire Acknowledge 40 bit Latch Value 32 lsb
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: CD Fire Acknowledge 40 bit Latch Value 32 lsb
Comments:

Product Var Name: iCDfcmdLch_32l
Is element of: GLA03 Main Record
Short Description: CD Fire Cmd 40 bit Latch Value 32 lsb
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: CD Fire Cmd 40 bit Latch Value 32 lsb
Comments:

Product Var Name: i_spare55_3
Is element of: GLA03 Main Record
Short Description: Spare 55_3
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Spare in telemetry
Comments:

Product Var Name iCDfcmdLch_8m
Is element of: GLA03 Main Record
Short Description: CD Fire Cmd 40 bit Latch Value 8 msb
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CD Fire Cmd 40 bit Latch Value 8 msb
Comments:

Product Var Name iCDfackLch_8m
Is element of: GLA03 Main Record
Short Description: CD Fire Acknowledge 40 bit Latch Value 8 msb
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CD Fire Acknowledge 40 bit Latch Value 8 msb
Comments:

Product Var Name iCD_GPSLch_8m
Is element of: GLA03 Main Record

Data Dictionary
Short Description: CD GPS 40 bit Latch Value 8 msb
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CD GPS 40 bit Latch Value 8 msb
Comments:

Product Var Name iCD_dataRdyCtr
Is element of: GLA03 Main Record
Short Description: CD Data Ready Counter
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 65280
Description: CD Data Ready Counter. Bits 8 - 15 are the CD FIRE ACKNOWLEDGE COUNTER.
Comments:

Product Var Name iCD_intsrc
Is element of: GLA03 Main Record
Short Description: CD Software Mode Flag
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description:
Comments:
Product Var Name iCD_PWaccum
Is element of: GLA03 Main Record
Short Description: CD PW Limit Violation Counter
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: counts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 2147483647
Description:
Comments:

Product Var Name iCD_PWLong
Is element of: GLA03 Main Record
Short Description: CD Long PW Violation Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 127
Description:
Comments:

Product Var Name iCD_PWshort
Is element of: GLA03 Main Record
Short Description: CD Short PW Violation Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 127
Description:
Comments:

Product Var Name: iCD_PWmsb
Is element of: GLA03 Main Record
Short Description: CD Short PW MSB
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 127
Description:

Comments:

Product Var Name: i_spare55_4
Is element of: GLA03 Main Record
Short Description: Spare 55_4
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Spare in telemetry
Comments:

Product Var Name: iDC_swFailct
Is element of: GLA03 Main Record
Short Description: DC Software Fail Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: Counts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description:
Comments:

Product Var Name iDC_shot_ct
Is element of: GLA03 Main Record
Short Description: DC Shot Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: DC Shot Count
Comments:

Product Var Name iDC_Xpos
Is element of: GLA03 Main Record
Short Description: DC X Position
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: DC X Position
Comments:

Product Var Name iDC_Ypos
Is element of: GLA03 Main Record
Short Description: DC Y Position
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: DC Y Position
Comments:

Product Var Name: iDC_LPApkt_ct
Is element of: GLA03 Main Record
Short Description: DC LPA Packets Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: DC LPA Packets Sent
Comments:

Product Var Name: iDC_tmode_rate
Is element of: GLA03 Main Record
Short Description: DC Test Mode Rate
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: DC Test Mode Rate
Comments:

Product Var Name: iDC_pkt_ct
Is element of: GLA03 Main Record
Short Description: DC Packets Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: DC Packets Sent
Comments:

Product Var Name iDC_byte_ct
Is element of: GLA03 Main Record
Short Description: DC Bytes Sent
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: DC Bytes Sent
Comments:

Product Var Name iDC_outbitrate
Is element of: GLA03 Main Record
Short Description: DC Output bit rate in BPS
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: DC Output bit rate in BPS
Comments:

Product Var Name iDC_IntReg
Is element of: GLA03 Main Record
Short Description: DC Interrupt register
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: DC Interrupt register
Comments:

Product Var Name iDC_CtlLchReg
Is element of: GLA03 Main Record
Short Description: DC Control latch register
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: DC Control latch register
Comments:

Product Var Name iDC_intMaskReg
Is element of: GLA03 Main Record
Short Description: DC Interrupt Mask Register
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: DC Interrupt Mask Register; indicates which interrupts are enabled/disabled. Bit 0 is the DC Interrupt 1; value of 0 = Disabled, 1 = Enabled. Bit 1 is the DC LPA Interrupt; value of 0 = Disabled, 1 = Enabled. Bit 2 is the DC Output FIFO Empty Interrupt; value of 0 = Disabled, 1 = Enabled. Bit 3 is the DC Output FIFO Full Interrupt; value of 0 = Disabled, 1 = Enabled. Bit 4 is the DC RAM Busy Interrupt; value of 0 = Disabled, 1 = Enabled. Bit 5 is the DC Interrupt 6; value of 0 = Disabled, 1 = Enabled. All other bits are unused.
Comments:
Product Var Name: iDC_FIFO_reg
Is element of: GLA03 Main Record
Short Description: DC fifo flags register
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: DC FIFO flags register. Bit 0 is the DC FIFO Fill flag; value of 0 = True, 1 = false. Bit 1 is the DC FIFO almost empty flag; value of 0 = True, 1 = false. Bit 2 is the DC FIFO almost full flag; value of 0 = True, 1 = false. Bit 3 is the DC FIFO empty flag; value of 0 = True, 1 = false. All other bits are unused.
Comments:

Product Var Name: IDC_LPAgainReg
Is element of: GLA03 Main Record
Short Description: DC LPA gain register
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: DC LPA gain register. Bits 0-2 are the LPA gain. Bit 3 is the LPA reset flag; value of 0 = In reset, 1 = not in reset.
Comments:

Product Var Name: iDC_LPACt_reg
Is element of: GLA03 Main Record
Short Description: DC LPA packet count register
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: DC LPA packet count register. Bits 0 - 13 are the LPA frame byte count. Bits 16 - 23 are the LPA packet (frame) count.
Comments:

Product Var Name iDC_spares
Is element of: GLA03 Main Record
Short Description: DC Spares
Product Data Type: i1b (8, 4)
Total Bytes: 32
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: DC Spares

Product Var Name iGPS10secIntCt
Is element of: GLA03 Main Record
Short Description: GP GPS 10 second Interrupt Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: GP GPS 10 second Interrupt Count
Comments:

Product Var Name iGPPosPktRcvCt
Is element of: GLA03 Main Record
Short Description: GP Number of Position Packets received
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: GP Number of Position Packets received
Comments:

Product Var Name iGP_HskPkt_ct
Is element of: GLA03 Main Record
Short Description: GP Number of Housekeeping packets sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: GP Number of Housekeeping packets sent
Comments:

Product Var Name iGP_AncPkt_ct
Is element of: GLA03 Main Record
Short Description: GP Number of Ancillary Packets sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: GP Number of Ancillary Packets sent
Comments:

Product Var Name iGPS40bitReqCt
Is element of: GLA03 Main Record
Short Description: GP GPS 10 sec Pulse 40-Bit Counter Requests sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: GP GPS 10 sec Pulse 40-Bit Counter Requests sent
Comments:

Product Var Name iGPS40bitRcvCt
Is element of: GLA03 Main Record
Short Description: GP GPS 10 sec Pulse 40-Bit Counter Packets Received
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: GP GPS 10 sec Pulse 40-Bit Counter Packets Received
Comments:

Product Var Name iGP_BadXYZ_cnt
Is element of: GLA03 Main Record
Short Description: GP Packets with bad X,Y,Z Position Data
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: -32768
Product Maximum: 32768
Description: GP Packets with bad X,Y,Z Position Data
Comments:

Product Var Name iGP_TolXYZ_cnt
Is element of: GLA03 Main Record
Short Description: GP Packets with X,Y,Z data below Tolerance
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: GP Packets with X,Y,Z Position Data Below Tolerance
Comments:

Product Var Name iGP_PktsSent
Is element of: GLA03 Main Record
Short Description: GP Number of Range Packets Sent
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: GP Number of Range Packets Sent
Comments:

Product Var Name iGP_spares
Is element of: GLA03 Main Record
Short Description: GP Spares
Product Data Type: i1b (22, 4)
Total Bytes: 88
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GP Spares

Product Var Name iP_C_swerrct
Is element of: GLA03 Main Record
Short Description: PC Software Error Count
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Software Error Count
Comments:

Product Var Name iPC_shot_ct
Is element of: GLA03 Main Record
Short Description: PC Shot Counter
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: Photon counter (PC) Shot Counter
Comments:

Product Var Name iPC_SciPkt_ct
Is element of: GLA03 Main Record
Short Description: PC SCIENCE MODE PACKETS SENT
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC SCIENCE MODE PACKETS SENT
Comments:
Product Var Name: iPC_EngPkt_ct
Is element of: GLA03 Main Record
Short Description: PC ENGINEERING MODE PACKETS SENT
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC ENGINEERING MODE PACKETS SENT
Comments:

Product Var Name: iPC_AncPkt_ct
Is element of: GLA03 Main Record
Short Description: PC ANCILLARY MODE PACKETS SENT
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC ANCILLARY MODE PACKETS SENT
Comments:

Product Var Name: iPC_RDlyRcv_ct
Is element of: GLA03 Main Record
Short Description: PC RANGE GATE DELAY PACKETS RECEIVED
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC RANGE GATE DELAY PACKETS RECEIVED
Comments:

Product Var Name iPC_SPCMDly
Is element of: GLA03 Main Record
Short Description: PC SPCM Gate Delay
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC SPCM Gate Delay
Comments:

Product Var Name iPC_BG1Dly
Is element of: GLA03 Main Record
Short Description: PC Background 1 Delay
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Background 1 Delay
Comments:

Product Var Name iPC_BG2Dly
Is element of: GLA03 Main Record
Short Description: PC Background 2 Delay
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Background 2 Delay
Comments:

Product Var Name iPC_RGateDly
Is element of: GLA03 Main Record
Short Description: PC Range Gate Delay
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Range Gate Delay
Comments:

Product Var Name iPC_HW_stat
Is element of: GLA03 Main Record
Short Description: PC Hardware Mode Status Word
Product Data Type: i4b (dictate)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: PC Hardware Mode Status Word. Bits 0-2 indicate the PC board hardware mode; a value of 1=Idle, 2=Engineering, 4=Science. Bits 12-13 indicate the PC interrupt source; a value of 1=Fire Command, 2=Fire Acknowledge. Bit 14 is the PC measurement source; a value of 0=Fire Command, 1=Fire Acknowledge. All other bits are unused.
Comments:

Product Var Name IPC_SPCM_st
Is element of: GLA03 Main Record
Short Description: PC SPCM STATUS
Product Data Type: i4b (4)
Total Bytes: 16
**Product Var Name:** iPC_DatRdyCtr  
**Is element of:** GLA03 Main Record  
**Short Description:** PC Data Ready Counter  
**Product Data Type:** i4b (4)  
**Total Bytes:** 16  
**Product Units:** n/a  
**Invalid Value/Flag:** i_APID_AvFlg  
**Is Correction Flag?:** NA  
**Is Unsigned?:** No  
**Product Minimum:** 0  
**Product Maximum:** 65535  
**Description:** PC Data Ready Counter. Bits 8 - 15 are the PC FIRE ACKNOWLEDGE COUNTER.  
**Comments:**

**Product Var Name:** iPCSPCMraw_1_4  
**Is element of:** GLA03 Main Record  
**Short Description:** PC SPCM 1 THROUGH 4 RAW COUNTS  
**Product Data Type:** i4b (4)  
**Total Bytes:** 16  
**Product Units:** counts  
**Invalid Value/Flag:** i_APID_AvFlg  
**Is Correction Flag?:** NA  
**Is Unsigned?:** No  
**Product Minimum:** 0  
**Product Maximum:** 2147483647  
**Description:** The raw counts for SPCM 1, 2, 3, 4. Bits 0-7 correspond to SPCM 1; bits 8 - 15 correspond to SPCM 2; bits 16 - 23 correspond to SPCM 3; bits 24 - 31 correspond to SPCM 4.  
**Comments:**

**Product Var Name:** iPCSPCMraw_5_8
Is element of: GLA03 Main Record
Short Description: PC SPCM 5 THROUGH 8 RAW COUNTS
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The raw counts for SPCM 5, 6, 7, 8. Bits 0-7 correspond to SPCM 5; bits 8 - 15 correspond to SPCM 6; bits 16 - 23 correspond to SPCM 7; bits 24 - 31 correspond to SPCM 8.
Comments:

Product Var Name iPCSPCM_DCycle
Is element of: GLA03 Main Record
Short Description: PC SPCM Duty Cycle
Product Data Type: i4b (4)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: PC SPCM Duty Cycle
Comments:

Product Var Name iPC_spare1
Is element of: GLA03 Main Record
Short Description: PC Spares
Product Data Type: i1b (2, 4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: PC spare

Product Var Name iC_BSCalXstart
Is element of: GLA03 Main Record
Short Description: PC Coarse Boresite Calibration X Start Pos
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Coarse Boresite Calibration X Start Pos
Comments:

Product Var Name iC_BSCalYstart
Is element of: GLA03 Main Record
Short Description: PC Coarse Boresite Calibration Y Start Pos
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Coarse Boresite Calibration Y Start Pos
Comments:

Product Var Name iF_BSCalXstart
Is element of: GLA03 Main Record
Short Description: PC Fine Boresite Calibration X Start Pos
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Fine Boresite Calibration X Start Pos
Comments:

Product Var Name iF_BSCalYstart
Is element of: GLA03 Main Record
Short Description: PC Fine Boresite Calibration Y Start Pos
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Fine Boresite Calibration Y Start Pos
Comments:

Product Var Name iC_BSCalXinc
Is element of: GLA03 Main Record
Short Description: PC Coarse Boresite Calibration X Increment
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Coarse Boresite Calibration X Increment
Comments:

Product Var Name iC_BSCalYinc
Is element of: GLA03 Main Record
Short Description: PC Coarse Boresite Calibration Y Increment
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Coarse Boresite Calibration Y Increment
Comments:

Product Var Name: iF_BSCalXinc
Is element of: GLA03 Main Record
Short Description: PC Fine Boresite Calibration X Increment
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Fine Boresite Calibration X Increment
Comments:

Product Var Name: iF_BSCalYinc
Is element of: GLA03 Main Record
Short Description: PC Fine Boresite Calibration Y Increment
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Fine Boresite Calibration Y Increment
Comments:

Product Var Name: iC_BSCalIntSec
Is element of: GLA03 Main Record
Short Description: PC Coarse Boresite Cal Integration Seconds
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: seconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Coarse Boresite Cal Integration Seconds
Comments:

Product Var Name iF_BSCallIntSec
Is element of: GLA03 Main Record
Short Description: PC Fine Boresite Cal Integration Seconds
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: seconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Fine Boresite Cal Integration Seconds
Comments:

Product Var Name i_BSCalXbest
Is element of: GLA03 Main Record
Short Description: PC Boresite Calibration Best X Position
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Boresite Calibration Best X Position
Comments:

Product Var Name i_BSCalYbest
Is element of: GLA03 Main Record
Short Description: PC Boresite Calibration Best Y Position
Product Data Type: i2b (4)
The GLAS Standard Data Products Specification - Data Dictionary

Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Boresite Calibration Best Y Position
Comments:

Product Var Name i_BSCal_remSec
Is element of: GLA03 Main Record
Short Description: PC Boresite Cal Seconds Remaining
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: seconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: PC Boresite Cal Seconds Remaining
Comments:

Product Var Name i_spare55_5
Is element of: GLA03 Main Record
Short Description: Spare 55_5
Product Data Type: i1b (10, 4)
Total Bytes: 40
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Spares in telemetry
Comments:

Product Var Name iCT_state
Is element of: GLA03 Main Record
Short Description: CT State Machine Current State
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6
Description: CT State Machine Current State
Comments:

Product Var Name iCTCmdEchoErrCt
Is element of: GLA03 Main Record
Short Description: CT COMMAND ECHO ERRORS
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT COMMAND ECHO ERRORS
Comments:

Product Var Name i_LMBCmdRcvCt
Is element of: GLA03 Main Record
Short Description: CT LM BOARD CMDS RECEIVED
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT LM BOARD CMDS RECEIVED
Comments:
Product Var Name i_TMBCmdRcvCt
Is element of: GLA03 Main Record
Short Description: CT TM BOARD CMDS RECEIVED
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT TM BOARD CMDS RECEIVED
Comments:

Product Var Name i_MCBCmdRcvCt
Is element of: GLA03 Main Record
Short Description: CT MC BOARD CMDS RECEIVED
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT MC BOARD CMDS RECEIVED
Comments:

Product Var Name i_HKBCmdRcvCt
Is element of: GLA03 Main Record
Short Description: CT HK BOARD CMDS RECEIVED
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT HK BOARD CMDS RECEIVED
Comments:

Product Var Name i_HVPSCmdRcvCt
Is element of: GLA03 Main Record
Short Description: CT HVPS Cmds Received
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT HVPS Cmds Received
Comments:

Product Var Name i_PDUCmdRcvCt
Is element of: GLA03 Main Record
Short Description: CT PDU Cmds Received
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT PDU Cmds Received
Comments:

Product Var Name i_HWtlm1Pkt_ct
Is element of: GLA03 Main Record
Short Description: CT HW TLM 1 PACKETS SENT
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT HW TLM 1 PACKETS SENT
Comments:

Product Var Name i_HWtlm2Pkt_ct
Is element of: GLA03 Main Record
Short Description: CT HW TLM 2 PACKETS SENT
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT HW TLM 2 PACKETS SENT
Comments:

Product Var Name i_HWtlm3Pkt_ct
Is element of: GLA03 Main Record
Short Description: CT HW TLM 3 PACKETS SENT
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT HW TLM 3 PACKETS SENT
Comments:

Product Var Name i_HWtlm4Pkt_ct
Is element of: GLA03 Main Record
Short Description: CT HW TLM 4 PACKETS SENT
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT HW TLM 4 PACKETS SENT
Comments:

Product Var Name: i_HWtlm5Pkt_ct
Is element of: GLA03 Main Record
Short Description: CT HW TLM 5 PACKETS SENT
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT HW TLM 5 PACKETS SENT
Comments:

Product Var Name: iCtdwellPkt_ct
Is element of: GLA03 Main Record
Short Description: CT DWELL PACKETS SENT
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT DWELL PACKETS SENT
Comments:

Product Var Name: iCT_AncPkt_ct
Is element of: GLA03 Main Record
Short Description: CT ANCILLARY PACKETS SENT
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT ANCILLARY PACKETS SENT
Comments:

Product Var Name iCT_timeout_ct
Is element of: GLA03 Main Record
Short Description: CT TIMEOUT COUNT
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT TIMEOUT COUNT
Comments:

Product Var Name iCT_int_ct
Is element of: GLA03 Main Record
Short Description: CT INTERRUPT COUNT
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT INTERRUPT COUNT
Comments:

Product Var Name iCT_ShotCtErr
Is element of: GLA03 Main Record
Short Description: CT Shot Counter Errors
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT Shot Counter Errors
Comments:

Product Var Name iCT_dwell_mode
Is element of: GLA03 Main Record
Short Description: CT Dwell Mode
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32
Description: CT Dwell Mode
Comments:

Product Var Name iCT_dwell_chnl
Is element of: GLA03 Main Record
Short Description: CT Dwell Channel
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT Dwell Channel
Comments:

Product Var Name iCTLMBmuxErrCt
Is element of: GLA03 Main Record
Short Description: CT Laser Monitor Board Mux Error Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT Laser Monitor Board Mux Error Counter
Comments:

Product Var Name iCTHBmuxErrCt
Is element of: GLA03 Main Record
Short Description: CT Housekeeping Board Mux Error Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT Housekeeping Board Mux Error Counter
Comments:

Product Var Name iCTHBsmsxErrCt
Is element of: GLA03 Main Record
Short Description: CT Housekeeping Board Submux Error Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT Housekeeping Board Submux Error Counter
Comments:
Product Var Name: iCTTCBmuxErrCt
Is element of: GLA03 Main Record
Short Description: CT Temperature Controller Board Mux Error Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT Temperature Controller Board Mux Error Counter
Comments:

Product Var Name: iCTMCBmuxErrCt
Is element of: GLA03 Main Record
Short Description: CT Mechanism Controller Board Mux Error Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT Mechanism Controller Board Mux Error Counter
Comments:

Product Var Name: iCTHVPSmuxErrCt
Is element of: GLA03 Main Record
Short Description: CT High Voltage Power Supply Mux Error Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT High Voltage Power Supply Mux Error Counter
Comments:

Product Var Name iCTPDUmuxErrCt
Is element of: GLA03 Main Record
Short Description: CT Power Distribution Unit Mux Error Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT Power Distribution Unit Mux Error Counter
Comments:

Product Var Name iCT_CEchoSucCt
Is element of: GLA03 Main Record
Short Description: CT Command Echo Success Count
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description: CT Command Echo Success Count
Comments:

Product Var Name iCT_SupErrflag
Is element of: GLA03 Main Record
Short Description: CT Suppressed Event Message Error Flags
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description:
Comments:

Product Var Name: iCT_LHP1tcstat
Is element of: GLA03 Main Record
Short Description: CT LHP1 Temperature Control State
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description:
Comments:

Product Var Name: iCT_LHP2tcstat
Is element of: GLA03 Main Record
Short Description: CT LHP2 Temperature Control State
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description:
Comments:

Product Var Name: iCT_LHP1tsp
Is element of: GLA03 Main Record
Short Description: CT LHP1 Temperature Setpoint
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description:
Comments:

Product Var Name: iCT_LHP2tsp
Is element of: GLA03 Main Record
Short Description: CT LHP2 Temperature Setpoint
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description:
Comments:

Product Var Name: iCT_LHP1tcctr
Is element of: GLA03 Main Record
Short Description: CT LHP1 Temperature Control Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description:
Comments:

Product Var Name: iCT_LHP2tcctr
Is element of: GLA03 Main Record
Short Description: CT LHP2 Temperature Control Counter
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description:
Comments:

Product Var Name: iCT_LHP1_Tmin
Is element of: GLA03 Main Record
Short Description: CT LHP1 Minimum Temperature
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description:
Comments:

Product Var Name: iCT_LHP2_Tmin
Is element of: GLA03 Main Record
Short Description: CT LHP2 Minimum Temperature
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description:
Comments:

Product Var Name: iCT_LHP1_Tdelta
Is element of: GLA03 Main Record
Short Description: CT LHP1 Temperature Change
Product Data Type: i1b (4)
**Total Bytes:** 4  
**Product Units:** n/a  
**Invalid Value/Flag:** No  
**Is Correction Flag?:** NA  
**Is Unsigned?:** Yes  
**Product Minimum:** 0  
**Product Maximum:** 128  
**Description:**  
**Comments:**

**Product Var Name:** iCT_LHP2_Tdelta  
**Is element of:** GLA03 Main Record  
**Short Description:** CT LHP2 Temperature Change  
**Product Data Type:** i1b (4)  
**Total Bytes:** 4  
**Product Units:** n/a  
**Invalid Value/Flag:** No  
**Is Correction Flag?:** NA  
**Is Unsigned?:** Yes  
**Product Minimum:** 0  
**Product Maximum:** 128  
**Description:**  
**Comments:**

**Product Var Name:** iCT_LHP1_Tcyct  
**Is element of:** GLA03 Main Record  
**Short Description:** CT LHP1 Temperature Control Cycle Time  
**Product Data Type:** i1b (4)  
**Total Bytes:** 4  
**Product Units:** n/a  
**Invalid Value/Flag:** No  
**Is Correction Flag?:** NA  
**Is Unsigned?:** Yes  
**Product Minimum:** 0  
**Product Maximum:** 128  
**Description:**  
**Comments:**

**Product Var Name:** iCT_LHP2_Tcyct  
**Is element of:** GLA03 Main Record
Short Description: CT LHP2 Temperature Control Cycle Time
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description:
Comments:

Product Var Name iCT_miscFlag
Is element of: GLA03 Main Record
Short Description: CT Misc Status Flags
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 128
Description:
Comments:

Product Var Name ICT_spares
Is element of: GLA03 Main Record
Short Description: CT Spares
Product Data Type: i1b (11, 4)
Total Bytes: 44
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: CT Spares
Product Var Name: i_phdr_ad
Is element of: GLA03 Main Record
Short Description: Primary Header APID 12 or 13
Product Data Type: i1b (6, 64)
Total Bytes: 384
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Primary Header APID 12 or 13
Comments:

Product Var Name: i_shdr_ad
Is element of: GLA03 Main Record
Short Description: Secondary Header 12 or 13 (time stamp)
Product Data Type: i1b (8, 64)
Total Bytes: 512
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Secondary Header 12 or 13 (time stamp)
Comments:

Product Var Name: i_phdr_15
Is element of: GLA03 Main Record
Short Description: Primary Header APID 15
Product Data Type: i1b (6, 16)
Total Bytes: 96
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Primary Header APID 15
Comments:

Product Var Name i_shdr_15
Is element of: GLA03 Main Record
Short Description: Secondary Header APID 15 (time stamp)
Product Data Type: i1b (8, 16)
Total Bytes: 128
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Secondary Header APID 15 (time stamp)
Comments:

Product Var Name i_phdr_17
Is element of: GLA03 Main Record
Short Description: Primary Header APID 17
Product Data Type: i1b (6, 16)
Total Bytes: 96
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Primary Header APID 17
Comments:

Product Var Name i_shdr_17
Is element of: GLA03 Main Record
Short Description: Secondary Header APID 17 (time stamp)
Product Data Type: i1b (8, 16)
Total Bytes: 128
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Secondary Header APID 17 (time stamp)
Comments:

Product Var Name: i_phdr_19
Is element of: GLA03 Main Record
Short Description: Primary Header APID 19
Product Data Type: i1b (6, 16)
Total Bytes: 96
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Primary Header APID 19
Comments:

Product Var Name: i_shdr_19
Is element of: GLA03 Main Record
Short Description: Secondary Header APID 19 (time stamp)
Product Data Type: i1b (8, 16)
Total Bytes: 128
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: Secondary Header APID 19 (time stamp)
Comments:

Product Var Name: i_sctr_19
Is element of: GLA03 Main Record
Short Description: Shot Counter APID 19
Product Data Type: i2b (16)
Total Bytes: 32
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: Shot Counter APID 19
Comments:

Product Var Name i_chin_flag
Is element of: GLA03 Main Record
Short Description: Check-In Flags, Mask 0x1F
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: null
Product Maximum: null
Description: The Check-in Flag indicates what telemetry tasks are represented in the current ancillary science packet: AD Task, Mask = 0x01; PC Task, Mask = 0x02; CD Task, Mask = 0x04; GP Task, Mask = 0x08; CT Task, Mask = 0x10; Bit value of 1=task tlm in ancillary pkt, 0=task tlm NOT in ancillary pkt. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_RMS_loc
Is element of: GLA03 Main Record
Short Description: RMS Noise Calculation Location
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: ns
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Location of RMS noise calculation: starting digitizer element number. RMS location start time. DSP tlm. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_sctrPDlyWF
Is element of: GLA03 Main Record
Short Description: Shot Counter for Post Delay WF
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Shot counter for the Post delay pulse waveform. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_dlaywf_start
Is element of: GLA03 Main Record
Short Description: Post Delay Pulse Waveform Start Address
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: ns
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Start address of the Post delay laser pulse waveform in nanosecond resolution relative to the first sample of the waveform. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_PDlyWf
Is element of: GLA03 Main Record
Short Description: Sampled Post Delay Pulse Waveform
Product Data Type: i1b (32, 16)
Total Bytes: 512
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Sampled post delay pulse waveform. Note: offset for this data is from the transmit pulse peak. Dimensioned to 32 by 16 because 32 samples occur once per second.
Comments:
Product Var Name: i_otswf_start
Is element of: GLA03 Main Record
Short Description: OTS Pulse Waveform Start Address
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: ns
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Start address of the following four Optical Test System (OTS) laser pulse waveforms in nanosecond resolution relative to the first sample of the waveform. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name: i_sctrOTSWf
Is element of: GLA03 Main Record
Short Description: Shot Counter for OTS WF
Product Data Type: i4b (4, 16)
Total Bytes: 256
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 65535
Description: Shot counters for the OTS pulse waveforms. Dimensioned to 4 by 16 because 4 OTS waveforms occur each second.
Comments:

Product Var Name: i_OTSPWf
Is element of: GLA03 Main Record
Short Description: Sampled OTS Pulse Waveform
Product Data Type: i1b (128, 16)
Total Bytes: 2048
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Sampled OTS pulse waveform. Note: offset for this data is from the laser fire. Dimensioned to 32 by 64 because 32 samples occur 4 times per second.

Comments:

Product Var Name: i_cTx_win_loc
Is element of: GLA03 Main Record
Short Description: Commanded Location of Transmit Pulse Search Window
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: ns
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name: i_cNumNoTxing
Is element of: GLA03 Main Record
Short Description: Commanded Number of No Threshold Crossings
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Number of no threshold crossing shots for error condition. Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name: i_spare19_1
Is element of: GLA03 Main Record
Short Description: Spare APID19 1
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare byte from telemetry packet. Dimensioned to 16 because occurs once per second.

Product Var Name i_cTxThresh
Is element of: GLA03 Main Record
Short Description: Commanded Transmit Pulse Threshold Value
Product Data Type: i2b (16)
Total Bytes: 32
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_cRwinSf
Is element of: GLA03 Main Record
Short Description: Commanded Range Window Weighting Scale Factors
Product Data Type: i4b (24, 16)
Total Bytes: 1536
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: Reflects commanded value. Dimensioned to 24 by 16 because 4 scale factors per each filter (6) occurs each second.
Comments:

Product Var Name i_cBgCoeff
Is element of: GLA03 Main Record
Short Description: Commanded Background Coefficients
Product Data Type: i4b (18, 16)
Total Bytes: 1152
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: Reflects commanded value. Background noise coefficients A1, A2, A3 for the 4ns, 8ns, 16ns, 32ns, 64ns, and 128ns filter. Dimensioned 3 by 6 by 16 because 3 coefficients occur for the filter per second.
Comments:

Product Var Name i_spare19_2
Is element of: GLA03 Main Record
Short Description: Spare APID19 2
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spare in the telemetry. Dimensioned to 16 because occurs once per second.

Product Var Name i_cEnAGC
Is element of: GLA03 Main Record
Short Description: Commanded Enable/Disable AGC
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Enable/Disable Auto Gain Calculation. Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:
Is element of: GLA03 Main Record
Short Description: Commanded Enable/Disable Use 4ns Filter for AGC
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Enable/Disable Use 4ns Filter for AGC. Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_cRetGn
Is element of: GLA03 Main Record
Short Description: Commanded Return Gain Value
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 200
Description: Return Gain Value. Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_cAGC_A
Is element of: GLA03 Main Record
Short Description: Commanded AGC A Parameter
Product Data Type: i4b (4, 16)
Total Bytes: 256
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: AGC A Parameters. Reflects commanded value. Dimensioned to 4 by 16 because 4 parameters occur per second.

Comments:

Product Var Name i_cAGC_B
Is element of: GLA03 Main Record
Short Description: Commanded AGC B Parameter
Product Data Type: i4b (4, 16)
Total Bytes: 256
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200

Description: AGC B Parameters. Reflects commanded value. Dimensioned to 4 by 16 because 4 parameters occur per second.

Comments:

Product Var Name i_cAGC_C
Is element of: GLA03 Main Record
Short Description: Commanded AGC C Parameter
Product Data Type: i4b (2, 16)
Total Bytes: 128
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200

Description: AGC C0 and C1 Parameters. Reflects commanded value. Dimensioned to 2 by 16 because 2 parameters occur per second.

Comments:

Product Var Name i_cAGC_Gmax
Is element of: GLA03 Main Record
Short Description: Commanded AGC Gmax Parameter
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 100
Description: AGC Gmax Parameter. Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_cAGC_Gmin
Is element of: GLA03 Main Record
Short Description: Commanded AGC Gmin Parameter
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 100
Description: AGC Gmin Parameter. Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_cAGC_Ginit
Is element of: GLA03 Main Record
Short Description: Commanded AGC Ginit Parameter
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 100
Description: AGC Ginit Parameter. Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_cAGC_Zmax
Is element of: GLA03 Main Record
Short Description: Commanded AGC Zmax Parameter
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: AGC Zmax Parameter. Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_cAGC_Zmin
Is element of: GLA03 Main Record
Short Description: Commanded AGC Zmin Parameter

Product Data Type: i4b (16)
Total Bytes: 64
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: AGC Zmin Parameter. Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_cAGC_Vref
Is element of: GLA03 Main Record
Short Description: Commanded AGC Vref Parameter

Product Data Type: i4b (16)
Total Bytes: 64
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: AGC Vref Parameter. Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:
Product Var Name i_cAGC_Vmin
Is element of: GLA03 Main Record
Short Description: Commanded AGC Vmin Parameter
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 200
Description: AGC Vmin Parameter. Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_cFiltCTol
Is element of: GLA03 Main Record
Short Description: Commanded Filter Coincidence Tolerance
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: Tolerance for coincidence of all filters. Reflects commanded value. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_cRwinDOff
Is element of: GLA03 Main Record
Short Description: Commanded Range Window Dump Offsets
Product Data Type: i4b (6, 16)
Total Bytes: 384
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 200
Description: Range Window Dump Offsets. Offsets applied to trailing edge of range pulse for the selection of the
1000 sample region to be downlinked. Each filter is given a separate offset. Index 0 => 4 nanosecond filter, Index
1 => 8 nanosecond filter, Index 2 => 16 nanosecond filter, Index 3 => 32 nanosecond filter, Index 4 => 64 nano-
second filter and Index 5 => 128 nanosecond filter. Reflects commanded value. Dimensioned to 6 by 16 because
offset occurs for each filter (6) per second.
Comments:

Product Var Name i_cRetFThr
Is element of: GLA03 Main Record
Short Description: Commanded Return Pulse Filter Threshold Values
Product Data Type: i1b (6, 16)
Total Bytes: 96
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 200
Description: Reflects commanded value. The return pulse threshold values for all filters. Dimensioned to 6 by 16
because occurs for each filter (6) per second.
Comments:

Product Var Name i_spare_tlm21
Is element of: GLA03 Main Record
Short Description: Spare 21
Product Data Type: i1b (2, 16)
Total Bytes: 32
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains
no meaningful information.
Comments:

Product Var Name i_cFIRCoeff
Is element of: GLA03 Main Record
Short Description: Commanded FIR Coefficients
Product Data Type: i1b (8, 16)
Total Bytes: 128
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 200
Description: FIR COEFFICIENTS ? aabb ccdd xxyy zzww; set of eight 8-bit coefficients used by the FIR Filter engine for all filtering conditions.  Aabb ccdd ? First set of coefficients.  Xxyy zzww? Second set of coefficients. Reflects commanded value. Dimensioned to 8 by 16 because 8 coefficients occur per second.
Comments:

Product Var Name i_FWminStDev
Is element of: GLA03 Main Record
Short Description: Filter Weight Minimum Standard Deviation
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Filter weight minimum standard deviation.
Comments:

Product Var Name i_FNzMinThr
Is element of: GLA03 Main Record
Short Description: Filter Noise Minimum Thresholds for each Filter
Product Data Type: i4b (6, 16)
Total Bytes: 384
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: Filter Noise Minimum Thresholds for each Filter (4ns, 8ns, 16 ns, 32 ns, 64 ns, 128ns).
Comments:

Product Var Name i_FRejMskLead
Is element of: GLA03 Main Record
Short Description: Filter reject mask for leading edge
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description:
Comments:

Product Var Name i_FRejMskTrail
Is element of: GLA03 Main Record
Short Description: Filter reject mask for trailing edge
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description:
Comments:

Product Var Name i_spare19_3
Is element of: GLA03 Main Record
Short Description: Spare APID19 3
Product Data Type: i1b (22, 16)
Total Bytes: 352
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spares in the telemetry. Dimensioned to 22 by 16 because 22 bytes occur per second.
<table>
<thead>
<tr>
<th>Product Var Name</th>
<th>Element of</th>
<th>Short Description</th>
<th>Product Data Type</th>
<th>Total Bytes</th>
<th>Product Units</th>
<th>Invalid Value/Flag</th>
<th>Is Correction Flag</th>
<th>Is Unsigned</th>
<th>Product Minimum</th>
<th>Product Maximum</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>i_shotctr_40</td>
<td>GLA03 Main Record</td>
<td>Shot Counter</td>
<td>i2b (40, 16)</td>
<td>1280</td>
<td>n/a</td>
<td>No</td>
<td>NA</td>
<td>Yes</td>
<td>1</td>
<td>200</td>
<td>Fire Acknowledge Time (from Freq and Time Bd). Freq &amp; Time Board Tlm, 40 bit counter, Dimensioned (5,40,16).</td>
</tr>
<tr>
<td>i_fack_time</td>
<td>GLA03 Main Record</td>
<td>Fire Acknowledge Time</td>
<td>i1b (200, 16)</td>
<td>3200</td>
<td>n/a</td>
<td>No</td>
<td>NA</td>
<td>Yes</td>
<td>0</td>
<td>128</td>
<td>Fire Acknowledge Time (from Freq and Time Bd). Freq &amp; Time Board Tlm, 40 bit counter, Dimensioned (5,40,16).</td>
</tr>
<tr>
<td>i_fcmd_time</td>
<td>GLA03 Main Record</td>
<td>Fire Command Time</td>
<td>i1b (200, 16)</td>
<td>3200</td>
<td>n/a</td>
<td>No</td>
<td>NA</td>
<td>Yes</td>
<td>0</td>
<td>128</td>
<td>Fire Acknowledge Time (from Freq and Time Bd). Freq &amp; Time Board Tlm, 40 bit counter, Dimensioned (5,40,16).</td>
</tr>
</tbody>
</table>
Description: Fire Command Time (from Freq and Time Bd). Freq & Time Board Tlm, 40 bit counter. Dimensioned (5,40,16).
Comments:

Product Var Name: i_calcSClat
Is element of: GLA03 Main Record
Short Description: Latitude
Product Data Type: i2b (16)
Total Bytes: 32
Product Units: Degrees
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -90
Product Maximum: 90
Description: S/C latitude calculated from s/c position data in degrees. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name: i_calcSClon
Is element of: GLA03 Main Record
Short Description: Longitude
Product Data Type: i2b (16)
Total Bytes: 32
Product Units: Degrees
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360
Description: S/C longitude calculated from s/c position data in degrees. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name: i_Hsat
Is element of: GLA03 Main Record
Short Description: Height (Hsat)
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 800000
Description: S/C geodetic altitude of s/c above earth's surface in kilometers. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_Rsat
Is element of: GLA03 Main Record
Short Description: Rsat
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 800000
Description: Distance from s/c to center of earth in kilometers. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_Rmin
Is element of: GLA03 Main Record
Short Description: Rmin
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 800000
Description: Range window start in kilometers. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_Rmax
Is element of: GLA03 Main Record
Short Description: Rmax
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 800000
Description: Range window stop in kilometers. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_Wmin
Is element of: GLA03 Main Record
Short Description: Wmin
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100000
Description: Minimum window size. Default is 2km. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_Wmax
Is element of: GLA03 Main Record
Short Description: Wmax
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 100000
Description: Maximum window size. Default is 11km. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_Hoffmin
Is element of: GLA03 Main Record
Short Description: Hoffmin (DEM uncertainty + bias)
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 10000
Description: Offset associated with the minimum height. Default is 1.125km. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_Hoffmax
Is element of: GLA03 Main Record
Short Description: Hoffmax (DEM uncertainty - bias)
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -2000
Product Maximum: 10000
Description: Offset associated with the maximum height. Default is negative 0.875km. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_Rbmin
Is element of: GLA03 Main Record
Short Description: Rbmin
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 10000
Description: Bias added to the minimum range for Altimeter Digitizer (in kilometers). Default is 0. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_Rbmax
Is element of: GLA03 Main Record
Short Description: Rbmax
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -2000
Product Maximum: 10000
Description: Bias added to the maximum range for Altimeter Digitizer (in kilometers). Default is 0. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_ObSurfType
Is element of: GLA03 Main Record
Short Description: Surface Type
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Surface type from telemetry data: 0=ocean & no ice; 1=land & no ice; 2=ocean & ice; 3=land & ice. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_PosDatFlg
Is element of: GLA03 Main Record
Short Description: Position data valid flag
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Set to zero(0) if no errors detected during position data processing, otherwise non-zero. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_SCPosPkt
Is element of: GLA03 Main Record
Short Description: Spacecraft Time and Position Packet
Product Data Type: i1b (40, 16)
Total Bytes: 640
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Spacecraft position and GPS Time command packet received over 1553 bus minus 8 byte CCSDS command header. Format is defined in spacecraft ICD.
Comments:

Product Var Name i_SCPosPktShot
Is element of: GLA03 Main Record
Short Description: Shot Count for 1553 Spacecraft Time and Position Packet
Product Data Type: i2b (16)
Total Bytes: 32
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Shot count captured by RT task when it receives spacecraft position and command packet. Only lower 8 bits valid
Comments:

Product Var Name i_SCPosPktGMET
Is element of: GLA03 Main Record
Short Description: GLAS MET for 1553 Spacecraft Time and Position Packet
Product Data Type: i1b (6, 16)
Total Bytes: 96
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: GLAS MET captured by RT task when it receives spacecraft position and command packet.
Comments:

Product Var Name i_DEMmin
Is element of: GLA03 Main Record
Short Description: DEM minimum byte
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: DEM minimum elevation byte used to calculate hmin. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_DEMmax
Is element of: GLA03 Main Record
Short Description: DEM maximum byte
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: DEM maximum elevation byte used to calculate hmax. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_RngDatSrc
Is element of: GLA03 Main Record
Short Description: Range data source
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 2
Description: Source of range data: 0=s/c time & pos pkt; 1=uplinked DEM bytes; 2=uplinked Rmin/Rmax. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_FTLatch
Is element of: GLA03 Main Record
Short Description: GPS 10 Sec Pulse 40 bit count value
Product Data Type: i1b (5, 16)
Total Bytes: 80
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Last 40-bit count value from frequency & time board. Corresponds to the last GPS 10 second pulse. Dimensioned to 16 because the latch time occurs once per second. 2 4-byte items because the latch value is 40 bits. The upper 24 bits are not used.
Comments:

Product Var Name i_GPSppsGMET
Is element of: GLA03 Main Record
Short Description: GLAS MET for GPS 0.1 Hz Pulse
Product Data Type: i1b (6, 16)
Total Bytes: 96
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: GLAS MET at time of last GPS 10 sec pulse (in VTCW format)
Comments:

Product Var Name i_spare19_4
Is element of: GLA03 Main Record
Short Description: Spare APID 19
Product Data Type: i1b (8, 16)
Total Bytes: 128
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spares in the telemetry. Dimensioned to 8 by 16 because 8 bytes occur per second.

Product Var Name i_et_cal_mode
Is element of: GLA03 Main Record
Short Description: Etalon Calibration - Current mode
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 3
Description: Current mode of Etalon calibration: OFF=0, Acquire=1, Tracking=2 or Invalid=3. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_ET_state
Is element of: GLA03 Main Record
Short Description: Etalon State
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4
Description: The state of the etalon: Init=0, Set Temp=1, Wait=2, Average=3. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_ETsettleTime
Is element of: GLA03 Main Record
Short Description: Etalon Temperature Settle Time
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: seconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Etalon Temperature Settle Time. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_ET_Flags
Is element of: GLA03 Main Record
Short Description: Etalon Flags
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Etalon Flags. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_et_onax_xmit
Is element of: GLA03 Main Record
Short Description: Etalon Averaged on-axis transmission
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Etalon Averaged on-axis transmission. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_et_offax_xmit
Is element of: GLA03 Main Record
Short Description: Etalon Averaged off-axis transition
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Etalon Averaged off-axis transmission. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_et_temperr
Is element of: GLA03 Main Record
Short Description: Etalon Temperature Error
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Etalon Temperature Error. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_et_trkfltout
Is element of: GLA03 Main Record
Short Description: Etalon Tracking Loop Filter output
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Etalon Tracking Loop Filter output. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_et_trkfltavg
Is element of: GLA03 Main Record
Short Description: Etalon Tracking Failure Average
Product Data Type: i4b (16)
Total Bytes: 64
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Etalon Tracking Failure Average. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_et_StartTemp
Is element of: GLA03 Main Record
Short Description: Start Temperature
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: celsius
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Start Temperature. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_et_StopTemp
Is element of: GLA03 Main Record
Short Description: Stop Temperature
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: celsius
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Stop Temperature. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_et_TempStep
Is element of: GLA03 Main Record
Short Description: Temperature Step
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: celsius
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Temperature Step. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_et_acqavg_tm
Is element of: GLA03 Main Record
Short Description: Etalon Averaging time for acquire command
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: seconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Etalon averaging time for acquire command. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_et_acqset_tm
Is element of: GLA03 Main Record
Short Description: Etalon Temperature settle time for acquire cmd
Product Data Type: i2b (16)
Total Bytes: 32
Product Units: seconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Etalon Temperature settle time for acquire cmd. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_et_update_ctr
Is element of: GLA03 Main Record
Short Description: Etalon averaging update counter
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: Etalon averaging update counter. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_et_spare
Is element of: GLA03 Main Record
Short Description: ET Spare
Product Data Type: i1b (16)
Total Bytes: 16
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA03 et spare.

Product Var Name i_DualPinA
Is element of: GLA03 Main Record
Short Description: Dual Pin A
Product Data Type: i1b (40, 16)
Total Bytes: 640
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: From Laser Monitor Board. Each corresponds to one of the 40 shots. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_DualPinB
Is element of: GLA03 Main Record
Short Description: Dual Pin B
Product Data Type: i1b (40, 16)
Total Bytes: 640
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: From Laser Monitor Board. Each corresponds to one of the 40 shots. Dimensioned to 16 because occurs once per second.
Comments:

Product Var Name i_532nrg
Is element of: GLA03 Main Record
Short Description: Etalon 532 Energy
Product Data Type: i1b (40, 16)
Total Bytes: 640
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 32768
Description: Etalon 532 Energy.
Comments:

Product Var Name: i_APID_AvFlg
Is element of: GLA03 Main Record
Short Description: Availability Flag
Product Data Type: i1b (8, 16)
Total Bytes: 128
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections. Please see the PDF flag description for more details.
Comments:

Product Var Name: i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href="flags/i_timecorflg.pdf">the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name: i_spare4
Is element of: GLA03 Main Record
Short Description: Spare 4
Product Data Type: i1b (78)
Total Bytes: 78
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index

Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name i.UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_dShotTime
Is element of: GLA01 Main Record, GLA04 LPA Main Record, GLA05 record, GLA06 record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Laser Shot Time Deltas (shots 2-40)
Product Data Type: i4b (39)
Total Bytes: 156
Product Units: microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1200000
Description: The time deltas of pulses 2 through 40 to i_UTCTime, the UTC time tag of the first pulse in the 1-second data frame. Adding the deltas to i_UTCTime will give the user the time of each individual shot in the frame.
Comments: To calculate the time for shots 2-40, add these deltas to the time of the first shot.

Product Var Name i_shot_cntr
Is element of: GLA04 LPA Main Record
Short Description: Shot Counter
Product Data Type: i2b (40)
Total Bytes: 80
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 200
Description: The forty Shot Counters corresponding to LPA Data. These match the corresponding waveform records on the GLA01 product.
Comments:

Product Var Name i_GPSLatch
Is element of: GLA04 LPA Main Record
Short Description: GPS Latch Time
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: null
Product Maximum: null
Description: The GPS time that was used to convert the frequency board time to J2000 for the lasers shot times in this record. The GPS time is normally updated approximately every 10 seconds; the previous latch time will repeat until a new one is received.
Comments:

Product Var Name i_boxX
Is element of: GLA04 LPA Main Record
Short Description: X Position of Box
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 79
Description: X Coordinate for the top left corner of the 20 by 20 LPA image data, 0 to 79. To map the LPA image into the LRS image the LPA image needs to be rotated 90 degrees clockwise. So the LPA rotated to LRS (column) upper left X corner is 79 minus i_boxY minus 19.
Comments:

Product Var Name i_boxY
Is element of: GLA04 LPA Main Record
Short Description: Y Position of Box
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 79
Description: Y Coordinate for the top left corner of the 20 by 20 LPA image data, 0 to 79. To map the LPA image into the LRS image the LPA image needs to be rotated 90 degrees clockwise. So the LPA rotated to LRS (row) upper left Y corner is i_boxX.
Comments:

Product Var Name i_PixInt
Is element of: GLA04 LPA Main Record
Short Description: LPA Data
Product Data Type: i1b (400, 40)
Total Bytes: 16000
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
IsUnsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: The forty per second images of the laser pulse. 20x20 box of LPA pixel intensity data. Row 1 column 1 to 20 first, then row 2 to 20. Row is Y and column is X. To map the LPA image into the LRS image the LPA image needs to be rotated 90 degrees clockwise.
Comments:

Product Var Name i_tx_wf
Is element of: GLA01 Main Record, GLA04 LPA Main Record
Short Description: Sampled Transmit Pulse Waveform
Product Data Type: i1b (48, 40)
Total Bytes: 1920
Product Units: counts
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
IsUnsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: Transmit Pulse; 48 bytes of raw data samples.
Comments:

Product Var Name i_time_txWfPk
Is element of: GLA01 Main Record, GLA04 LPA Main Record
Short Description: Transmit Pulse Peak Location
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: ns
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
IsUnsigned?: No
Product Minimum: 0
Product Maximum: 500000
Description: Address in digitizer counts of the Transmit Pulse Peak as measured from the start of Acquisition Memory, i.e. start of digitization. From APID12/13, Offset 68.
Comments: The range measurement starts from this time. To accurately time stamp the transmit pulse, it is necessary to add the delay to start of digitizer.

Product Var Name i_TxWfStart
Is element of: GLA01 Main Record, GLA04 LPA Main Record
Short Description: Starting Address of Transmit Pulse Sample
Product Data Type: i4b (40)
Total Bytes: 160
Product Units: ns
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 500000
Description: Starting Address in digitizer counts of the Transmit Pulse sample relative to the start of digitization. From APID12/13, Offset 76.
Comments:

Product Var Name i_txWfPk_Flag
Is element of: GLA01 Main Record, GLA04 LPA Main Record
Short Description: Transmit Waveform Peak Status Flag
Product Data Type: i1b (40)
Total Bytes: 40
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 8
Description: Transmit_Peak_Status. Status Word: Bit 0: If bit is set to 1 (true), then internal software failure. Bit 1: If bit is set to 1 (true), then peak is below threshold. Bit 2: If bit is set to 1 (true), peak was not found. Note: once set to true, Bit 2 is latched and is only cleared by a DSP board reset or by a ground command. From APID12/13, Offset 72.
Please see <a href='flags/i_txWfPk_Flag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_lpa_spare0
Is element of: GLA04 LPA Main Record
Short Description: LPA Spare 0
Product Data Type: i1b (120)
Total Bytes: 120
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_APIID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections.
Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href="flags/i_timecorflg.pdf">the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_lpa_spare1
Is element of: GLA04 LPA Main Record
Short Description: LPA Spare 1
Product Data Type: i1b (6)
Total Bytes: 6
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647

Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_samp_time
Is element of: GLA04 LRS Main Record
Short Description: Sample Time
Product Data Type: i4b (2, 10)
Total Bytes: 80
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647

Description: The 10 times of the LRS data as computed from the VTCW converted by using GPS if available and time offsets to the GLAS laser 10 hertz signal (every fourth fire cmd). The first item is the whole number of seconds since J2000; the second item is the fractional part in microseconds. (In UTC J2000 time).
Comments:

Product Var Name i_shot_time
Is element of: GLA04 LRS Main Record
Short Description: Shot time
Product Data Type: i4b (2, 10)
Total Bytes: 80
Product Units: seconds microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The time for each of the 10 laser shots based on alignment to GLA01 using GPS time if available. The first item is the whole number of seconds since J2000; the second item is the fractional part in microseconds. (In UTC J2000 time)
Comments:

Product Var Name: i_shot_ctr
Is element of: GLA04 LRS Main Record
Short Description: shot numbers
Product Data Type: i4b (10)
Total Bytes: 40
Product Units: counts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 1
Product Maximum: 200
Description: Shot numbers for the 10 laser fire commands associated with the LRS data.
Comments:

Product Var Name: i_lrs_vtcw
Is element of: GLA04 LRS Main Record
Short Description: LRS VTCW Time Tag
Product Data Type: i4b (2, 10)
Total Bytes: 80
Product Units: seconds, microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Raw VTCW counts converted to seconds.
Comments:

Product Var Name: i_lrs_timetag
Is element of: GLA04 LRS Main Record
Short Description: LRS Time Tag
Product Data Type: i4b (10)
Total Bytes: 40
Product Units: Microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1000000
Description: LRS SA-2 Time Tag, Sample 1-10. The time increment to GLAS 10 Hz pulse.
Comments:

Product Var Name i_lrs_msginc
Is element of: GLA04 LRS Main Record
Short Description: LRS Message Incomplete Flag
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: LRS SA-2 Message Incomplete Flag, Sample 1-10
Comments:

Product Var Name i_lrs_flag
Is element of: GLA04 LRS Main Record
Short Description: LRS Flag
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: LRS Flag Byte. Please see <a href='flags/i_lrs_flag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_lrs_TkrMode
Is element of: GLA04 LRS Main Record
Short Description: LRS Tracker Mode Status
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 7
Description: LRS SA-2 Tracker Mode Status, Sample 1-10
Comments:

Product Var Name i_lrs_tspare2
Is element of: GLA04 LRS Main Record
Short Description: LRS Spare 2
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: LRS SA-2 Spare 1, Sample 1-10

Product Var Name i_lrs_DiagStat
Is element of: GLA04 LRS Main Record
Short Description: LRS Diagnostic Sub-Mode Status
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: LRS SA-2 Diagnostic Sub-Mode Status, Sample 1-10
Comments:

Product Var Name i_lrs_LastPCmd
Is element of: GLA04 LRS Main Record
Short Description: LRS Last Processed Command ID
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: LRS SA-2 Last Processed Command ID, Sample 1-10
Comments:

Product Var Name i_lrs_RollCt
Is element of: GLA04 LRS Main Record
Short Description: LRS Time Tag Rollover Count
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: LRS SA-2 Time Tag Rollover Count, Samples 1-10
Comments:

Product Var Name i_lrs_tspare3
Is element of: GLA04 LRS Main Record
Short Description: LRS Spare 3
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: LRS SA-2 Spare 1, Sample 1-10

Product Var Name i_lrs_VTkrSt
Is element of: GLA04 LRS Main Record
Short Description: LRS Virtual Trackers State
Product Data Type: i1b (3, 10)
Total Bytes: 30
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: State of IST SA-8 Virtual Trackers 0-2 for Samples 1-10. For each tracker byte value indicates the state. Values are 0=Offline, 1=Standby, 2=Acq1, 3=Acq2, 4=RedAcq1, 5=RedAcq2, 6=Handoff1, 7=Handoff2, 8=Handoff3, 9=Handoff4, 10=Handoff5, 11=Track, 12=U12 bad, 13=U13 bad, 14=U14 bad, 15=AwaitAcq. Tracker 0 starts at byte 1.
Comments:

Product Var Name i_lrs_stat
Is element of: GLA04 LRS Main Record
Short Description: LRS SA-2 Status
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: IST SA-8 Bit Flags. Bit 7 = Fault Detection Summary (0/Clear 1/Set); Bit 6 = Cold Boot Indicator (0/Clear 1/Set); Bit 5 = Time Mark Received (0/Clear 1/ Set); Bit 4 = Software Reset Event (0/Clear 1/ Set); Bit 3 = Sync Mode (0/External 1/Internal); Bit 2 = Invalid Command (0/Clear 1/ Set); Bit 1 = TEC Enbl/Dsbl Status (0/Dsbl 1/Enbl); Bit 0 = Command Ignored Flag (0/Clear 1/ Set)
Comments:

Product Var Name i_lrs_TimeMark
Is element of: GLA04 LRS Main Record
Short Description: LRS Time Mark ID
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: LRS SA-2 Time Mark ID, Sample 1-10
Comments:

Product Var Name i_lrs_CamID
Is element of: GLA04 LRS Main Record
Short Description: LRS Camera ID
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: LRS SA-2 Camera ID, Sample 1-10
Comments:

Product Var Name i_lrs_swVID
Is element of: GLA04 LRS Main Record
Short Description: LRS Software Version ID
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: LRS SA-2 Software Version ID, Sample 1-10
Comments:

Product Var Name i_LPAC13_t1
Is element of: GLA03 Main Record, GLA04 LRS Main Record
Short Description: Laser Profiler Array (LPA) Temperature 1, Ch 13
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 4000
Description: Oscillator Board Temperature, Ch 13
Comments:

Product Var Name i_Vtstarvalid
Is element of: GLA04 LRS Main Record
Short Description: LRS Virtual Tracker Star Valid
Product Data Type: i1b (3, 10)
Total Bytes: 30
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1
Description: Star Valid Flag for LRS SA-2 Virtual Trackers 0 - 2, Samples 1-10
Comments:

Product Var Name i_lrs_tspare4
Is element of: GLA04 LRS Main Record
Short Description: LRS Spare 4
Product Data Type: i1b (30)
Total Bytes: 30
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: Spares 4,5,6 from LRS SA-2 trackers 0-2, samples 1-10.

Product Var Name i_VTEEnergy
Is element of: GLA04 LRS Main Record
Short Description: LRS Virtual Tracker Encircled Energy
Product Data Type: i2b (3, 10)
Total Bytes: 60
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Encircled Energy for LRS SA-2 Virtual Trackers 0 - 2, Samples 1-10
Comments:

Product Var Name: i_VTBgBias
Is element of: GLA04 LRS Main Record
Short Description: LRS Virtual Tracker Bckgrnd Bias
Product Data Type: i2b (3, 10)
Total Bytes: 60
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1023
Description: Backgrnd Bias for LRS SA-2 Virtual Trackers 0 - 2, Samples 1-10
Comments:

Product Var Name: i_VTCentR
Is element of: GLA04 LRS Main Record
Short Description: LRS Virtual Tracker Centroid Row
Product Data Type: i4b (3, 10)
Total Bytes: 120
Product Units: Arc-seconds*1.0d6
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1800000000
Description: Centroid Row from LRS SA-2 Virtual Trackers 0 - 2, Samples 1-10. Row is Y. The row (0 to 15) within the image data (i_T0_SA) is i_VTCentR minus i_lrs_RawRow.
Comments:

Product Var Name: i_VTCentC
Is element of: GLA04 LRS Main Record
Short Description: LRS Virtual Tracker Centroid Column
Product Data Type: i4b (3, 10)
Total Bytes: 120
Product Units: Arc-seconds*1.0d6
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1800000000
Description: Centroid Column from LRS SA-2 Virtual Trackers 0 - 2, Samples 1-10. Column is X. The column (0 to 15) within the image data (i_T0_SA) is i_VTCentC minus i_lrs_RawCol.
Comments:

Product Var Name i_lrsTimCofInt
Is element of: GLA04 LRS Main Record
Short Description: LRS Time to Center of Integration
Product Data Type: i4b (10)
Total Bytes: 40
Product Units: Microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 131070000
Description: LRS SA-29 Time to Center of Integration, Samples 1-10
Comments:

Product Var Name i_lrs_RawRow
Is element of: GLA04 LRS Main Record
Short Description: LRS Virtual Tracker Raw Row
Product Data Type: i2b (3, 10)
Total Bytes: 60
Product Units: pixels
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 495
Description: Raw row data from LRS SA-2 trackers 0-2, Samples 1-10. Raw Row (Y axis) is the upper left hand corner Y position of the LRS 16x16 image array (i_T0_SA).
Comments:
Product Var Name i_lrs_RawCol
Is element of: GLA04 LRS Main Record
Short Description: LRS Virtual Tracker Raw Column
Product Data Type: i2b (3, 10)
Total Bytes: 60
Product Units: pixels
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 495
Description: Raw column data from LRS SA-2 trackers 0-2, Samples 1-10. Raw column (X axis) is the upper left hand corner X position of the LRS 16x16 image array (i_T0_SA).
Comments:

Product Var Name i_lrs_TrkThr
Is element of: GLA04 LRS Main Record
Short Description: LRS Virtual Tracker Track Threshold
Product Data Type: i1b (3, 10)
Total Bytes: 30
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 2
Product Maximum: 255
Description: Threshold from LRS SA-2 trackers 0-2, Samples 1-10
Comments:

Product Var Name i_lrs_AcqThr
Is element of: GLA04 LRS Main Record
Short Description: LRS Acquisition Threshold
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 2
Product Maximum: 255
Description: LRS SA-2 Acquisition Threshold, Samples 1-10
Comments:

Product Var Name i_lrs_FOVEdge
Is element of: GLA04 LRS Main Record
Short Description: LRS FOV Entrance Edge
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 3
Description: LRS SA-2 FOV Entrance Edge, Samples 1-10

Comments:

Product Var Name iF1LTRSRSC26_t
Is element of: GLA03 Main Record, GLA04 LRS Main Record
Short Description: PRT, Face 1 LTR to SRS Temperature, Ch26
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT, Stellar Reference System (SRS) Temperature, Ch 26

Comments:

Product Var Name i_lrs_IntTime
Is element of: GLA04 LRS Main Record
Short Description: LRS Integration Time
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: milliseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 40
Description: LRS SA-2 Integration Time, Samples 1-10
Comments:

Product Var Name: i_lrs_FrmCtr
Is element of: GLA04 LRS Main Record
Short Description: LRS Frame Counter
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: LRS SA-2 Frame Counter, Samples 1-10
Comments:

Product Var Name: i_lrs_tspare7
Is element of: GLA04 LRS Main Record
Short Description: LRS Spare 7
Product Data Type: i1b (4, 10)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: LRS SA-2 Spare 7, Samples 1-10

Product Var Name: i_lrs_ccdtemp
Is element of: GLA04 LRS Main Record
Short Description: LRS SA-5 CCD Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius*100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Product Var Name i_lrslenscellt
Is element of: GLA04 LRS Main Record
Short Description: LRS SA-5 Lens Cell Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius*100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -27316
Product Maximum: 23880
Description: Counts to degree C value in deg C = Counts/128 -273.16  The 273 changes K to C degrees  Scale it by 100 on product output to keep .01 degrees
Comments:

Product Var Name i_trkr_subject
Is element of: GLA04 LRS Main Record
Short Description: Tracker Subject
Product Data Type: i1b
Total Bytes: 1
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 63
Description: Tells what the tracker is tracking:  0=> Star Data,  1=> Laser Data, 2=> Collimated Data. The one byte looks like | 0 0 | T 2 | T 1 | T 0 | where T0 = Tracker 0, T 1 is tracker 1 and T2 is tracker 2. The MSB will be set to 00.
Comments:

Product Var Name i_spare
Is element of: GLA04 LRS Main Record
Short Description: Spare
Product Data Type: i1b (3)
Total Bytes: 3
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: null
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: GLA04_LRS Spare.

Product Var Name i_T0_shot_no
Is element of: GLA04 LRS Main Record
Short Description: shot number
Product Data Type: i4b
Total Bytes: 4
Product Units: NA
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 200
Description: Shot number of the first frame.
Comments:

Product Var Name i_T0_frame
Is element of: GLA04 LRS Main Record
Short Description: T0 Frame number
Product Data Type: i2b (5)
Total Bytes: 10
Product Units: n/a
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: No
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: Two byte word describing the frame.
Comments:
Short Description: LRS SA Virtual Tracker 0 Data
Product Data Type: i2b (256, 5)
Total Bytes: 2560
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: null
Product Maximum: null
Description: The image will be a 16 X 16 pixel image. The first word (2byte) in the PRAP data contains the frame number. It has been set to the same value as the second pixel so that automatic scaling in plots can work. Order of the data is: row 1 column 1 to 16; row2 column 1 to 16; ....; row 16 column 1 to 16. Column is X and Row is Y.
Comments:

Product Var Name i_lrs_spare2
Is element of: GLA04 LRS Main Record
Short Description: LRS Spare2
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: NA
Invalid Value/Flag: N/A
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: NA
Product Maximum: NA
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_T1_shot_no
Is element of: GLA04 LRS Main Record
Short Description: shot number
Product Data Type: i4b
Total Bytes: 4
Product Units: counts
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 200
Description: Shot number of the first frame.
Comments:

Product Var Name i_T1_frame
Is element of: GLA04 LRS Main Record
Short Description: Tracker 1 Frame Number
Product Data Type: i2b (4)
Total Bytes: 8
Product Units: counts
Invalid Value/Flag: gi_invalid_i2b
Is Correction Flag?: No
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: Two byte word describing the frame
Comments:

Product Var Name i_T1_SA
Is element of: GLA04 LRS Main Record
Short Description: LRS SA Virtual Tracker 1 Data
Product Data Type: i2b (256, 4)
Total Bytes: 2048
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: null
Product Maximum: null
Description: The image will be a 16 X 16 pixel image. The first word (2byte) in the PRAP data contains the frame number. It has been set to the same value as the second pixel so no automatic scaling will take place.
Comments:

Product Var Name i_T2_shot_no
Is element of: GLA04 LRS Main Record
Short Description: shot numbers
Product Data Type: i4b
Total Bytes: 4
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: null
Product Maximum: null
Product Var Name i_T2_frame
Is element of: GLA04 LRS Main Record
Short Description: Tracker2 Frame Number
Product Data Type: i2b
Total Bytes: 2
Product Units: counts
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: No
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: Two byte word describing the frame
Comments:

Product Var Name i_T2_SA
Is element of: GLA04 LRS Main Record
Short Description: LRS SA Virtual Tracker 2 Data
Product Data Type: i2b (256)
Total Bytes: 512
Product Units: null
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: null
Product Maximum: null
Description: The image will be a 16 X 16 pixel image. The first word(2byte) in the PRAP data contains the frame number. It has been set to the same value as the second pixel so no automatic scaling will take place.
Comments:

Product Var Name i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections.
Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href='flags/i_timecorflg.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name iF2LTRSRSC27_t
Is element of: GLA03 Main Record, GLA04 LRS Main Record
Short Description: PRT, Face 2 LTR to SRS Temperature, Ch27
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: PRT, Lidar Detector Pkg? Temperature, Ch 27
Comments:
Product Var Name i_TsPMir_t
Is element of: GLA03 Main Record, GLA04 LRS Main Record
Short Description: Telescope Region 0 Primary Mirror Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 3000
Description: Telescope Region 0 Primary Mirror
Comments:

Product Var Name i_TsSMir_t
Is element of: GLA03 Main Record, GLA04 LRS Main Record
Short Description: Telescope Region 1 Secondary Mirror Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1000
Product Maximum: 3000
Description: Telescope Region 1 Secondary Mirror
Comments:

Product Var Name i_srs_ff_optio_t
Is element of: GLA03 Main Record, GLA04 LRS Main Record
Short Description: SRS First Fold Optics Temperature
Product Data Type: i2b
Total Bytes: 2
Product Units: Celsius X 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 5000
Description: SRS First Fold Optics Temperature
Comments:

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.
Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_samp_time
Is element of: GLA04 GYRO Main Record
Short Description: Sample Time
Product Data Type: i4b (2, 10)
Total Bytes: 80
Product Units: seconds, microseconds
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: The 10 times associated with the gyro data samples in the packet. Time in UTC seconds computed from corresponding VTCW converted by using GPS if available. The first item is the whole number of seconds since J2000; the second item is the fractional part in microseconds. (In UTC J2000 time)
Comments:

Product Var Name i_siru_vtcw
Is element of: GLA04 GYRO Main Record
Short Description: SIRU VTCW
Product Data Type: i4b (2, 10)
Total Bytes: 80
Product Units: seconds, microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Raw VTCW counts converted to seconds.
Comments:

Product Var Name i_siru_valdata
Is element of: GLA04 GYRO Main Record
Short Description: SIRU Data Valid Word
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: The SIRU Data Valid Word is composed of bit flags: Mode Valid (1/Valid, 0/Invalid); Gyro Scale Factor (1/High, 0/Low); Gyro A Angle Valid (1/Valid, 0/Invalid); Gyro B Angle Valid (1/Valid, 0/Invalid); Gyro C Angle Valid (1/Valid, 0/Invalid); Gyro D Angle Valid (1/Valid, 0/Invalid); Spare 1 (4 bits unused); Gyro A Rate Saturation (1/Saturated, 0/Normal); Gyro B Rate Saturation (1/Saturated, 0/Normal); Gyro C Rate Saturation (1/Saturated, 0/Normal); Gyro D Rate Saturation (1/Saturated, 0/Normal); Heater Power Status (1/Off or Error, 0/Normal); Spare 2 (1 bit unused). One flag word per sample; 10 samples per second.
Please see <a href='flags/i_siru_valdata.pdf'>the PDF flag description in the next section</a> for more details.

Comments:

Product Var Name i_siru_AIA
Is element of: GLA04 GYRO Main Record
Short Description: SIRU Gyro A Integrated Angle
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: Arc-Seconds*20
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 3600
Description: 10 samples per second.
Comments:

Product Var Name i_siru_BIA
Is element of: GLA04 GYRO Main Record
Short Description: SIRU Gyro B Integrated Angle
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: Arc-Seconds*20
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 3600
Description: 10 samples per second.
Comments:

Product Var Name i_siru_CIA
Is element of: GLA04 GYRO Main Record
Short Description: SIRU Gyro C Integrated Angle
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: Arc-Seconds*20
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 3600
Description: 10 samples per second.
Comments:

Product Var Name i_siru_DIA
Is element of: GLA04 GYRO Main Record
Short Description: SIRU Gyro D Integrated Angle
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: Arc-Seconds*20
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 3600
Description: 10 samples per second.
Comments:

Product Var Name i_siru_ttag
Is element of: GLA04 GYRO Main Record
Short Description: SIRU Time Tag (free-run bin clock)
Product Data Type: i4b (10)
Total Bytes: 40
Product Units: Microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4194240
Description: 10 samples per second.
Comments:

Product Var Name i_siru_config
Is element of: GLA04 GYRO Main Record
Short Description: SIRU Configuration Word, Sample 1
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: n/a
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535

Description: The SIRU Configuration Word is composed of bit flags: Gyro A Status (1/Active, 0/Inactive); Gyro B Status (1/Active, 0/Inactive); Gyro C Status (1/Active, 0/Inactive); Gyro D Status (1/Active, 0/Inactive); CPU/HCM Channel 1 Status (1/Active, 0/Inactive); CPU/HCM Channel 2 Status (1/Active, 0/Inactive); Power Supply 1 Status (1/Active, 0/Inactive); Power Supply 2 Status (1/Active, 0/Inactive); Reserved (4 bits); Spare 3 (4 bits unused). One flag word per sample; 10 samples per second.

Please see the PDF flag description in the next section for more details.

Comments:

Product Var Name: i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127

Description: Flag indicating which packets (APIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections.

Please see the PDF flag description in the next section for more details.

Comments:

Product Var Name: i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href='flags/i_timecorflg.pdf'>the PDF flag description in the next section</a> for more details.

Comments:

Product Var Name: i_gyro_spare1
Is element of: GLA04 GYRO Main Record
Short Description: Gyro Spare1
Product Data Type: i1b (6)
Total Bytes: 6
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:

Product Var Name: i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.

Comments:

Product Var Name: i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647

Description: The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.

Comments: This is not the ground bounce time, but the transmit time.

Product Var Name i_samp_time
Is element of: GLA04 IST Main Record
Short Description: Sample Time
Product Data Type: i4b (2, 10)
Total Bytes: 80
Product Units: seconds, microseconds
Invalid Value/Flag: gi_invalid_i4b
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647

Description: The 10 times of the IST data as computed from the VTCW converted by using GPS if available and time offsets to the GLAS laser 10 hertz signal (every fourth fire cmd). The first item is the whole number of seconds since J2000; the second item is the fractional part in microseconds. (In UTC J2000 time).

Comments:

Product Var Name i_shot_time
Is element of: GLA04 IST Main Record
Short Description: Shot times
Product Data Type: i4b (2, 10)
Total Bytes: 80
Product Units: seconds microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: null
Product Maximum: null
Description: The time for each of the 10 laser shots based on alignment with GLA01 using the GPS time if available. The first item is the whole number of seconds since J2000; the second item is the fractional part in microseconds. (In UTC J2000 time)

Comments:

Product Var Name: i_shot_ctr
Is element of: GLA04 IST Main Record
Short Description: shot numbers
Product Data Type: i4b (10)
Total Bytes: 40
Product Units: counts
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: null
Product Maximum: null
Description: Shot numbers for the 10 laser fire commands associated with the IST data.
Comments:

Product Var Name: i_ist_vtcw
Is element of: GLA04 IST Main Record
Short Description: IST VTCW Time Tag
Product Data Type: i4b (2, 10)
Total Bytes: 80
Product Units: seconds microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Raw VTCW counts converted to seconds.
Comments:

Product Var Name: i_ist_timetag
Is element of: GLA04 IST Main Record
Short Description: IST Time Tag
Product Data Type: i4b (10)
Total Bytes: 40
Product Units: Microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: IST SA-8 Time Tag, Sample 1-10. The time increment to GLAS 10 Hz pulse.
Comments:

Product Var Name i_ist_msginc
Is element of: GLA04 IST Main Record
Short Description: IST Message Incomplete Flag
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: IST SA-8 Message Incomplete Flag, Sample 1-10
Comments:

Product Var Name i_ist_RollCt
Is element of: GLA04 IST Main Record
Short Description: IST Time Tag Rollover Count
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 15
Description: IST SA-8 Time Tag Rollover Count, Sample 1-10
Comments:

Product Var Name i_ist_TkrMode
Is element of: GLA04 IST Main Record
Short Description: IST Tracker Mode Status
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 7

Description: IST SA-8 Tracker Mode Status, Sample 1-10
Comments:

Product Var Name i_ist_tspare1
Is element of: GLA04 IST Main Record
Short Description: IST Spare 1
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments: IST SA-8 Spare 1, Sample 1-10

Product Var Name i_ist_DiagStat
Is element of: GLA04 IST Main Record
Short Description: IST Diagnostic Sub-Mode Status
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: IST SA-8 Diagnostic Sub-Mode Status, Sample 1-10
Comments:

Product Var Name i_ist_LastPCmd
Is element of: GLA04 IST Main Record
Short Description: IST Last Processed Command ID
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: IST SA-8 Last Processed Command ID, Sample 1-10
Comments:

Product Var Name i_ist_VTkrSt
Is element of: GLA04 IST Main Record
Short Description: IST Virtual Trackers State
Product Data Type: i1b (6, 10)
Total Bytes: 60
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: State of IST SA-8 Virtual Trackers 0-5 for Samples 1-10. For each tracker byte value indicates the state. Values are 0=Offline, 1=Standby, 2=Acq1, 3=Acq2, 4=RedAcq1, 5=RedAcq2, 6=Handoff1, 7=Handoff2, 8=Handoff3, 9=Handoff4, 10=Handoff5, 11=Track, 12=U12 bad, 13=U13 bad, 14=U14 bad, 15=AwaitAcq. Tracker 0 starts at byte 1.
Comments:

Product Var Name i_ist_stat
Is element of: GLA04 IST Main Record
Short Description: IST SA-8 Status
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: IST SA-8 Bit Flags. Bit 7 = Fault Detection Summary (0/Clear 1/Set); Bit 6 = Cold Boot Indicator (0/Clear 1/Set); Bit 5 = Time Mark Received (0/Clear 1/Set); Bit 4 = Software Reset Event (0/Clear 1/Set); Bit 3 =
Bright Object Event (0/External  1/Internal); Bit 2 = Invalid Command (0/Clear  1/Set); Bit 1 = TEC Enbl/Dsbl Status (0/Dsbl  1/Enbl); Bit 0 = Command Ignored Flag (0/Clear  1/Set)
Comments:

Product Var Name i_ist_TimeMark
Is element of: GLA04 IST Main Record
Short Description: IST Time Mark ID
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: IST SA-8 Time Mark ID, Sample 1-10
Comments:

Product Var Name i_ist_CamID
Is element of: GLA04 IST Main Record
Short Description: IST Camera ID
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: IST SA-8 Camera ID, Sample 1-10
Comments:

Product Var Name i_ist_swVID
Is element of: GLA04 IST Main Record
Short Description: IST Software Version ID
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: IST SA-8 Software Version ID, Sample 1-10
Comments:

Product Var Name i_ist_flag
Is element of: GLA04 IST Main Record
Short Description: IST Flag
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 255
Description: IST Flag Byte. Please see <a href='flags/i_ist_flag.pdf'> the PDF flag description in the next section for more details.
Comments:

Product Var Name i_ist_spare1
Is element of: GLA04 IST Main Record
Short Description: IST Spare1
Product Data Type: i1b (2)
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_Vtstarvalid
Is element of: GLA04 IST Main Record
Short Description: IST Virtual Tracker Star Valid
Product Data Type: i1b (6, 10)
Total Bytes: 60
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: Star Valid Flag for IST SA-8 Virtual Trackers 0 - 5, Samples 1-10
Comments:

Product Var Name i_VTEEnergy
Is element of: GLA04 IST Main Record
Short Description: IST Virtual Tracker Encircled Energy
Product Data Type: i2b (6, 10)
Total Bytes: 120
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32678
Description: Encircled Energy for IST SA-8 Virtual Trackers 0 - 5, Samples 1-10
Comments:

Product Var Name i_VTBgBias
Is element of: GLA04 IST Main Record
Short Description: IST Virtual Tracker Bckgrnd Bias
Product Data Type: i2b (6, 10)
Total Bytes: 120
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 1024
Description: Backgrnd Bias for IST SA-8 Virtual Trackers 0 - 5, Samples 1-10
Comments:

Product Var Name i_VTStarMag
Is element of: GLA04 IST Main Record
Short Description: IST Virtual Tracker Star Magnitude
Product Data Type: i2b (6, 10)
Total Bytes: 120
Product Units: star magnitude*10
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 63
Description: Star Magnitude from IST SA-8 Virtual Trackers 0 - 5, Samples 1-10
Comments:

Product Var Name i_VTBoreH
Is element of: GLA04 IST Main Record
Short Description: IST Virtual Tracker Boresight H
Product Data Type: i4b (6, 10)
Total Bytes: 240
Product Units: Arc-seconds*100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1700000
Product Maximum: 1700000
Description: Boresight H from IST SA-8 Virtual Trackers 0 - 5, Samples 1-10
Comments:

Product Var Name i_VTBoreV
Is element of: GLA04 IST Main Record
Short Description: IST Virtual Tracker Boresight V
Product Data Type: i4b (6, 10)
Total Bytes: 240
Product Units: Arc-seconds*100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1700000
Product Maximum: 1700000
Description: Boresight V from IST SA-8 Virtual Trackers 0 - 5, Samples 1-10
Comments:

Product Var Name i_ist_FocLngth
Is element of: GLA04 IST Main Record
Short Description: IST Effective Focal Length
Product Data Type: i4b (10)
Total Bytes: 40
Product Units: Microns * 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 6535500
Description: IST SA-8 Effective Focal Length, Samples 1-10
Comments:

Product Var Name i_istTimCofInt
Is element of: GLA04 IST Main Record
Short Description: IST Time to Center of Integration
Product Data Type: i4b (10)
Total Bytes: 40
Product Units: Microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 131070000
Description: IST SA-29 Time to Center of Integration, Samples 1-10
Comments:

Product Var Name i_ist_BoreCol
Is element of: GLA04 IST Main Record
Short Description: IST Boresight Column
Product Data Type: i4b (10)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 390000
Description: IST SA-29 Boresight Column, Samples 1-10
Comments:
Product Var Name: i_ist_BoreRow
Is element of: GLA04 IST Main Record
Short Description: IST Boresight Row
Product Data Type: i4b (10)
Total Bytes: 40
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 390000
Description: IST SA-29 Boresight Row, Samples 1-10
Comments:

Product Var Name: i_ist_CCDTemp
Is element of: GLA04 IST Main Record
Short Description: IST CCD Temperature
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: Celsius*100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -27316
Product Maximum: 23880
Description: IST SA-29 CCD Temperature, Samples 1-10
Comments:

Product Var Name: i_istLensCellT
Is element of: GLA04 IST Main Record
Short Description: IST Lens Cell Temperature
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: Celsius*100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -27316
Product Maximum: 23880
Description: IST SA-29 Lens Cell Temperature, Samples 1-10
Comments:
Comments:

Product Var Name i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections. Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href="flags/i_timecorflg.pdf">the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_ist_spare2
Is element of: GLA04 IST Main Record
Short Description: IST Spare2
Product Data Type: i1b (6)
Total Bytes: 6
Product Var Name: i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Unique index that relates this record to the corresponding record(s) in each GLAS data product.
Comments:

Product Var Name: i_UTCTime
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: Transmit Time of First Shot in frame in J2000
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
**Description:** The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.

**Comments:** This is not the ground bounce time, but the transmit time.

**Product Var Name:** i_bst1_samp_time  
**Is element of:** GLA04 BST Main Record  
**Short Description:** BST1 Sample Time  
**Product Data Type:** i4b (2, 10)  
**Total Bytes:** 80  
**Product Units:** seconds, microseconds  
**Invalid Value/Flag:** No  
**Is Correction Flag?:** NA  
**Is Unsigned?:** No  
**Product Minimum:** 0  
**Product Maximum:** 2147483647

**Description:** The time of the ten BST1 data. This time is computed using the VTCW counts and converted to seconds using GPS if available.

**Comments:**

**Product Var Name:** i_bst1_vtcw  
**Is element of:** GLA04 BST Main Record  
**Short Description:** BST1 VTCW Time Tag  
**Product Data Type:** i4b (2, 10)  
**Total Bytes:** 80  
**Product Units:** Microseconds  
**Invalid Value/Flag:** i_APID_AvFlg  
**Is Correction Flag?:** NA  
**Is Unsigned?:** No  
**Product Minimum:** 0  
**Product Maximum:** null

**Description:** BST1 VTCW counts converted to seconds.

**Comments:**

**Product Var Name:** i_bst1_pchstat  
**Is element of:** GLA04 BST Main Record  
**Short Description:** BST1 Patch Execution Status  
**Product Data Type:** i2b (10)  
**Total Bytes:** 20  
**Product Units:** N/A  
**Invalid Value/Flag:** i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 0
Description: 0 = No patches. 10 samples per second.
Comments:

Product Var Name i_bst1_datlat
Is element of: GLA04 BST Main Record
Short Description: BST1 Data Latency
Product Data Type: i4b (10)
Total Bytes: 40
Product Units: Microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4194240
Description: 10 samples per second.
Comments:

Product Var Name i_bst1_sw1
Is element of: GLA04 BST Main Record
Short Description: BST1 Status Word 1
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: BST1 Status Word 1 is composed of bit flags: Position Uncalibrated (0/CalEnbl, 1/CalDsbl); Intensity Uncalibrated (0/CalEnbl, 1/CalDsbl); BITE Star On (0/NoBITE, 1/BITEOn); Background High (0/OK, 1/High); RAM Fail (0/OK, 1/Error); ROM Fail (0/OK, 1/Error); Star 5 Invalid (0/OK, 1/Invalid); Star 4 Invalid (0/OK, 1/Invalid); Star 3 Invalid (0/OK, 1/Invalid); Star 2 Invalid (0/OK, 1/Invalid); Star 1 Invalid (0/OK, 1/Invalid); Star 5 Track (0/NoTrack, 1/Track); Star 4 Track (0/NoTrack, 1/Track); Star 3 Track (0/NoTrack, 1/Track); Star 2 Track (0/NoTrack, 1/Track); Star 1 Track (0/NoTrack, 1/Track). One status word per sample; 10 samples per second. Please see <a href='flags/i_bst_sw1.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_bst1_sw2
Is element of: GLA04 BST Main Record
Short Description: BST1 Status Word 2
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: BST1 Status Word 2 is composed of bit flags: Star 5 Directed Search (0/NoSrch, 1/Search); Star 4 Directed Search (0/NoSrch, 1/Search); Star 3 Directed Search (0/NoSrch, 1/Search); Star 2 Directed Search (0/NoSrch, 1/Search); Star 1 Directed Search (0/NoSrch, 1/Search); Full Field Search (0/NoSrch, 1/Search); Calibration Override (0/NoOverride, 1/Override); Unsync (0/OK, 1/Unsync); Download (0/NoDnld, 1/Dnld); Stack Error (0/OK, 1/Error); Smoothed Raw Data (0/NoSmooth, 1/Smoothed); Watchdog Timeout (0/OK, 1/Timeout); Data Error (0/OK, 1/Error); Data Upset (0/OK, 1/Upset); RAM Execution (0/ROM, 1/RAM); Reset (0/Clear, 1/Reset). One status word per sample; 10 samples per second. Please see <a href='flags/i_bst_sw2.pdf'> the PDF flag description in the next section for more details.

Comments:

Product Var Name i_bst1_mctr
Is element of: GLA04 BST Main Record
Short Description: BST1 Message Counter
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: 10 samples per second.
Comments:

Product Var Name i_bst1_reccr
Is element of: GLA04 BST Main Record
Short Description: BST1 Command Received Counter
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: 10 samples per second.
Comments:

Product Var Name i_bst1_rejctr
Is element of: GLA04 BST Main Record
Short Description: BST1 Command Rejected Counter
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: 10 samples per second
Comments:

Product Var Name i_bst1_starX
Is element of: GLA04 BST Main Record
Short Description: BST1 Star Position X
Product Data Type: i4b (5, 10)
Total Bytes: 200
Product Units: Arc-SecondsX100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000
Description: Position X of 5 stars at 10 samples per second.
Comments:

Product Var Name i_bst1_starY
Is element of: GLA04 BST Main Record
Short Description: BST1 Star Position Y
Product Data Type: i4b (5, 10)
Total Bytes: 200
Product Units: Arc-SecondsX100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000
Description: Position Y of 5 stars at 10 samples per second.
Comments:

Product Var Name i_bst1_starInt
Is element of: GLA04 BST Main Record
Short Description: BST1 Star Intensity
Product Data Type: i4b (5, 10)
Total Bytes: 200
Product Units: Magnitude*100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -250000
Product Maximum: 250000
Description: Intensity of 5 stars at 10 samples per second.
Comments:

Product Var Name i_bst1_ccdtemp
Is element of: GLA04 BST Main Record
Short Description: BST1 CCD Temperature
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: Celsius* 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -32677
Product Maximum: 32678
Description: 10 samples per second.
Comments:

Product Var Name i_bst1_bptemp
Is element of: GLA04 BST Main Record
Short Description: BST1 Baseplate Temperature
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: Celsius * 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -32677
Product Maximum: 32678
Description: 10 samples per second.
Comments:

Product Var Name: i_bst1_lenstmp
Is element of: GLA04 BST Main Record
Short Description: BST1 Lens Temperature
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: Celsius * 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -32677
Product Maximum: 32678
Description: 10 samples per second.
Comments:

Product Var Name: i_bst1_8V
Is element of: GLA04 BST Main Record
Short Description: BST1 +8 Volt Supply
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: Volt * 10
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: 10 samples per second.
Comments:

Product Var Name: i_bst1_n9V
Is element of: GLA04 BST Main Record
Short Description: BST1 -9 Volt Supply
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: Volt * 10
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: 10 samples per second.
Comments:

Product Var Name i_bst1_4V
Is element of: GLA04 BST Main Record
Short Description: BST1 +4 Volt Supply
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: Volt * 10
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: 10 samples per second.
Comments:

Product Var Name i_bst1_n5V
Is element of: GLA04 BST Main Record
Short Description: BST1 -5 Volt Supply
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: Volt * 10
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: 10 samples per second.
Comments:

Product Var Name i_bst1_BG
Is element of: GLA04 BST Main Record
Short Description: BST1 Background Reading
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -32767
Product Maximum: 32767
Description: 10 samples per second.
Comments: From Paul Woznick: The background count should be treated as signed. A negative count means that the tracker has been light saturated for a longer period of time and because the reference voltage is dynamic, can result in a negative output.

Product Var Name i_bst1_srchct
Is element of: GLA04 BST Main Record
Short Description: BST1 Full Field Search Count
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: 10 samples per second.
Comments:

Product Var Name i_bst1_Fact
Is element of: GLA04 BST Main Record
Short Description: BST1 False Alarms Count
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: 10 samples per second.
Comments:

Product Var Name i_bst1_sernum
Is element of: GLA04 BST Main Record
Short Description: BST1 Serial Number
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: 10 samples per second.
Comments:

Product Var Name i_bst1_swver
Is element of: GLA04 BST Main Record
Short Description: BST1 Software Revision Code
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: One revision code per sample; 10 samples per second.
Comments:

Product Var Name i_bst1_cancode
Is element of: GLA04 BST Main Record
Short Description: BST1 Cancel Code Word
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: BST1 Cancel Code Word; 3 bits for each star (1-5); bit 15 is spare. The flag values are: 0/NoTerm, 1/Overlap, 2/NoFOV, 3/TooDark, 4/HotPixel, 5/ColumnDefect, 6/BreakTrack, 7/Dropped. Star 1 flag starts at bit 0. One code word per sample; 10 samples per second.
Please see <a href='flags/i_bst_cancode.pdf'> the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_bst_spare1
Is element of: GLA04 BST Main Record
Short Description: BST Spare1
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_bst2_samp_time
Is element of: GLA04 BST Main Record
Short Description: BST2 Sample Time
Product Data Type: i4b (2, 10)
Total Bytes: 80
Product Units: seconds, microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 2147483647
Description: The time of the ten BST2 data. This time is computed using the VTCW counts and converted to seconds using GPS if available.
Comments:

Product Var Name i_bst2_vtcw
Is element of: GLA04 BST Main Record
Short Description: BST2 VTCW Time Tag
Product Data Type: i4b (2, 10)
Total Bytes: 80
Product Units: Microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: null
Description: BST2 raw VTCW converted to seconds.

Comments:

Product Var Name i_bst2_pchstat
Is element of: GLA04 BST Main Record
Short Description: BST2 Patch Execution Status
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 0
Description: 0 = No patches. 10 samples per second.
Comments:

Product Var Name i_bst2_datlat
Is element of: GLA04 BST Main Record
Short Description: BST2 Data Latency
Product Data Type: i4b (10)
Total Bytes: 40
Product Units: Microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 4194240
Description: 10 samples per second.
Comments:

Product Var Name i_bst2_sw1
Is element of: GLA04 BST Main Record
Short Description: BST2 Status Word 1
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535

Description: BST2 Status Word 1 is composed of bit flags:
Position Uncalibrated (0/CalEnbl, 1/CalDsbl); Intensity Uncalibrated (0/CalEnbl, 1/CalDsbl); BITE Star On (0/NoBITE, 1/BITEOn); Back);ground High (0/OK, 1/High);
RAM Fail (0/OK, 1/Error); ROM Fail (0/OK, 1/Error); Star 5 Invalid (0/OK, 1/Invalid); Star 4 Invalid (0/OK, 1/Invalid);
Star 3 Invalid (0/OK, 1/Invalid); Star 2 Invalid (0/OK, 1/Invalid); Star 1 Invalid (0/OK, 1/Invalid); Star 5 Track (0/
NoTrack, 1/Track); Star 4 Track (0/NoTrack, 1/Track); Star 3 Track (0/NoTrack, 1/Track); Star 2 Track (0/NoTrack,
1/Track); Star 1 Track (0/NoTrack, 1/Track). One status word per sample; 10 samples per second. Please see <a href='flags/i_bst_sw1.pdf'> the PDF flag description in the next section for more details.

Comments:

Product Var Name: i_bst2_sw2
Is element of: GLA04 BST Main Record
Short Description: BST2 Status Word 2
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535

Description: BST2 Status Word 2 is composed of bit flags:
Star 5 Directed Search (0/NoSrch, 1/Search); Star 4 Directed Search (0/NoSrch, 1/Search); Star 3 Directed Search (0/NoSrch, 1/Search); Star 2 Directed Search (0/
NoSrch, 1/Search); Star 1 Directed Search (0/NoSrch, 1/Search); Full Field Search (0/NoSrch, 1/Search); Calibration Override (0/NoOverride, 1/Override); Unsync (0/OK, 1/Unsync); Download (0/NoDnld, 1/Dnld); Stack Error (0/OK, 1/Error); Smoothed Raw Data (0/NoSmooth, 1/Smoothed); Watchdog Timeout (0/OK, 1/Timeout); Data Error (0/OK, 1/Error); Data Upset (0/OK, 1/Upset); RAM Execution (0/ROM, 1/RAM); Reset (0/Clear, 1/Reset). One status word per sample; 10 samples per second. Please see <a href='flags/i_bst_sw2.pdf'> the PDF flag description in the next section for more details.

Comments:

Product Var Name: i_bst2_mctr
Is element of: GLA04 BST Main Record
Short Description: BST2 Message Counter
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: 10 samples per second.
Comments:

Product Var Name i_bst2_recctr
Is element of: GLA04 BST Main Record
Short Description: BST2 Command Received Counter
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: 10 samples per second.
Comments:

Product Var Name i_bst2_rejctr
Is element of: GLA04 BST Main Record
Short Description: BST2 Command Rejected Counter
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: 10 samples per second.
Comments:

Product Var Name i_bst2_starX
Is element of: GLA04 BST Main Record
Short Description: BST2 Star Position X
Product Data Type: i4b (5, 10)
Total Bytes: 200
Product Units: Arc-Seconds*100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000
Description: Position X of 5 stars at 10 samples per second.
Comments:

Product Var Name i_bst2_starY
Is element of: GLA04 BST Main Record
Short Description: BST2 Star Position Y
Product Data Type: i4b (5, 10)
Total Bytes: 200
Product Units: Arc-Seconds*100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 360000
Description: Position Y of 5 stars at 10 samples per second.
Comments:

Product Var Name i_bst2_starInt
Is element of: GLA04 BST Main Record
Short Description: BST2 Star Intensity
Product Data Type: i4b (5, 10)
Total Bytes: 200
Product Units: Magnitude*100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -250000
Product Maximum: 250000
Description: Intensity of 5 stars at 10 samples per second.
Comments:

Product Var Name i_bst2_ccdtemp
Is element of: GLA04 BST Main Record
Short Description: BST2 CCD Temperature
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: Celsius* 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -32677
Product Maximum: 32678
Description: 10 samples per second.
Comments:

Product Var Name i_bst2_bptemp
Is element of: GLA04 BST Main Record
Short Description: BST2 Baseplate Temperature
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: Celsius* 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -32677
Product Maximum: 32678
Description: 10 samples per second.
Comments:

Product Var Name i_bst2_lenstmp
Is element of: GLA04 BST Main Record
Short Description: BST2 Lens Temperature
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: Celsius* 100
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -32677
Product Maximum: 32678
Description: 10 samples per second.
Comments:

Product Var Name i_bst2_8V
Is element of: GLA04 BST Main Record
Short Description: BST2 +8 Volt Supply
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: Volt * 10
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: 10 samples per second.
Comments:

Product Var Name i_bst2_n9V
Is element of: GLA04 BST Main Record
Short Description: BST2 -9 Volt Supply
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: Volt * 10
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: 10 samples per second.
Comments:

Product Var Name i_bst2_4V
Is element of: GLA04 BST Main Record
Short Description: BST2 +4 Volt Supply
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: Volt * 10
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: 10 samples per second.
Comments:
Product Var Name i_bst2_n5V
Is element of: GLA04 BST Main Record
Short Description: BST2 5 Volt Supply
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: Volt * 10
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: 10 samples per second.
Comments:

Product Var Name i_bst2_BG
Is element of: GLA04 BST Main Record
Short Description: BST2 Background Reading
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -32767
Product Maximum: 32767
Description: 10 samples per second.
Comments: From Paul Woznick: The background count should be treated as signed. A negative count means that the tracker has been light saturated for a longer period of time and because the reference voltage is dynamic, can result in a negative output.

Product Var Name i_bst2_srchct
Is element of: GLA04 BST Main Record
Short Description: BST2 Full Field Search Count
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: 10 samples per second
Comments:

Product Var Name: i_bst2_Fact
Is element of: GLA04 BST Main Record
Short Description: BST2 False Alarms Count
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: 10 samples per second.
Comments:

Product Var Name: i_bst2_sernum
Is element of: GLA04 BST Main Record
Short Description: BST2 Serial Number
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: 10 samples per second.
Comments:

Product Var Name: i_bst2_swver
Is element of: GLA04 BST Main Record
Short Description: BST2 Software Revision Code
Product Data Type: i1b (10)
Total Bytes: 10
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 255
Description: One revision code per sample; 10 samples per second.
Comments:

Product Var Name i_bst2_cancode
Is element of: GLA04 BST Main Record
Short Description: BST2 Cancel Code Word
Product Data Type: i2b (10)
Total Bytes: 20
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 65535
Description: BST2 Cancel Code Word; 3 bits for each star (1-5); bit 15 is spare. The flag values are: 0/NoTerm, 1/Overlap, 2/NoFOV, 3/TooDark, 4/HatPixel, 5/ColumnDefect, 6/BreakTrack, 7/Dropped. Star 1 flag starts at bit 0. One code word per sample; 10 samples per second.
Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections.
Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href='flags/i_timecorflg.pdf'>the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name i_bst_spare2
Is element of: GLA04 BST Main Record
Short Description: BST Spare2
Product Data Type: i1b (6)
Total Bytes: 6
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0
Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.
Comments:

Product Var Name i_rec_ndx
Is element of: GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: GLAS Record Index
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: No
**Product Var Name i_UTCTime**

*Is element of:* GLA01 Long Waveform Record, GLA01 Main Record, GLA01_Short_Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record

*Short Description:* Transmit Time of First Shot in frame in J2000

*Product Data Type:* i4b (2)

*Total Bytes:* 8

*Product Units:* seconds, microseconds

*Invalid Value/Flag:* No

*Is Correction Flag?:* NA

*Is Unsigned?:* No

*Product Minimum:* 0

*Product Maximum:* 2147483647

*Description:* The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds. The first item is the whole number of seconds; the second item is the fractional part in microseconds.

*Comments:* This is not the ground bounce time, but the transmit time.

**Product Var Name i_samp_time**

*Is element of:* GLA04 SCPA Main Record

*Short Description:* Sample time

*Product Data Type:* i4b (2)

*Total Bytes:* 8

*Product Units:* seconds microseconds

*Invalid Value/Flag:* No

*Is Correction Flag?:* No

*Is Unsigned?:* NA

*Product Minimum:* 0

*Product Maximum:* 2147483647

*Description:* The time for the s/c data based on the GPS time latched to VTCW. The first item is the whole number of seconds since J2000; the second item is the fractional part in microseconds. (In UTC J2000 time)

*Comments:*
Is element of: GLA04 SCPA Main Record
Short Description: S/C Data VTCW Time Tag
Product Data Type: i4b (2)
Total Bytes: 8
Product Units: seconds, microseconds
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 2147483647
Description: Raw VTCW counts converted to seconds
Comments:

Product Var Name i_CFA_Q1
Is element of: GLA04 SCPA Main Record
Short Description: Control Frame Att Quaternion Q1
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1100000
Product Maximum: 1100000
Description: The spacecraft control frame attitude quaternion 1 from the ADCS Data.
Comments:

Product Var Name i_CFA_Q2
Is element of: GLA04 SCPA Main Record
Short Description: Control Frame Att Quaternion Q2
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1100000
Product Maximum: 1100000
Description: The spacecraft control frame attitude quaternion 2 from the ADCS Data.
Comments:
Product Var Name: i_CFA_Q3
Is element of: GLA04 SCPA Main Record
Short Description: Control Frame Att Quaternion Q3
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1100000
Product Maximum: 1100000
Description: The spacecraft control frame attitude quaternion 3 from the ADCS Data.
Comments:

Product Var Name: i_CFA_Q4
Is element of: GLA04 SCPA Main Record
Short Description: Control Frame Att Quaternion Q4
Product Data Type: i4b
Total Bytes: 4
Product Units: N/A
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1100000
Product Maximum: 1100000
Description: The spacecraft control frame attitude quaternion 4 from the ADCS Data.
Comments:

Product Var Name: i_ECIOrb_PosX
Is element of: GLA04 SCPA Main Record
Short Description: Next ECI Orbital Position X
Product Data Type: i4b
Total Bytes: 4
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -8169500
Product Maximum: 8169500
Description: The spacecraft's next ECI Orbital Position X from the ADCS Data.
Comments:

Product Var Name: i_ECIOrb_PosY
Is element of: GLA04 SCPA Main Record
Short Description: Next ECI Orbital Position Y
Product Data Type: i4b
Total Bytes: 4
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -8169500
Product Maximum: 8169500
Description: The spacecraft's next ECI Orbital Position Y from the ADCS Data.
Comments:

Product Var Name: i_ECIOrb_PosZ
Is element of: GLA04 SCPA Main Record
Short Description: Next ECI Orbital Position Z
Product Data Type: i4b
Total Bytes: 4
Product Units: meters
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -8169500
Product Maximum: 8169500
Description: The spacecraft's next ECI Orbital Position Z from the ADCS Data.
Comments:

Product Var Name: i_ECIOrb_VelX
Is element of: GLA04 SCPA Main Record
Short Description: Next ECI Orbital Velocity X
Product Data Type: i4b
Total Bytes: 4
Product Units: cm/sec
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1045696
Product Maximum: 1045696
Description: The spacecraft's next ECI Orbital Velocity X from the ADCS Data.
Comments:

Product Var Name i_ECIOrb_VelY
Is element of: GLA04 SCPA Main Record
Short Description: Next ECI Orbital Velocity Y
Product Data Type: i4b
Total Bytes: 4
Product Units: cm/sec
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1045696
Product Maximum: 1045696
Description: The spacecraft's next ECI Orbital Velocity Y from the ADCS Data.
Comments:

Product Var Name i_ECIOrb_VelZ
Is element of: GLA04 SCPA Main Record
Short Description: Next ECI Orbital Velocity Z
Product Data Type: i4b
Total Bytes: 4
Product Units: cm/sec
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -1045696
Product Maximum: 1045696
Description: The spacecraft's next ECI Orbital Velocity Z from the ADCS Data.
Comments:

Product Var Name i_SA_Pos1
Is element of: GLA04 SCPA Main Record
Short Description: Calculated SA 1 Position
Product Data Type: i4b
Total Bytes: 4
Product Units: radians*1.0E+6
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -65536
Product Maximum: 65536
Description: The spacecraft calculated SA 1 Position from the ADCS Data.
Comments:

Product Var Name i_SA_Pos2
Is element of: GLA04 SCPA Main Record
Short Description: Calculated SA 2 Position
Product Data Type: i4b
Total Bytes: 4
Product Units: radians*1.0E+6
Invalid Value/Flag: i_APID_AvFlg
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -65536
Product Maximum: 65536
Description: The spacecraft calculated SA 2 Position from the ADCS Data.
Comments:

Product Var Name i_gps_latch
Is element of: GLA04 SCPA Main Record
Short Description: GPS Latched VTCW
Product Data Type: i2b (3)
Total Bytes: 6
Product Units: microseconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: null
Product Maximum: null
Description:
Comments:

Product Var Name i_gps_time
Is element of: GLA04 SCPA Main Record
Short Description: GPS Time of Current Solution
Product Data Type: i4b
Total Bytes: 4
Product Units: seconds
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: null
Product Maximum: null
Description:
Comments:

Product Var Name i_SA_CntrFlg1
Is element of: GLA04 SCPA Main Record
Short Description: SA 1 Autonomous Control Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: Points indicate whether or not solar array articulation is enabled or inhibited.
Comments:

Product Var Name i_SA_CntrFlg2
Is element of: GLA04 SCPA Main Record
Short Description: SA 2 Autonomous Control Flag
Product Data Type: i1b
Total Bytes: 1
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: Yes
Product Minimum: 0
Product Maximum: 1
Description: Points indicate whether or not solar array articulation is enabled or inhibited.
Comments:

Product Var Name i_APID_AvFlg
Is element of: GLA01 Main Record, GLA02 Record, GLA04 BST Main Record, GLA04 GYRO Main Record,
GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record,
GLA05 record, GLA06 record, GLA07 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: APID Data Availability Flag
Product Data Type: i1b (8)
Total Bytes: 8
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: -127
Product Maximum: 127
Description: Flag indicating which packets (APIIDs) for each second are available missing, or filled. APID 19 is broken down further into Altimeter Digitizer, Photon Counter, Cloud Digitizer, GPS/DEM, and C&T sections. Please see the PDF flag description in the next section for more details.
Comments:

Product Var Name: i_timecorflg
Is element of: GLA01 Main Record, GLA02 Record, GLA03 Main Record, GLA04 BST Main Record, GLA04 GYRO Main Record, GLA04 IST Main Record, GLA04 LPA Main Record, GLA04 LRS Main Record, GLA04 SCPA Main Record, GLA05 record, GLA06 record, GLA07 Record, GLA08 Record, GLA09 Record, GLA10 record, GLA11 Record, GLA12 Record, GLA13 Record, GLA14 Record, GLA15 Record
Short Description: time correction flag
Product Data Type: i2b
Total Bytes: 2
Product Units: N/A
Invalid Value/Flag: No
Is Correction Flag?: No
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 32767
Description: Indicates what instrument or bias corrections were applied to the times on this record. Please see <a href="flags/i_timecorflg.pdf">the PDF flag description in the next section</a> for more details.
Comments:

Product Var Name: i_scpa_spare1
Is element of: GLA04 SCPA Main Record
Short Description: SCPA Spare 1
Product Data Type: i1b (4)
Total Bytes: 4
Product Units: n/a
Invalid Value/Flag: No
Is Correction Flag?: NA
Is Unsigned?: No
Product Minimum: 0
Product Maximum: 0

Description: This variable consists of spare bytes reserved for architectural consistency of the data file. It contains no meaningful information.

Comments:
5.1 Flag Design Philosophy

GSAS flag design is governed by a consistent design philosophy. Per big-endian convention, bits are numbered right to left starting at 0. E.g., a byte has the following bit numbers:

```
|   |   |   |   |   |   |   |
---|---|---|---|---|---|---|
bit: 7 6 5 4 3 2 1 0
```

However, arrays of bytes are numbered left to right starting at 1. The direction from which shots are incremented depend if the flag is a byte flag or bit flag. Byte flags increment from left to right, bit flags increment from right to left. This follows the "natural" big endian ordering scheme. E.g.:

BIT flags increment from right to left:

```
|   |   |   |   |
---|---|---|---|
bit: 39 38 37 36
shot: 40 39 38 37
```

BYTE flags increment from left to right:

```
|   |   |   |   |
---|---|---|---|
byte: 01 02 03 04
shot: 01 02 03 04
```

The following section contains detailed descriptions of each flag found in the GLAS standard data products. The descriptions are ordered alphabetically.

5.2 PDF Flag Descriptions
Figure 5-1 APID Data Availability Flag
**Flags**

The GLAS Standard Data Products Specification - Data Dictionary

---

**i_FiltNumMask** [GLA01_Main]: Filter Section Mask

1 bit set of values: 0 = not selectable, 1 = selectable

![Diagram](image1)

**Figure 5-2 Filter Section Mask**

**i_GainShiftFlg** [1/sec for GLA01_main]: Gain Shift Flag; One flag per shot; indicates if the gain has been shifted for the corresponding measurement.

1-bit flags, 40/second.

0=Gain has been shifted (valid)

1=Gain has not been shifted (potentially invalid)

![Diagram](image2)

**Figure 5-3 Gain Shift Flag**

---

January 2013 Page 5-3 Version 1.0
**i_InstState [GLA01_main]: Instrument State Flag**

1 bit set of values: 0 = Disabled/Off, 1 = Enabled/On

**Figure 5-4 Instrument State Flag**

**i_ObSurfType [GLA01]: Surface Type**

1 byte set of values: 0 = ocean & no ice, 1 = land & no ice, 2 = ocean & ice, 3 = land & ice

**Figure 5-5 Surface Type**
i_OrbFlg (1/sec for GLA01, 02, 05-15): Orbit Flag

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>15 14 13 12 11 10 9 8</th>
<th>7 6 5 4 3 2 1 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSB</td>
<td>0=precision orbit used</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=predicted orbit used</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>2=on-board orbit used</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
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<td>0=no maneuvers</td>
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<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no maneuvers</td>
<td>0=no maneuvers</td>
</tr>
<tr>
<td></td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
<td>1=maneuvers occurred during this record; orbit degraded</td>
</tr>
<tr>
<td></td>
<td>0=no model problems</td>
<td>0=no model problems; orbit RMS &gt; 5 cm; required accuracy not met</td>
</tr>
<tr>
<td></td>
<td>1=model problems; orbit RMS &gt; 5 cm; required accuracy not met</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0=instrument attitude used for orbit</td>
<td>0=instrument attitude used for orbit</td>
</tr>
<tr>
<td></td>
<td>1=modeled solar ray orientation used from measurement</td>
<td>1=modeled solar ray orientation used from measurement</td>
</tr>
<tr>
<td></td>
<td>0=no GPS data outage</td>
<td>0=no GPS data outage</td>
</tr>
<tr>
<td></td>
<td>1=GPS data missing from portion of this record, possible degradation</td>
<td>1=GPS data missing from portion of this record, possible degradation</td>
</tr>
</tbody>
</table>

Figure 5-6 Orbit Flag

i_RngSrc_Flag [GLA01_Main]: Range Data Source Flag

1 byte set of values: 0 = s/c time and position packet, 1 = uplinked DEM bytes, 2 = uplinked Rmin/Rmax

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>7 6 5 4 3 2 1 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSB</td>
<td>Range Data Source</td>
</tr>
<tr>
<td></td>
<td>spares</td>
</tr>
<tr>
<td></td>
<td>Range Data Source</td>
</tr>
</tbody>
</table>

Figure 5-7 Range Data Source Flag
i_statflags [GLA01_long, GLA01_short]: Range Window Status Word

Note: i_statflags is a 4 byte flag. Each 4 byte flag corresponds to 1/40 of a second measurement. There are multiple types of subrecords in GLA01: GLA01_long and GLA01_short. Each type contains a specific number of subrecords: GLA01_long contains 5 records per second and GLA01_short contains 2 records per second. Therefore, i_statflags will be represented by 8, 4 byte flags, in GLA01_long for each of the 5 records (40 total flags) and represented by 20, 4 byte flags, in GLA01_short for each of the 2 records (40 total flags). The first 4 byte flag in the first subrecord corresponds to the first 1/40 second of data.

1 bit sets of values; 0=False, 1=True

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSB</td>
<td>MSB</td>
<td>MSB</td>
<td>MSB</td>
</tr>
<tr>
<td>31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0</td>
<td>31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0</td>
<td>31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0</td>
<td>31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0</td>
</tr>
<tr>
<td>Unused</td>
<td>Unused</td>
<td>Unused</td>
<td>Unused</td>
</tr>
<tr>
<td>Spares</td>
<td>Spares</td>
<td>Spares</td>
<td>Spares</td>
</tr>
<tr>
<td>0=Ready</td>
<td>0=Ready</td>
<td>0=Ready</td>
<td>0=Ready</td>
</tr>
<tr>
<td>1=Failure</td>
<td>1=Failure</td>
<td>1=Failure</td>
<td>1=Failure</td>
</tr>
<tr>
<td>128ns filter failed</td>
<td>64ns filter failed</td>
<td>32ns filter failed</td>
<td>16ns filter failed</td>
</tr>
<tr>
<td>No second crossing found on 128-nsec filter</td>
<td>No second crossing found on 64-nsec filter</td>
<td>No second crossing found on 32-nsec filter</td>
<td>No second crossing found on 16-nsec filter</td>
</tr>
<tr>
<td>No second crossing found on 8-nsec filter</td>
<td>No second crossing found on 4-nsec filter</td>
<td>No first crossing found on 128-nsec filter</td>
<td>No first crossing found on 64-nsec filter</td>
</tr>
<tr>
<td>No first crossing found on 32-nsec filter</td>
<td>No first crossing found on 16-nsec filter</td>
<td>No first crossing found on 8-nsec filter</td>
<td>No first crossing found on 4-nsec filter</td>
</tr>
<tr>
<td>No filters were ever selected; all previous selections failed. (happens on DSP reset)</td>
<td>No filters were ever selected; all previous selections failed. (happens on DSP reset)</td>
<td>No filters were ever selected; all previous selections failed. (happens on DSP reset)</td>
<td>No filters were ever selected; all previous selections failed. (happens on DSP reset)</td>
</tr>
</tbody>
</table>

Science processing is incomplete. 0=Ready, 1=Failure.
Return range is invalid. 0=Range OK, 1=Failure.

i_timecorflg [1/15 sec for GLA01-15]: Correction Status Flag

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSB</td>
<td>MSB</td>
</tr>
<tr>
<td>31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0</td>
<td>31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0</td>
</tr>
<tr>
<td>0=shot time is transmit time</td>
<td>0=shot time is transmit time</td>
</tr>
<tr>
<td>1=shot time is ground bounce time</td>
<td>1=shot time is ground bounce time</td>
</tr>
<tr>
<td>0=no delta gps time correction applied to shot time</td>
<td>0=no delta gps time correction applied to shot time</td>
</tr>
<tr>
<td>1=delta gps time correction applied to shot time</td>
<td>1=delta gps time correction applied to shot time</td>
</tr>
<tr>
<td>0=no post-launch timing bias applied</td>
<td>0=no post-launch timing bias applied</td>
</tr>
<tr>
<td>1=post-launch timing bias applied - see header for value</td>
<td>1=post-launch timing bias applied - see header for value</td>
</tr>
<tr>
<td>0=digitizer turn-on delay accounted for in shot time - see header</td>
<td>0=digitizer turn-on delay accounted for in shot time - see header</td>
</tr>
<tr>
<td>1=digitizer turn-on delay not accounted for in shot time</td>
<td>1=digitizer turn-on delay not accounted for in shot time</td>
</tr>
<tr>
<td>0=time to peak of transmit pulse accounted for in shot time</td>
<td>0=time to peak of transmit pulse accounted for in shot time</td>
</tr>
<tr>
<td>1=time to peak of transmit pulse not accounted for in shot time</td>
<td>1=time to peak of transmit pulse not accounted for in shot time</td>
</tr>
</tbody>
</table>

Figure 5-8 Range Window Status Word

Figure 5-9 Correction Status Flag
i_TxFlg [1/sec for GLA01_main]: Transmit Pulse Flag
One flag per shot; indicates quality to use based on valid or invalid criteria
1-bit flags, 40/second.
0=Transmit Pulse is telemetered (valid)
1=Transmit Pulse is not telemetered (invalid)

Figure 5-10 Transmit Pulse Flag

i_txWfPk_Flag [GLA01_Main, GLA04-01[LPA]]: Transmit Waveform Peak Status Flag
1-bit flags, 40 per second
0=No Problem, 1=Peak value is below threshold
0=No Problem, 1=Internal software failure
0=No Problem, 1=Peak was never found (once set this bit is latched until cleared by command)

Figure 5-11 Transmit Waveform Peak Status Flag

i_g_IntRet_qf [GLA02]: Integrated Return Quality Flag
4-bit set of values: 0 = unused, 1 = excellent, 2 = good, 3 = marginal, 5 = bad data

Figure 5-12 Integrated Return Quality Flag
**Figure 5-13  532nm LIDAR Data Quality Flag**

**i_g_lid_qf ([GLA02]):** 532nm LIDAR Data Quality Flag  
2 bits per shot

```
0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1
```

**Figure 5-14  532 nm Laser Transmitted Energy Quality Flag**

**i_g_TxNrg_qf ([GLA02,07]):** 532 nm Laser Transmitted Energy Quality Flag  
2 bit per shot values: 0=not used, 1=full laser energy, 2=marginal laser energy, 3=deficient laser energy

```
0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1
```

**Figure 5-14  532 nm Laser Transmitted Energy Quality Flag**

```
0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1
```
**Figure 5-15  1064nm LIDAR Data Quality Flag**

`i_ir_lid_qf [GLA02]: 1064nm LIDAR Data Quality Flag`

2 bits per shot

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Byte 5</td>
<td>Byte 6</td>
<td>Byte 7</td>
<td>Byte 8</td>
</tr>
</tbody>
</table>

**Figure 5-16  1064 nm Laser Transmitted Energy Quality Flag**

`i_ir_TxNrg_qf [GLA02, 07]: 1064 nm Laser Transmitted Energy Quality Flag`

2 bits per shot values: 0=not used, 1=full laser energy, 2=marginal laser energy, 3=deficient laser energy

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Byte 5</td>
<td>Byte 6</td>
<td>Byte 7</td>
<td>Byte 8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Byte 9</th>
<th>Byte 10</th>
</tr>
</thead>
</table>

January 2013  Page 5-9  Version 1.0
**Figure 5-17** Bit flag indicating whether the 532 nm signal is saturated or not for the 40 to 20 KM Segment

**i1_g_sat_f [GLA02]**: Bit flag indicating whether the 532 nm signal is saturated or not for the 40 to 20 KM Segment. 1 bit per each sum of 46 shots per bin (268); 0 = not saturated, 1 = saturated.

```
<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>spare</td>
<td>spare</td>
<td>spare</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bins 268-257</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

**Figure 5-18** Bit flag indicating whether the 532 nm signal is saturated or not for the 20 to 10 KM Segment

**i5_g_sat_f [GLA02]**: Bit flag indicating whether the 532 nm signal is saturated or not for the 20 to 10 KM Segment. 1 bit per each sum of 8 shots(40) per bin (132); 0 = not saturated, 1 = saturated.

```
<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>spare</td>
<td>spare</td>
<td>spare</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bins 268-257</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

**Figure 5-19** Bit flag indicating whether the 532 nm signal is saturated or not for the 20 to 10 KM Segment

**j1_g_sat_f [GLA02]**: Bit flag indicating whether the 532 nm signal is saturated or not for the 20 to 10 KM Segment. 1 bit per each sum of 8 shots(40) per bin (132); 0 = not saturated, 1 = saturated.

```
<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>spare</td>
<td>spare</td>
<td>spare</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bins 268-257</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

**Figure 5-20** Bit flag indicating whether the 532 nm signal is saturated or not for the 20 to 10 KM Segment
**Flags**

The GLAS Standard Data Products Specification - Data Dictionary

---

**Figure 5-19** Bit flag indicating whether the 532 nm signal is saturated or not for the 10 to -1 KM Segment.

1 bit per each shot (40) per bin (148): 0 = not saturated, 1 = saturated.

```plaintext
|
|  i48_g_sat_f [GLA02]: Bit flag indicating whether the 532 nm signal is saturated or not for the 10 to -1 KM Segment. |
|  1 bit per each shot (40) per bin (148): 0 = not saturated, 1 = saturated. |

MSB

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>39</td>
<td>38</td>
<td>37</td>
</tr>
<tr>
<td>36</td>
<td>35</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>32</td>
<td>31</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td>28</td>
<td>27</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>24</td>
<td>23</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>20</td>
<td>19</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>12</td>
<td>11</td>
<td>10</td>
<td>09</td>
</tr>
<tr>
<td>Bin 148 (shots 08-01)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LSB

<table>
<thead>
<tr>
<th>Byte 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
</tr>
<tr>
<td>04</td>
</tr>
<tr>
<td>Bin 148 (shots 08-01)</td>
</tr>
</tbody>
</table>

Bins 147-3 (shots 40-1)

```plaintext
Figure 5-20 BST1 Cancel Code Word BST2 Cancel Code Word
Two bytes per shot, 10/second

**MSB**

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>

- shot 1
- shots 3 - 8
- 7

<table>
<thead>
<tr>
<th>Byte 17</th>
<th>Byte 18</th>
<th>Byte 19</th>
<th>Byte 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>14</td>
<td>13</td>
<td>12</td>
</tr>
</tbody>
</table>

- shot 9
- shot 10

**LSB**

- 11 10 9 8 7 6 5 4 3 2 1 0
- 0

- 15 14 13 12 11 10 9 8

- Star Track 1
  - 0: No Track, 1: Track
- Star Track 2
  - 0: No Track, 1: Track
- Star Track 3
  - 0: No Track, 1: Track
- Star Track 4
  - 0: No Track, 1: Track
- Star Track 5
  - 0: No Track, 1: Track
- Star 1 Invalid
  - 0: Okay, 1: Invalid
- Star 2 Invalid
  - 0: Okay, 1: Invalid
- Star 3 Invalid
  - 0: Okay, 1: Invalid
- Star 4 Invalid
  - 0: Okay, 1: Invalid
- Star 5 Invalid
  - 0: Okay, 1: Invalid
- Background High
  - 0: Okay, 1: High
- Test Bit On
  - 0: Off, 1: On
- Intensity Uncalibrated
  - 0: Cal Enbl, 1: Cal Dsbl
- Position Uncalibrated
  - 0: Cal Enbl, 1: Cal Dsbl
- ROM Fail
  - 0: Okay, 1: Error
- RAM Fail
  - 0: Okay, 1: Error

---

**Figure 5-21 BST1 Status Word BST2 Status Word 1**
Figure 5-22  BST1 Status Word 2 BST2 Status Word 2

Two bytes per shot, 10/second

<table>
<thead>
<tr>
<th>MSB</th>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>70</td>
<td>Byte 1</td>
<td>70</td>
<td>Byte 2</td>
</tr>
<tr>
<td></td>
<td>Byte 3</td>
<td>Byte 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>shot 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>shots 3 - 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>shot 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>shot 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LSB</th>
<th>Byte 17</th>
<th>Byte 18</th>
<th>Byte 19</th>
<th>Byte 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>76</td>
<td>54</td>
<td>32</td>
<td>10</td>
<td>70</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Star 5 Directed Search</th>
<th>0=No Search, 1=Search</th>
</tr>
</thead>
<tbody>
<tr>
<td>Star 4 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>Star 3 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>Star 2 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>Star Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>Calibration Override</td>
<td>0=No Override, 1=Override</td>
</tr>
<tr>
<td>Unsynchronized</td>
<td>0=Okay, 1=Unsynchronized</td>
</tr>
<tr>
<td>RAM Execution</td>
<td>0=ROM, 1=RAM</td>
</tr>
<tr>
<td>Data Error</td>
<td>0=Okay, 1=Error</td>
</tr>
<tr>
<td>Data Upset</td>
<td>0=Okay, 1=Upset</td>
</tr>
<tr>
<td>Watchdog Timeout</td>
<td>0=Okay, 1=Timeout</td>
</tr>
<tr>
<td>Smoothed Raw Data</td>
<td>0=No Smooth, 1=Smooth</td>
</tr>
<tr>
<td>Stack Error</td>
<td>0=Okay, 1=Error</td>
</tr>
<tr>
<td>Download</td>
<td>0=No Download, 1=Download</td>
</tr>
<tr>
<td>Unsync</td>
<td>0=Okay, 1=Unsync</td>
</tr>
<tr>
<td>Full Field Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>Star 1 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>Star 2 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>Star 3 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>Star 4 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>STAR 5 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>RAM Execution</td>
<td>0=ROM, 1=RAM</td>
</tr>
<tr>
<td>Data Error</td>
<td>0=Okay, 1=Error</td>
</tr>
<tr>
<td>Data Upset</td>
<td>0=Okay, 1=Upset</td>
</tr>
<tr>
<td>Watchdog Timeout</td>
<td>0=Okay, 1=Timeout</td>
</tr>
<tr>
<td>Smoothed Raw Data</td>
<td>0=No Smooth, 1=Smooth</td>
</tr>
<tr>
<td>Stack Error</td>
<td>0=Okay, 1=Error</td>
</tr>
<tr>
<td>Download</td>
<td>0=No Download, 1=Download</td>
</tr>
<tr>
<td>Unsync</td>
<td>0=Okay, 1=Unsync</td>
</tr>
<tr>
<td>Calibration Override</td>
<td>0=No Override, 1=Override</td>
</tr>
<tr>
<td>Full Field Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>Star 1 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>Star 2 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>Star 3 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>Star 4 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
<tr>
<td>STAR 5 Directed Search</td>
<td>0=No Search, 1=Search</td>
</tr>
</tbody>
</table>
i_ist_flag [GLA04-04]: IST Flag

1 byte flag, 10/second

**Figure 5-23 IST Flag**
**i_lrs_flag [GLA04-02]: LRS Flag**

1 byte flag, 10/second

**Figure 5-24  LRS Flag**
Figure 5-25  SIRU Data Valid Word

Two bytes per shot, 10/second

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Byte 5</td>
<td>Byte 6</td>
<td>Byte 7</td>
<td>Byte 8</td>
</tr>
<tr>
<td>Byte 9</td>
<td>Byte 10</td>
<td>Byte 11</td>
<td>Byte 12</td>
</tr>
<tr>
<td>Byte 13</td>
<td>Byte 14</td>
<td>Byte 15</td>
<td>Byte 16</td>
</tr>
<tr>
<td>Byte 17</td>
<td>Byte 18</td>
<td>Byte 19</td>
<td>Byte 20</td>
</tr>
</tbody>
</table>

**Mode Valid**
0=Invalid, 1=Valid

**Gyro Scale Factor**
0=Low, 1=High

**Gyro A Angle Valid**
0=Invalid, 1=Valid

**Gyro B Angle Valid**
0=Invalid, 1=Valid

**Gyro C Angle Valid**
0=Invalid, 1=Valid

**Gyro D Angle Valid**
0=Invalid, 1=Valid

**Gyro A Rate Saturation**
0=Normal, 1=Saturation

**Gyro B Rate Saturation**
0=Normal, 1=Saturation

**Gyro C Rate Saturation**
0=Normal, 1=Saturation

**Gyro D Rate Saturation**
0=Normal, 1=Saturation

**Heater Power Status**
0=Normal, 1=Off or Error

**Spare 1**

**Spare 2**

**Shot 1 - Shot 3**

**Shot 4 - Shot 8**

**Shot 9 - Shot 10**

**Byte 17**

**Byte 18**

**Byte 19**

**Byte 20**

**Figure 5-25  SIRU Data Valid Word**
**Figure 5-26  Atmosphere Flag**

- **i_atmQF** (1/sec for GLA05, 06, 12-15): Atmosphere Flag
- 2 bit flags, 40/second

The figure illustrates the Atmosphere Flag with bytes organized as follows:

- **Byte 1**
  - MSB
  - 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25

- **Byte 2**
  - Shots 40 - 25
  - 70 Byte 1 Byte 2 Byte 3 Byte 4

- **Byte 3**
  - Shots 24 - 09
  - Byte 5 Byte 6 Byte 7 Byte 8

- **Byte 4**
  - Shots 08 - 01
  - Byte 9 Byte 10

Legend:
- 0: conditions not favorable for forward scattering
- 1: conditions favorable for forward scattering
- 0: atmqf flag has been set using LIDAR products
- 1: atmqf forward scattering flag has not been set - no valid Atmosphere data available for this shot

The diagram visually represents the flag configuration and its implications for data interpretation.
Figure 5-27  Attitude Flag 1

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Off-nadir angle within limits</td>
</tr>
<tr>
<td>1</td>
<td>Large off-nadir angle</td>
</tr>
<tr>
<td>2</td>
<td>Non-ocean sweep, within time frame of ocean sweep</td>
</tr>
<tr>
<td>3</td>
<td>Not within target of opportunity off-pointing, within time of target of opportunity off-pointing</td>
</tr>
<tr>
<td>4</td>
<td>Steering to reference track</td>
</tr>
<tr>
<td>5</td>
<td>Not steering to reference track</td>
</tr>
<tr>
<td>6</td>
<td>Bits 1 through 3 of this flag have been set based on actual data</td>
</tr>
<tr>
<td>7</td>
<td>Bits 1 through 3 have not been set - IGNORE these bits</td>
</tr>
</tbody>
</table>

Figure 5-27  Attitude Flag 1
### i_AttFlg2 (1/sec for GLA05,06,12-15): Attitude Flag 2

Bytes 1-5, PAD Use Flag: 1 bit/shot values; 0 = PAD used to determine spot location, 1 = PAD not used to determine spot location

Bytes 6-10, Calc PAD Use Flag: 1 bit/shot values; 0 = new PAD used to determine orbit, 1 = pass-thru PAD not used to determine orbit

Bytes 11-20, LPA Problem Flag: 2 bit/shot values; 0 = no problems with LPA, 1 = missing LPA, 2 = noisy LPA

#### Figure 5-28  Attitude Flag 2

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>39</td>
<td>38</td>
<td>37</td>
</tr>
<tr>
<td>36</td>
<td>35</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>32</td>
<td>31</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td>28</td>
<td>27</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>24</td>
<td>23</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>20</td>
<td>19</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>12</td>
<td>11</td>
<td>10</td>
<td>9</td>
</tr>
</tbody>
</table>

MSB

<table>
<thead>
<tr>
<th>Byte 5</th>
<th>Byte 6</th>
<th>Byte 7</th>
<th>Byte 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
<td>07</td>
<td>06</td>
<td>05</td>
</tr>
<tr>
<td>04</td>
<td>03</td>
<td>02</td>
<td>01</td>
</tr>
<tr>
<td>40</td>
<td>39</td>
<td>38</td>
<td>37</td>
</tr>
<tr>
<td>36</td>
<td>35</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>32</td>
<td>31</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td>28</td>
<td>27</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>24</td>
<td>23</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>20</td>
<td>19</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
</tbody>
</table>

Calc PAD Use Flag (for shots 40 - 09)

<table>
<thead>
<tr>
<th>Byte 9</th>
<th>Byte 10</th>
<th>Byte 11</th>
<th>Byte 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>12</td>
<td>11</td>
<td>10</td>
<td>09</td>
</tr>
<tr>
<td>08</td>
<td>07</td>
<td>06</td>
<td>05</td>
</tr>
<tr>
<td>04</td>
<td>03</td>
<td>02</td>
<td>01</td>
</tr>
<tr>
<td>40</td>
<td>39</td>
<td>38</td>
<td>37</td>
</tr>
<tr>
<td>36</td>
<td>35</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>32</td>
<td>31</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td>28</td>
<td>27</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>24</td>
<td>23</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>20</td>
<td>19</td>
<td>18</td>
<td>17</td>
</tr>
</tbody>
</table>

Calc PAD Use Flag (for shots 40 - 17)

<table>
<thead>
<tr>
<th>Byte 13</th>
<th>Byte 14</th>
<th>Byte 15</th>
<th>Byte 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>31</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td>28</td>
<td>27</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>24</td>
<td>23</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>20</td>
<td>19</td>
<td>18</td>
<td>17</td>
</tr>
</tbody>
</table>

LPA Problem Flag (for shots 32 - 17)

### i_AttFlg3 (1/sec for GLA07-11): Attitude Flag 3

0=PAD used for geolocation
1=PAD not used for geolocation

#### Figure 5-29  Attitude Flag 3

<table>
<thead>
<tr>
<th>Byte 17</th>
<th>Byte 18</th>
<th>Byte 19</th>
<th>Byte 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>12</td>
<td>11</td>
<td>10</td>
<td>09</td>
</tr>
<tr>
<td>08</td>
<td>07</td>
<td>06</td>
<td>05</td>
</tr>
<tr>
<td>04</td>
<td>03</td>
<td>02</td>
<td>01</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

LSB

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
i_ElvFlg [1/sec GLA05, 06, 12-15]: Elevation Definition Flag: Indicates which location on the received echo was used to calculate the elevation on the record.

1-byte flags, 40/second.

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Byte 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

 shots 05

- 1=centroid of received pulse between signal begin and signal end defined for standard parameterization used to calculate elevation
- 1=centroid of received pulse between signal begin and signal end defined for alternate parameterization used to calculate elevation
- 1=location of last Gaussian peak in received pulse for standard parameterization used to calculate elevation
- 1=location of last Gaussian peak in received pulse for alternate parameterization used to calculate elevation
- 1=Location of threshold retracker used to calculate elevation
- 1=location associated with Gaussian with largest peak used to calculate elevation
- 1="other" algorithm used to calculate elevation - see software release documentation for details

1 = Gain > flag value, indicating probable cloud contamination

**Figure 5-30 Elevation Definition Flag**

i_ElvuseFlg [1/sec for GLA05, 06, 12-15]: Elevation Use Flag: One flag per shot; indicates quality to use based on valid or invalid criteria

1-bit flags, 40/second.

0=elevation is valid
1=elevation is invalid

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Byte 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

 shots 08-01

**Figure 5-31 Elevation Use Flag**
Figure 5-32  Altimeter Quality Flag

Byte 1

0 = all data in frame is good with appropriate corrections applied
1 = some of data is not corrected or has measurement problems

0 = there is at least some usable data in the frame
1 = all elevations in the frame are bad due to problems with corrections

0 = all GLAS measurements are good,
1 = there is at least one unusable measurement in the frame

0 = there is at least one usable measurement in the frame
1 = all GLAS measurements are bad

TBD

i_FrameQF [1/sec for GLA05, 06, 12-15]: Altimeter Quality Flag

Figure 5-33  Range Correction Flag

2 byte set of 1 bit values: 0 = used, 1 = not used

Note: This is a range correction flag. Some of the corrections are applied to the reference range, i_refrng on the data record, and some of them are used in the calculation of the elevation but are not applied to the reference range.

Figure 5-33  Range Correction Flag
**i_WFqual** (GLA05): Waveform Quality Flags

4 byte set of 32 bit flags, 40/second

<table>
<thead>
<tr>
<th>MSB</th>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>7</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

- **Shot 1**:
  - Shots 2-39

<table>
<thead>
<tr>
<th>Byte 157</th>
<th>Byte 158</th>
<th>Byte 159</th>
<th>Byte 160</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Shot 40**

---

**Breakdown of shot 40, Bytes 157 - 158, Bits 31-16**

**i_WFqual** (GLA05): Waveform Quality Flags (continued)

4 byte set of 32 bit flags, 40/second

<table>
<thead>
<tr>
<th>MSB</th>
<th>Byte 157</th>
<th>Byte 158</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16</td>
<td></td>
</tr>
</tbody>
</table>

- **1** = number of gates with raw amplitude of 255 is greater than \( i_{\text{min4clip}} \) (a variable in anc07_0004)
- **0** = pqn type compression used, **1** = r type compression used for shot 40
- **standard parameterization used for shot 40**
- **alternate parameterization used for shot 40**
- **1** = the shot has no signal because the first gate is above threshold
- **0** = WF fit using all gates, **1** = WF fit using selected region from signal begin minus \( i_{\text{OFFSETB2}} \) to signal end plus \( i_{\text{OFFSETE2}} \) for standard parameters for shot 40 (the offsets are in anc07_0004)
- **0** = WF fit using all gates, **1** = WF fit using selected region from signal begin minus \( i_{\text{OFFSETB1}} \) to signal end plus \( i_{\text{OFFSETE1}} \) for alternate parameters for shot 40 (the offsets are in anc07_0004)
- **0** = standard deviation of fit (standard parameters) is too large for shot 40
- **standard deviation of fit (alternate parameters) is too large for shot 40**
- **1** = a second fit was tried for std parameters
- **1** = a second fit was tried for alt parameters
- **1** = the shot has no signal because the first gate is above threshold
- **Fit is suspect (narrow pulse or low signal to noise ratio) for shot 40**
- **alternate parameterization used for shot 40**
- **standard parameterization used for shot 40**
- **0** = pqn type compression used, **1** = r type compression used for shot 40

---

**Figure 5-34  Waveform Quality Flags**
Figure 5-34 Waveform Quality Flags (Continued)

i_WFqual [GLA05]: Waveform Quality Flags (continued)

4 byte set of 32 bit flags, 40/second

- maximum iteration exceeded for alternate parameters for shot 40
- maximum iteration exceeded for standard parameters for shot 40
- no leading edge detected for alternate parameters for shot 40
- no trailing edge detected for alternate parameters for shot 40
- possible land surface as indicated by regional ID grid for shot 40
- possible ocean surface as indicated by regional ID grid for shot 40
- possible icesheet surface as indicated by regional ID grid for shot 40
- possible seaice surface as indicated by regional ID grid for shot 40
- invalid WF (filled/missing data) for shot 40
- no transmitted pulse for shot 40
- no fit for alternate parameters ... also set if no signal or invalid for shot 40
- no fit for standard parameters ... also set if no signal or invalid for shot 40
- background noise and standard deviation of noise were calculated for alternate parameters for shot 40
- background noise and standard deviation of noise were calculated for standard parameters for shot 40

Figure 5-35 Atmosphere Availability Flag

i_atm_avail [1/sec for GLA06, 12-15]: Atmosphere Availability Flag

- 1 = GLA09 data available
- 0 = GLA09 data not available
- 1 = GLA11 data available
- 0 = GLA11 data not available
**Flags**

The GLAS Standard Data Products Specification - Data Dictionary

---

**i_cld1_mswf [GLA06, 12-15]: Multiple Scattering Warning Flag**

4 bit set of values:

- 0 = < 0.010
- 1 = 0.010 - 0.030
- 2 = 0.030 - 0.060
- 3 = 0.060 - 0.100
- 4 = 0.100 - 0.150
- 5 = 0.150 - 0.225
- 6 = 0.225 - 0.300
- 7 = 0.300 - 0.400
- 8 = 0.400 - 0.500
- 9 = 0.500 - 0.670
- 10 = 0.670 - 0.900
- 11 = 0.900 - 1.200
- 12 = 1.200 - 1.600
- 13 = 1.600 - 2.000
- 14 = > 2.000
- 15 = Invalid

---

**Note:** A warning flag value of 15 will be the default whenever no 532nm signal is available (as when the 532 laser energy is < 4 mJ during daytime). To distinguish this case from that of optically thick clouds, one must check the number of layers. If there were zero layers reported, but the MSWF is 15, then the cause is the lack of useable 532 data. If the number of layers is > 0 and the MSWF is 15, then the cause is total extinction of the lidar beam (this happens for clouds of optical depth > about 3).

A warning flag of ‘0’ is a very good indicator of no layers or a layer so thin it won’t cause any altimetry range delays.

---

**Figure 5-36 Multiple Scattering Warning Flag**

---

**i_CorrStatFlg [1/sec for GLA06, 12-15]: Correction Status Flag**

**Byte 1**

- 15 = load and ocean tides are from global model
- 14 = load and ocean tides are from regional model no. 1
- 13 = load and ocean tides are from regional model no. 2
- 12 = load and ocean tides are from regional model no. 3
- 11 = troposphere corrections based on 6hr NCEP grids surrounding data
- 10 = troposphere corrections based on 6hr NCEP grids but at least one was >6 but <24 hrs away from data
- 9 = troposphere corrections based on standard atm
- 8 = troposphere corrections based on reanalyzed met data

**Byte 2**

- 7 = computed aerosol and cloud optical depths used to calculate corrected reflectivity
- 6 = default-null aerosol and computed cloud optical depths used
- 5 = computed aerosol and default-null cloud optical depths used
- 4 = default-null values for aerosol and cloud optical depths used to calculate corrected reflectivity
- 3 = maximum bound set

---

**Figure 5-37 Correction Status Flag**
**Figure 5-38 High Resolution Source Flag**

i\textsubscript{DEM\_hires\_src} [1/sec for GLA06,12-14]: High Resolution Source Flag

1-byte flag, 40/second

<table>
<thead>
<tr>
<th>LSB</th>
<th>MSB</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Values:

- 0 = no high res source available
- 1 = "unfinished research" Shuttle Radar Topography Mission (SRTM)
- 2 = "finished" SRTM C-band 90 m DEM produced by NGA (+-2.1km E-W swath)
- 3 = ICESat Greenland V1 1km DEM
- 4 = ICESat Antarctica V1 500m DEM
- 5 = 90m Canadian Digital Elevation Data (CDED)
- 6 = 90m Canadian Digital Elevation Data (CDED) if available otherwise "finished" SRTM C-band 90 m DEM

**Figure 5-39 Medium Resolution Cloud Availability Flag**

i\textsubscript{MRC\_af} [GLA06, 12-15]: Medium Resolution Cloud Availability Flag

af = availability flag [extracted from the af bits of i\_MRCL\_flag on GLA09]: Tells how many cloud layers were found at this resolution from the 532 nm channel. Value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for, but not detected. Rate is once per second.
**i_rng_UQF [1/sec for GLA06, 12-15]: Range Increment Quality/Use Flag**; Two bytes per shot. Shot 1 is in first location in array.

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
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<td>13</td>
<td>12</td>
</tr>
<tr>
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<td>13</td>
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<table>
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<th>Byte 79</th>
<th>Byte 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>14</td>
<td>13</td>
<td>12</td>
</tr>
</tbody>
</table>

**MSB**

- 0 = signal begin range increment - standard parameterization - valid
- 1 = signal begin range increment - standard parameterization - invalid
- 0 = signal end range increment - standard parameterization - valid
- 1 = signal end range increment - standard parameterization - invalid
- 0 = threshold retracker range increment - standard parameterization - valid
- 1 = threshold retracker range increment - standard parameterization - invalid
- 0 = centroid range increment - standard parameterization - valid
- 1 = centroid range increment - standard parameterization - invalid
- 0 = signal begin range increment - alternate parameterization - valid
- 1 = signal begin range increment - alternate parameterization - invalid
- 0 = signal end range increment - alternate parameterization - valid
- 1 = signal end range increment - alternate parameterization - invalid
- 0 = threshold retracker range increment - alternate parameterization - valid
- 1 = threshold retracker range increment - alternate parameterization - invalid
- 0 = centroid range increment - alternate parameterization - valid
- 1 = centroid range increment - alternate parameterization - invalid
- 0 = ice sheet range increment - valid
- 1 = ice sheet range increment - invalid
- 0 = sea ice range increment - valid
- 1 = sea ice range increment - invalid
- 0 = land range increment - valid
- 1 = land range increment - invalid
- 0 = ocean range increment - valid
- 1 = ocean range increment - invalid

**LSB**

- spare

**Figure 5-40** Range Increment Quality/Use Flag
i_SurfRuf_slpQF [1/sec for GLA06, 12-14]: Surface Roughness and Slope Quality Flag. One byte per shot data quality flag.

Figure 5-41 Surface Roughness and Slope Quality Flag

i_surfType [GLA06, 12-15]: Region Type

Note: Multiple surface type bits may be set for a given location, i.e. Land and Ice Sheet bits are set for any grounded ice.

Figure 5-42 Region Type
### Lidar Frame Quality Flag

**i_LidarQF [1/Sec for GLA07], [1/4 sec for GLA08-11]: Lidar Frame Quality Flag**

- 0 = good data
- 1 = data unsuitable for L2 processing due to weak 532 laser energy or high background
- 2 = either SPCMs not turned on or bad background

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### 532 nm Attenuated Backscatter Vertical Profile Flag

**i_532AttBS_Flag [GLA07]: 532 nm Attenuated Backscatter Vertical Profile Flag**

- i40_g_bscs_uf = use flag at 40Hz: value 0 = no, saturated bins were replaced; value 1 = yes, saturated bins were replaced
- i40_g_bscs_qf = quality flag at 40Hz: value 0 = good data; value 1 = if 532 nm laser energy flag equals 3; value 2 = if 1064 nm quality flag equals 1 and 1064 nm backscatter value replaced 532 nm backscatter value
- i5_g_bscs_uf = use flag at 5Hz: value 0 = no, saturated bins were replaced; value 1 = yes, saturated bins were replaced
- i5_g_bscs_qf = quality flag at 5Hz: value 0 = good data; value 1 = if 532 nm laser energy flag equals 3; value 2 = if 1064 nm quality flag equals 1 and 1064 nm backscatter value replaced 532 nm backscatter value
- i1_g_bscs_qf = quality flag at 1sec: value 0 = good quality; value 2 = 532 nm integrated return is bad; value 3 = ratio of integrated return to molecular integrated return is bad
- i_g_cal_qf = quality flag: value 0 = good quality; value 2 = if no records left after elimination tests, value before elimination tests used instead
- i_g_cal_dnf = day/night flag: value 0 = indeterminate; value 1 = night; value 2 = day

**Figure 5-43 Lidar Frame Quality Flag**

![Diagram of Lidar Frame Quality Flag]

**Figure 5-44 532 nm Attenuated Backscatter Vertical Profile Flag**

![Diagram of 532 nm Attenuated Backscatter Vertical Profile Flag]
**i\_1064AttBS\_Flag [GLA07]: 1064 nm Attenuated Backscatter Vertical Profile Flag**

- \( i40\_ir\_bscs\_uf \) = use flag: not used
- \( i40\_ir\_bscs\_qf \) = quality flag at 40Hz: value 0 = good data; value 1 = if 1064 nm laser energy flag equals 3
- \( i5\_ir\_bscs\_uf \) = use flag: not used
- \( i5\_ir\_bscs\_qf \) = quality flag at 5Hz: value 0 = good data; value 1 = if 1064 nm laser energy flag equals 3
- \( i1\_ir\_cal\_qf \) = quality flag: value 0 = good quality; value 2 = if no records left after elimination tests, value before elimination tests used instead

---

**Figure 5-45  1064 nm Attenuated Backscatter Vertical Profile Flag**

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<td>5 4 3 2 1</td>
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<td>7 32 31 30 29</td>
<td>7 28 27 26 25</td>
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<td>7 16 15 14 13</td>
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<tbody>
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<td>7 7 7 7 0</td>
<td>7 16 15 14 13</td>
</tr>
</tbody>
</table>

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Version 1.0    Page 5-30    January 2013
i metFlg [GLA07]: Meteorological/Standard Atmospheric Data Source/Quality Flag

The met data used by the atmospheric processing routines normally consists of 2 global gridded data sets, one before the GLAS observation time and one after. They are both normally within 6 hours of the GLAS observation time. A check is made on the time of the MET files and if either one is > 24 hours from the GLAS observation time, it is not used. If both files are not used, then the standard atmosphere data is according to the latitude and season.

Met Data Source:
0: use both met files
1: use first met file
2: use second met file
3: use standard atmosphere, arctic summer
4: use standard atmosphere, arctic winter
5: use standard atmosphere, midlatitude summer
6: use standard atmosphere, midlatitude winter
7: use standard atmosphere, tropical

The quality flag is not used at this time.

Figure 5-46 Meteorological/Standard Atmospheric Data Source/Quality Flag

i5_g_sat_prof [GLA07]: 532 nm Saturation Flag Profile 40 to -1km. Indicates whether the 532 data were saturated and therefore whether the value is converted from the 1064 data.

1 bit per each shot(40) per bin (548); 0 = not saturated, 1 = saturated.

Figure 5-47 532 nm Saturation Flag Profile 40 to -1km
**i40_g_sat_prof [GLA07]:** 532 nm Saturation Flag Profile 10 to -1km. Indicates whether the 532 data were saturated and therefore whether the value is converted from the 1064 data.

1 bit per each shot(40) per bin (148); 0 = not saturated, 1 = saturated.

**i_Aer_ir_layflg [GLA08]:** Layer Flag for 1064 Aerosol

**Figure 5-48 532 nm Saturation Flag Profile 10 to -1km**

**Figure 5-49 Layer Flag for 1064 Aerosol**
**Figure 5-50  Layer Height Flag**

The GLAS Standard Data Products Specification - Data Dictionary

**i_LayHgt_Flag [GLA08]: Layer Height Flag**

- **Byte 1**: Height flags: 0 = not a Polar Stratospheric Cloud (PSC); 1 = low likely; 2 = medium likely; 3 = high likely
- **Byte 2**: Quality flags at 1 per 20 sec: 0 = aerosol layers were searched for, but not detected; 1 to 13 = increasing goodness; 14 = bad; 15 = upper (>20 km) aerosol layers were not searched for
- **Byte 3**: Availability flags at 1 per 20 sec: 0 = aerosol layers were searched for, but not detected; 15 = aerosol layers were not searched for.
- **Byte 4**: Use flags at 1 per 20 sec: 0 = no saturated bins present in layer; 1 = saturated bins present in layer and replaced with 1064 data

**i_pscf**: Value 0 = not a Polar Stratospheric Cloud (PSC); Value 1 = low likely; Value 2 = medium likely; Value 3 = high likely

**i20_aer_qf**: Quality flag at 1 per 20 sec: Value 0 = aerosol layers were searched for, but not detected; Values 1 to 13 = increasing goodness; Value 14 = bad; Value 15 = lower (<20 km) aerosol layers were not searched for.

**i20_aer_af**: Availability flag at 1 per 20 sec: Contains the number of aerosol layers found below 20 km from a 20 second average of the data. Value 0 = aerosol layers were searched for, but not detected; Value 15 = aerosol layers were not searched for.

**i20_aer_uf**: Use flag at 1 per 20 sec: Value 0 = no saturated bins present in layer; Value 1 = saturated bins present in layer and replaced with 1064 data

**i4_aer_qf**: Quality flag at 1 per 4 sec: Value 0 = aerosol layers were searched for, but not detected; Values 1 to 13 = increasing goodness; Value 14 = bad; Value 15 = lower (<20 km) aerosol layers were not searched for.

**i4_aer_af**: Availability flag at 1 per 4 sec: Contains the number of elevated (excluding PBL) aerosol layers found below 20 km from a 4 second average of the data. Value 0 = aerosol layers were searched for, but not detected; Value 15 = aerosol layers were not searched for.

**i4_aer_uf**: Use flag at 1 per 4 sec: Value 0 = no saturated bins present in layer; Value 1 = saturated bins present in layer and replaced with 1064 data

**i_HRpbl_qf**: Quality flag at 5Hz for 4 sec: Value 0 = PBL was searched for, but not detected; Values 1 to 13 = increasing goodness; Value 14 = bad; Value 15 = PBL not searched for.

**i_HRpbl_uf**: Use flag at 5Hz for 4 sec: Value 0 = no saturated bins present in layer; Value 1 = saturated bins present in layer and replaced with 1064 data

**i_HRpbl_ccf**: Clear/cloudy flag at 5Hz for 4 sec: Value 0 = clear; Value 1 = cloudy

**i_LRpbl_qf**: Quality flag at 1 per 4 sec: Value 0 = PBL was searched for, but not detected; Values 1 to 13 = increasing goodness; Value 14 = bad; Value 15 = PBL not searched for.

**i_LRpbl_uf**: Use flag at 1 per 4 sec: Value 0 = no saturated bins present in layer; Value 1 = saturated bins present in layer and replaced with 1064 data

**i_LRpbl_ccf**: Clear/cloudy flag at 1 per 4 sec: Value 0 = clear; Value 1 = cloudy

**i_pscf (layers 8-1)**

**i20_aer_qf (layers 3-1)**

**i4_aer_qf (layers 5-1)**

**i4_aer_af (layers 5-1)**

**Figure 5-50 Layer Height Flag**
**i_FRCL_Flag [GLA09]: Full Resolution Cloud Layer Flag** (4 seconds per record, 40 per second rate)

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<th>Byte 1</th>
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<tr>
<td>1</td>
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<tr>
<td>0</td>
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</tbody>
</table>

**af** = availability flag: Tells how many cloud layers were found (from the 532 channel) at this resolution. Value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for, but not detected.

**quality flag:** value 15 = cloud layers were not searched for - either bad data or cloud layers were not found at a coarser resolution; value 1 = low chance of being a cloud; value 2 = moderate; value 3 = high; value 4 = no doubt -- based upon noise-to-signal and geometric thickness evaluation; Value 14 = height of bottom of lowest detected layer in profile very uncertain because ground signal was not detected.

**df** = diurnal flag: This tells whether a given layer would be detected during normal daylight conditions. Value 0 = layer would not have been detected in typical daytime background; value 1 = layer would have been detected in daylight.

---

**Figure 5-51 Full Resolution Cloud Layer Flag**
 bytes 81, 100, 101, 120, and 160

Figure 5-51  Full Resolution Cloud Layer Flag (Continued)
**Figure 5-51** Full Resolution Cloud Layer Flag (Continued)
Figure 5-51  Full Resolution Cloud Layer Flag (Continued)
**i_FRir_qaFlag [GLA09, 11]: Full Resolution 1064 Quality Flag (i1b(160): 4 seconds per record, 40 per second rate)**

One byte per data quality flag

Value 15 = No clouds.

Value 14 = Indicates the likely presence of low clouds (< 150 m) based on elevated signal from the two bins above the ground return bin that were not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (i_Frir_cldtop) is set to a value of 0.10 km.

Value 13 = Indicates the possible presence of a cloud based on the value of the integrated signal parameter (i_Frir_intsig) that was not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (i_Frir_cldtop) is set to a value of 10.0 km.

Value 0 - 12 = Cloud detected by cloud search algorithm with higher numbers indicating a stronger average signal from the region starting at cloud top and extending 500 m below cloud top height.

---

**Figure 5-52 Full Resolution 1064 Quality Flag**
af = availability flag: Tells how many cloud layers were found (from the 532 channel) at this resolution; value 15 = cloud layers were not searched for, value 0 = cloud layers were searched for, but not detected.

qf = quality flag: value 15 = cloud layers were not searched for - either bad data or cloud layers were not found at a coarser resolution; value 1 = low chance of being a cloud; value 2 = moderate; value 3 = high; value 4 = no doubt -- based upon noise-to-signal and geometric thickness evaluation; Value 14 = height of bottom of lowest detected layer in profile very uncertain because ground signal was not detected.

uf = use flag: not used at this time

df = diurnal flag: This tells whether a given layer would be detected during normal daylight conditions. value 0 = layer would not have been detected in typical daytime background; value 1 = layer would have been detected in daylight

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Figure 5-53 High Resolution Cloud Layer Flag
i_HRCL_Flag [GLA09]: High Resolution Cloud Layer Flag (4 seconds per record, 5 per second rate)

Figure 5-53  High Resolution Cloud Layer Flag (Continued)
i_HRCL_Flag [GLA09]: High Resolution Cloud Layer Flag (4 seconds per record, 5 per second rate)

Figure 5-53  High Resolution Cloud Layer Flag (Continued)
i_HRCL_Flag [GLA09]: High Resolution Cloud Layer Flag (4 seconds per record, 5 per second rate)

Figure 5-53  High Resolution Cloud Layer Flag (Continued)
i_HRC_L_Flag [GLA09]: High Resolution Cloud Layer Flag (4 seconds per record, 5 per second rate)  

**Figure 5-53** High Resolution Cloud Layer Flag (Continued)
Figure 5-53 High Resolution Cloud Layer Flag (Continued)

i_HRCL_Flag [GLA09]: High Resolution Cloud Layer Flag (4 seconds per record, 5 per second rate)

Byte 161

7 | 1 | 1 | 1 | 1 | 1 | 1 | 1
8 | 1 | 1 | 1 | 1 | 1 | 1 | 1

i_HRC_df (layers 10-1, flag 5, second 1)

Byte 166

7 | 1 | 1 | 1 | 1 | 1 | 1 | 1
8 | 1 | 1 | 1 | 1 | 1 | 1 | 1

i_HRC_df (layers 10-1, flag 1, second 4)

Byte 167

7 | 1 | 1 | 1 | 1 | 1 | 1 | 1
8 | 1 | 1 | 1 | 1 | 1 | 1 | 1

i_HRC_df (layers 10-1, flag 2, second 4)

Byte 168

7 | 1 | 1 | 1 | 1 | 1 | 1 | 1
8 | 1 | 1 | 1 | 1 | 1 | 1 | 1

i_HRC_df (layers 10-1, flag 3, second 2)

Byte 169

7 | 1 | 1 | 1 | 1 | 1 | 1 | 1
8 | 1 | 1 | 1 | 1 | 1 | 1 | 1

i_HRC_df (layers 10-1, flag 4, second 1)

Figure 5-54 Low Resolution Cloud Layer Flag

i_LRCL_Flag [GLA09]: Low Resolution Cloud Layer Flag (4 seconds per record, at once per 4 second rate)

af = availability flag: Tells how many cloud layers were found at this resolution from the 532 nm channel.
value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for, but not detected

qf = quality flag: value 15 = cloud layers were not searched for - either bad data or cloud layers were not found at a coarser resolution;
value 1 = low chance of being a cloud; value 2 = moderate; value 3 = high; value 4 = no doubt -- based upon noise-to-signal and geometric
thickness evaluation; Value 14 = height of bottom of lowest detected layer in profile very uncertain because ground signal was not detected.

df = diurnal flag: This tells whether a given layer would be detected during normal daylight conditions. value 0 = layer would not have been
detected in typical daytime background; value 1 = layer would have been detected in daylight

Figure 5-54 Low Resolution Cloud Layer Flag
i_LRIR_QAflag [GLA09]: Low Resolution 1064 Quality Flag (once per 4 seconds rate)

af = availability flag: It provides the number of cloud layers determined from the 1064 nm data.
value 0 = layers searched for but not detected; value 15 = cloud layers not searched for.
QAflag = quality flag: Value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for but not detected; values 1-14 indicate increasing confidence of good cloud retrieval (value 1 = least confidence, value 14 = greatest confidence).

<table>
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<tr>
<th>MSB</th>
<th>LSB</th>
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<th>Byte 3</th>
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<td>8</td>
<td>7</td>
</tr>
<tr>
<td>QAflag (layers 10-5)</td>
<td>QAflag (layers 4-1)</td>
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<td></td>
</tr>
</tbody>
</table>

Figure 5-55  Low Resolution 1064 Quality Flag

i_MRC_Cflag [GLA09]: Medium Resolution Cloud Layer Flag (4 seconds per record, at once per second rate)

af = availability flag: Tells how many cloud layers were found at this resolution from the 532 nm channel.
value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for, but not detected
qf=quality flag: value 15 = cloud layers were not searched for - either bad data or cloud layers were not found at a coarser resolution;
value 1 = low chance of being a cloud; value 2 = moderate; value 3 = high; value 4 = no doubt -- based upon noise-to-signal and geometric thickness evaluation; Value 14 = height of bottom of lowest detected layer in profile very uncertain because ground signal was not detected.
df = diurnal flag: Tells whether a given layer would be detected during normal daylight conditions. value 0 = layer would not have been detected in typical daytime background; value 1 = layer would have been detected in daylight

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<th>Byte 3</th>
<th>Byte 4</th>
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<td>7</td>
</tr>
<tr>
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<td>3</td>
<td>1</td>
<td>1</td>
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<td>i_MRC_af (seconds 4-1)</td>
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<tr>
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<td>8</td>
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</tr>
<tr>
<td>i_MRC_qf (layers 10-1, second 4)</td>
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<td></td>
</tr>
</tbody>
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<tr>
<td>i_MRC_qf (layers 10-1, second 3)</td>
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<table>
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<td>4</td>
<td>3</td>
</tr>
<tr>
<td>i_MRC_qf (layers 10-1, second 2)</td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
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<th>Byte 19</th>
<th>Byte 20</th>
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</tr>
<tr>
<td>2</td>
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<td>0</td>
<td>7</td>
</tr>
<tr>
<td>i_MRC_qf (layers 10-1, second 1)</td>
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<td></td>
</tr>
</tbody>
</table>

<table>
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</tr>
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<td>7</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 5-56  Medium Resolution Cloud Layer Flag
### i_MRC_Flag [GLA09]: Medium Resolution Cloud Layer Flag (4 seconds per record, at once per second rate)

<table>
<thead>
<tr>
<th>Byte 25</th>
<th>Byte 26</th>
<th>Byte 27</th>
<th>Byte 28</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

Spare

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<th>Byte 36</th>
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<td>0</td>
</tr>
</tbody>
</table>

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i_MRC_df (layers 10-1, second 4)  i_MRC_df (layers 10-1, second 3)  i_MRC_df (layers 10-1, second 2)

<table>
<thead>
<tr>
<th>Byte 29</th>
<th>Byte 30</th>
<th>Byte 31</th>
<th>Byte 32</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0</td>
</tr>
</tbody>
</table>

Spare

<table>
<thead>
<tr>
<th>Byte 37</th>
</tr>
</thead>
</table>

0

i_MRC_df (layers 10-1, second 1)

---

**Figure 5-56 Medium Resolution Cloud Layer Flag (Continued)**
**i_MRCir_QAflag [GLA09, 11]: Medium Resolution 1064 Quality Flag** (4 seconds per record, at once per second rate)

- **af** = availability flag: It provides the number of cloud layers determined from the 1064 nm data.
  - value 0 = layers searched for but not detected; value 15 = cloud layers not searched for.

- **QAflag** = quality flag: value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for but not detected; values 1-14 indicate increasing confidence of good cloud retrieval (value 1 = least confidence, value 14 = greatest confidence).

---

**Figure 5-57 Medium Resolution 1064 Quality Flag**
i_aer4_bs_flag (GLA10): Aerosol Backscatter Flag (once per 4 sec., up to 9 layers/record)

(QF = Quality Flag; UF = Use Flag)

The layers shown below are ordered as follows. Layer 9 corresponds to the lowest layer in the atmosphere (the PBL). Layers 8-4 are for the elevated aerosol layers below 20 km, with 8 the lowest and 4 the highest in altitude. Layers 3-1 are for elevated aerosol above 20 km again with 3 the lowest and 1 the highest.

For example if there were two elevated aerosol layers and the PBL detected, then the flags would be set for layers 9 (PBL), 4 and 5. In this case layer 4 is the highest elevated aerosol layer found.

Layer Use Flag Values

a) For backscatter cross section, the use flag gives saturation status as follows:

Use FLAG SATURATION STATUS
0 = no saturation detected
1 = one or two bins were saturated with 1064 nm conversion performed
2 = at least three bins were saturated with 1064 nm conversion performed
3 = at least one but less than four bins were saturated with no conversion performed
4 = four or more bins were saturated with no conversion performed
15 = invalid

Quality Flag Values

0 = 0-5 % Error
1 = 5-10 % Error
2 = 10-15 % Error
3 = 15-20 % Error
4 = 20-25 % Error
5 = 25-30 % Error
6 = 30-35 % Error
7 = 35-40 % Error
8 = 40-45 % Error
9 = 45-50 % Error
10 = 50-55 % Error
11 = 55-60 % Error
12 = 60-65 % Error
13 = 65-70 % Error
14 = 70 and greater % Error
15 = Unable to calculate error

Figure 5-58 Aerosol Backscatter Flag
Figure 5-59 Aerosol Extinction Flag

Layer Use Flag Values

- for extinction cross section and layer optical depth, the use flag designates layer type category as follows:

  Use Flag Meaning
  - Aerosol: based on S ratio default index, PSC flag, and tropopause height
  - 00 = PBL generic (all PBL indices not mentioned below)
  - 01 = PBL maritime (index 4)
  - 02 = PBL continental ice (index 7)
  - 03 = PBL continental haze (index 11)
  - 04 = PBL Saharan dust (index 12)
  - 05 = PBL desert (index 13)
  - 06 = PBL smoke (indices 15,3)
  - 07 = TROP generic (all TROP indices not mentioned below)
  - 08 = TROP volcanic (index 3)
  - 09 = TROP continental haze (index 11)
  - 10 = TROP Saharan dust (index 12)
  - 11 = TROP desert (index 13)
  - 12 = TROP smoke (index 15)
  - 13 = STRATO aerosol (any non-PSC layer whose top is > tropopause)
  - 14 = PSC type I (PSC with rh less than or equal to 95%) or PSC type II (PSC with rh greater than 95%)
  - 15 = invalid

Quality Flag Values

- 0 = 0-5% Error
- 1 = 5-10% Error
- 2 = 10-15% Error
- 3 = 15-20% Error
- 4 = 20-25% Error
- 5 = 25-30% Error
- 6 = 30-35% Error
- 7 = 35-40% Error
- 8 = 40-45% Error
- 9 = 45-50% Error
- 10 = 50-55% Error
- 11 = 55-60% Error
- 12 = 60-65% Error
- 13 = 65-70% Error
- 14 = 70 and greater % Error
- 15 = Unable to calculate error

The layers shown below are ordered as follows. Layer 9 corresponds to the lowest layer in the atmosphere (the PBL). Layers 8-4 are for the elevated aerosol layers below 20 km with 8 the lowest and 4 the highest altitude. Layers 3-1 are for elevated aerosol above 20 km again with 3 the lowest and 1 the highest.

For example if there were two elevated aerosol layers and the PBL detected, then the flags would be set for layers 9 (PBL), 4 and 5. In this case layer 4 is the highest elevated aerosol layer found.
i_cld1_bs_flag [GLA10]: Cloud Backscatter Flag (4 sec/records, up to 10 layers/sec.)

(QF = Quality Flag, UF = Use Flag)

The layers shown below are ordered as follows. Layer 1 is the highest in the atmosphere and layer 10 is the lowest. For example if 3 cloud layers were detected then the flags corresponding to those layers would be found in layers 1, 2 and 3 (from highest to lowest cloud layer).

<table>
<thead>
<tr>
<th>Byte 1</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>UF (second 4, layer 10-1)</td>
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</tbody>
</table>

<table>
<thead>
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<td></td>
<td></td>
</tr>
<tr>
<td>UF (second 3, layer 10-1)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Byte 11</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Byte 13</th>
<th>Byte 14</th>
<th>Byte 15</th>
<th>Byte 16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UF (second 2, layer 10-1)</td>
<td></td>
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<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Byte 17</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>UF (second 1, layer 10-1)</td>
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</tr>
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</table>

**Figure 5-60 Cloud Backscatter Flag**
### i_cld1_bs_flag [GLA10]: Cloud Backscatter Flag (4 sec/records, up to 10 layers/sec.)

(QF = Quality Flag; UF = Use Flag)

<table>
<thead>
<tr>
<th>Byte 21</th>
<th>Byte 22</th>
<th>Byte 23</th>
<th>Byte 24</th>
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<tbody>
<tr>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>QF (second 4, layer 10-1)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Byte 25</th>
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<th>Byte 28</th>
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<tr>
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<td>0</td>
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<tr>
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<td>10</td>
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</tr>
<tr>
<td>10</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>QF (second 1, layer 10-1)</td>
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<td>5</td>
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<tr>
<td>4</td>
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<td>2</td>
<td>1</td>
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<tr>
<td>QF (second 1, layer 10-1)</td>
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<td></td>
</tr>
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### Layer Use Flag Values

a) For backscatter cross section, the use flag gives saturation status as follows:

**Use FLAG SATURATION STATUS**

- 0 = no saturation detected
- 1 = one or two bins were saturated with 1064 nm conversion performed
- 2 = at least three bins were saturated with 1064 nm conversion performed
- 3 = at least one but less than four bins were saturated with no conversion performed
- 4 = four or more bins were saturated with no conversion performed
- 15 = invalid

### Quality Flag Values

- 0 = 0-5 % Error
- 1 = 5-10 % Error
- 2 = 10-15% Error
- 3 = 15-20% Error
- 4 = 20-25% Error
- 5 = 25-30% Error
- 6 = 30-35% Error
- 7 = 35-40% Error
- 8 = 40-45% Error
- 9 = 45-50% Error
- 10 = 50-55% Error
- 11 = 55-60% Error
- 12 = 60-65% Error
- 13 = 65-70% Error
- 14 = 70 and greater % Error
- 15 = Unable to calculate error

---

**Figure 5-60 Cloud Backscatter Flag (Continued)**
Figure 5-61  Cloud Extinction Flag
Layer Use Flag Values

a) for extinction cross section and layer optical depth, the use flag designates layer type category as follows:

Cloud: (based on average cloud temperature, water cloud is warmer than –13 C)

<table>
<thead>
<tr>
<th>Use Flag</th>
<th>Temperature Range</th>
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<tbody>
<tr>
<td>00</td>
<td>less than or equal to –75.0 C</td>
</tr>
<tr>
<td>01</td>
<td>75.0 through –68.5</td>
</tr>
<tr>
<td>02</td>
<td>68.5 through –62.0</td>
</tr>
<tr>
<td>03</td>
<td>62.0 through –55.5</td>
</tr>
<tr>
<td>04</td>
<td>55.5 through –49.0</td>
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<td>05</td>
<td>49.0 through –42.5</td>
</tr>
<tr>
<td>06</td>
<td>42.5 through –36.0</td>
</tr>
<tr>
<td>07</td>
<td>36.0 through –29.5</td>
</tr>
<tr>
<td>08</td>
<td>29.5 through –23.0</td>
</tr>
<tr>
<td>09</td>
<td>23.0 through –16.5</td>
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<td>6.5 through 13.0</td>
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<td>13</td>
<td>13.0 through 19.5</td>
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<tr>
<td>14</td>
<td>greater than 19.5 C</td>
</tr>
<tr>
<td>15</td>
<td>invalid</td>
</tr>
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</table>

Figure 5-61 Cloud Extinction Flag (Continued)
i_aer4_sval uf [GLA10]: Aerosol True S Values Use Flag (once per 4 sec., up to 9 layers/record)

![Figure 5-62 Aerosol True S Values Use Flag](image)

i_cld1_sval uf [GLA10]: Cloud True S Values Use Flag (4 sec/records, up to 10 layers/sec.)

![Figure 5-63 Cloud True S Values Use Flag](image)
**i_aer4_flag [GLA11]: Aerosol Optical Depth** (4 sec. per record, at once per 4 second rate)

(QF = Quality Flag; UF = Use Flag)

The layers shown below are ordered as follows. Layers 8-4 are for the elevated aerosol layers below 20 km, with 8 the lowest and 4 the highest in altitude. Layers 3 – 1 are for elevated aerosol above 20 km again with 3 the lowest and 1 the highest. For example if there were two elevated aerosol layers detected which were below 20 km, then the flags would be set for layers 8 and 7. In this case layer 7 is the highest elevated aerosol layer found. The values for layers 1-3 would be invalid.

<table>
<thead>
<tr>
<th>Layer Use Flag Values</th>
<th>Quality Flag Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - none (use your default Sa)</td>
<td>0 = 0-5 % Error</td>
</tr>
<tr>
<td>1 - sulfate+carbon (67.5 sr)</td>
<td>1 = 5-10 % Error</td>
</tr>
<tr>
<td>2 - carbon (62.0 sr)</td>
<td>2 = 10-15 % Error</td>
</tr>
<tr>
<td>3 - salt+dust (32.5 sr)</td>
<td>3 = 15-20 % Error</td>
</tr>
<tr>
<td>4 - salt (28.5 sr)</td>
<td>4 = 20-25 % Error</td>
</tr>
<tr>
<td>5 - sulfate (60.0 sr)</td>
<td>5 = 25-30 % Error</td>
</tr>
<tr>
<td>6 - dust+carbon (58.1 sr)</td>
<td>6 = 30-35 % Error</td>
</tr>
<tr>
<td>7 - salt+dust+sulfate (47.2 sr)</td>
<td>7 = 35-40 % Error</td>
</tr>
<tr>
<td>8 - sulfate (40.0 sr)</td>
<td>8 = 40-45 % Error</td>
</tr>
<tr>
<td>9 - dust+carbon+ sulfite (44.2 sr)</td>
<td>9 = 45-50 % Error</td>
</tr>
<tr>
<td>10 - dust (42.5 sr)</td>
<td>10 = 50-55 % Error</td>
</tr>
<tr>
<td>11 - salt+ sulfate (47.9 sr)</td>
<td>11 = 55-60 % Error</td>
</tr>
<tr>
<td>12 - dust+sulfate (46.2 sr)</td>
<td>12 = 60-65 % Error</td>
</tr>
<tr>
<td>13 - sulfate (51.0 sr)</td>
<td>13 = 65-70 % Error</td>
</tr>
<tr>
<td>14 - dust+ sulfate (52.3 sr)</td>
<td>14 = 70 and greater % Error</td>
</tr>
<tr>
<td>15 - all (52.3 sr)</td>
<td>15 = Unable to calculate error</td>
</tr>
</tbody>
</table>

Use flag meaning for stratospheric layers (layers 1-3)

12 - Stratospheric aerosol (non PSC layer whose top is > tropopause)
13 - PSC Type I
14 - PSC Type II
15 - Invalid
**I_cld1_flag [GLA11]: Cloud Optical Depth** (4 sec. per record, at once per second rate)

(QF = Quality Flag; UF = Use Flag; see Page 3 for Value Descriptions)

The layers shown below are ordered as follows. Layer 1 is the highest in the atmosphere and layer 10 is the lowest. For example if 3 cloud layers were detected then the flags corresponding to those layers would be found in layers 1, 2 and 3 (from highest to lowest cloud layer).

<table>
<thead>
<tr>
<th>Byte</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Byte 1</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Byte 2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Byte 3</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Byte 4</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

**Figure 5-65 Cloud Optical Depth**

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Layer Use Flag Values

a) for extinction cross section and layer optical depth, the use flag designates layer type category as follows:

Cloud: (based on average cloud temperature, water cloud is warmer than –13 C)

<table>
<thead>
<tr>
<th>Use Flag Meaning</th>
<th>Layer Type Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 = less than or equal to –75.0 C</td>
<td>Cloud type 1</td>
</tr>
<tr>
<td>01 = -75.0 through –68.5</td>
<td>Cloud type 2</td>
</tr>
<tr>
<td>02 = -68.5 through –62.0</td>
<td>Cloud type 3</td>
</tr>
<tr>
<td>03 = -62.0 through –55.5</td>
<td>Cloud type 4</td>
</tr>
<tr>
<td>04 = -55.5 through –49.0</td>
<td>Cloud type 5</td>
</tr>
<tr>
<td>05 = -49.0 through –32.5</td>
<td>Cloud type 6</td>
</tr>
<tr>
<td>06 = -32.5 through –26.0</td>
<td>Cloud type 7</td>
</tr>
<tr>
<td>07 = -26.0 through –19.5</td>
<td>Cloud type 8</td>
</tr>
<tr>
<td>08 = -19.5 through –13.0</td>
<td>Cloud type 9</td>
</tr>
<tr>
<td>09 = -13.0 through –6.5</td>
<td>Cloud type 10</td>
</tr>
<tr>
<td>10 = -6.5 through 0.0</td>
<td>Cloud type 11</td>
</tr>
<tr>
<td>11 = 0.0 through 6.5</td>
<td>Cloud type 12</td>
</tr>
<tr>
<td>12 = 6.5 through 13.0</td>
<td>Cloud type 13</td>
</tr>
<tr>
<td>13 = 13.0 through 19.5</td>
<td>Cloud type 14</td>
</tr>
<tr>
<td>14 = greater than 19.5 C</td>
<td>Cloud type 15</td>
</tr>
<tr>
<td>15 = invalid</td>
<td>Cloud type 16</td>
</tr>
</tbody>
</table>

Quality Flag Values

<table>
<thead>
<tr>
<th>Quality Flag Value</th>
<th>Error Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0–5 % Error</td>
</tr>
<tr>
<td>1</td>
<td>5–10 % Error</td>
</tr>
<tr>
<td>2</td>
<td>10–15 % Error</td>
</tr>
<tr>
<td>3</td>
<td>15–20 % Error</td>
</tr>
<tr>
<td>4</td>
<td>20–25 % Error</td>
</tr>
<tr>
<td>5</td>
<td>25–30 % Error</td>
</tr>
<tr>
<td>6</td>
<td>30–35 % Error</td>
</tr>
<tr>
<td>7</td>
<td>35–40 % Error</td>
</tr>
<tr>
<td>8</td>
<td>40–45 % Error</td>
</tr>
<tr>
<td>9</td>
<td>45–50 % Error</td>
</tr>
<tr>
<td>10</td>
<td>50–55 % Error</td>
</tr>
<tr>
<td>11</td>
<td>55–60 % Error</td>
</tr>
<tr>
<td>12</td>
<td>60–65 % Error</td>
</tr>
<tr>
<td>13</td>
<td>65–70 % Error</td>
</tr>
<tr>
<td>14</td>
<td>70 and greater % Error</td>
</tr>
<tr>
<td>15</td>
<td>Unable to calculate error</td>
</tr>
</tbody>
</table>

Figure 5-65 Cloud Optical Depth (Continued)
**i_cld1_mswf [GLA11]: Multiple Scattering Warning Flag (4 sec. per record, at once per second rate)**

4 bit set of values:

0 = < 0.010  
1 = 0.010 - 0.030  
2 = 0.030 - 0.060  
3 = 0.060 - 0.100  
4 = 0.100 - 0.150  
5 = 0.150 - 0.225  
6 = 0.225 - 0.300  
7 = 0.300 - 0.400  
8 = 0.400 - 0.500  
9 = 0.500 - 0.670  
10 = 0.670 - 0.900  
11 = 0.900 - 1.200  
12 = 1.200 - 1.800  
13 = 1.800 - 2.000  
14 = > 2.000  
15 = Invalid

---

**i_pbl4_flag [GLA11]: PBL Optical Depth (4 sec. per record, at once per 4 second rate)**

(QF = Quality Flag; UF = Use Flag)

---

**Figure 5-66 Multiple Scattering Warning Flag**

**Figure 5-67 PBL Optical Depth**
**i_SiRufQF** [1/sec for GLA13]: Sea Ice Roughness Quality Flag; One byte per shot data quality flag

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>shots 02-19</td>
<td>shots 20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Byte 21</th>
<th>Byte 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>40</td>
</tr>
<tr>
<td>shots 22-39</td>
<td>shots 40</td>
</tr>
</tbody>
</table>

- **70** Byte 1
- **70** Byte 20
- **70** Byte 40
- **70** Byte 21
- **70** Byte 40

### Figure 5-68 Sea Ice Roughness Quality Flag

**i_OcRMSqf** [1/sec for GLA15]: Ocean RMS Roughness Quality Flag; one byte per shot quality flag

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>shots 02-19</td>
<td>shots 20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Byte 21</th>
<th>Byte 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>40</td>
</tr>
<tr>
<td>shots 22-39</td>
<td>shots 40</td>
</tr>
</tbody>
</table>

### Figure 5-69 Ocean RMS Roughness Quality Flag

- **0=roughness valid (other bits may indicate degradation)**
- **1=roughness invalid**
- **0=single peak waveform from standard fit**
- **1=multi-peak waveform from standard fit - roughness and slope degraded and will not be presentative of full footprint**
- **0=reasonable values for standard deviation of the width of gaussian for received wf**
- **1=high values for standard deviation of the width of gaussian for received wf - may cause degradation of slope and roughness values**
- **0=no problems with received/transmitted pulse widths**
- **1=valid values do not exist for slope and roughness**
- **0=roughness calculated from Gaussian fits to transmitted and received wfs**
- **1=roughness calculated from external source**
- **2=roughness calculated as rms of 40 surface elevations**
- **not used**
Figure 5-70 Saturation Correction Flag

Bytes per shot: 10/second

Bits 0-3: i_satElevCorr flag (4 bits); values indicated below:
0 = Not Saturated (i_satIdx<2) or No Signal
1 = Sat. Correction is Inconsequential
2 = Sat. Correction is Applicable
3 = Sat. Correction is Not Computable
4-15 = TBD

* Full Width=EndOff-SigBegOff (using Std threshold for GLA06,12,13,15, Alt threshold for GLA14)

Figure 5-71 SIRU Configuration Word

Gyro A Status
0 = Inactive, 1 = Active

Gyro B Status
0 = Inactive, 1 = Active

Gyro C Status
0 = Inactive, 1 = Active

Gyro D Status
0 = Inactive, 1 = Active

CPU/HCM Channel 1 Status
0 = Inactive, 1 = Active

CPU/HCM Channel 2 Status
0 = Inactive, 1 = Active

Power Supply 1 Status
0 = Inactive, 1 = Active

Power Supply 2 Status
0 = Inactive, 1 = Active

Reserved

Reserved

Spare 3

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## Abbreviations & Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2P</td>
<td>Algorithm-to-Product Conversion</td>
</tr>
<tr>
<td>ALT</td>
<td>Altimeter or Altimetry, also designation for the EOS-Altimeter spacecraft series</td>
</tr>
<tr>
<td>ANCxx</td>
<td>GLAS Ancillary Data Files</td>
</tr>
<tr>
<td>APID</td>
<td>GLAS Level-0 Data file</td>
</tr>
<tr>
<td>ATBD</td>
<td>Algorithm Theoretical Basis Document</td>
</tr>
<tr>
<td>ATM</td>
<td>Atmosphere</td>
</tr>
<tr>
<td>CCB</td>
<td>Change Control Board</td>
</tr>
<tr>
<td>ClearCase</td>
<td>GSAS version tracking software</td>
</tr>
<tr>
<td>CR</td>
<td>Change Request</td>
</tr>
<tr>
<td>DAAC</td>
<td>Distributed Active Archive Center</td>
</tr>
<tr>
<td>DEM</td>
<td>Digital Elevation Model</td>
</tr>
<tr>
<td>DFD</td>
<td>Data Flow Diagram</td>
</tr>
<tr>
<td>DLT</td>
<td>Digital Linear Tape</td>
</tr>
<tr>
<td>EDOS</td>
<td>EOS Data and Operations System</td>
</tr>
<tr>
<td>EDS</td>
<td>Expedited Data Set</td>
</tr>
<tr>
<td>ELEV</td>
<td>Elevation</td>
</tr>
<tr>
<td>EOC</td>
<td>EOS Operating Center</td>
</tr>
<tr>
<td>EOS</td>
<td>NASA Earth Observing System Mission Program</td>
</tr>
<tr>
<td>EOSDIS</td>
<td>Earth Observing System Data and Information System</td>
</tr>
<tr>
<td>GB</td>
<td>Gigabyte</td>
</tr>
<tr>
<td>GDS</td>
<td>GLAS Ground Data System</td>
</tr>
<tr>
<td>GLAS</td>
<td>Geoscience Laser Altimeter System instrument or investigation</td>
</tr>
<tr>
<td>GLAxx</td>
<td>GLAS Science Data Product Files</td>
</tr>
<tr>
<td>GLOP</td>
<td>GLAS Level-0 PGE (correctly called GLAS_L0proc)</td>
</tr>
<tr>
<td>TBD</td>
<td>to be determined, to be done, or to be developed</td>
</tr>
</tbody>
</table>
Glossary

aggregate A collection, assemblage, or grouping of distinct data parts together to make a whole. It is generally used to indicate the grouping of GLAS data items, arrays, elements, and EOS parameters into a data record. For example, the collection of Level 1B EOS Data Parameters gathered to form a one-second Level 1B data record. It could be used to represent groupings of various GLAS data entities such as data items aggregated as an array, data items and arrays aggregated into a GLAS Data Element, GLAS Data Elements aggregated as an EOS Data Parameter, or EOS Data Parameters aggregated into a Data Product record.

array An ordered arrangement of homogenous data items that may either be synchronous or asynchronous. An array of data items usually implies the ability to access individual data items or members of the array by an index. An array of GLAS data items might represent the three coordinates of a georeference location, a collection of values at a rate, or a collection of values describing an altimeter waveform.

file A collection of data stored as records and terminated by a physical or logical end-of-file (EOF) marker. The term usually applies to the collection within a storage device or storage media such as a disk file or a tape file.

header A text and/or binary label or information record, record set, or block, prefacing a data record, record set, or a file. A header usually contains identifying or descriptive information, and may sometimes be embedded within a record rather than attached as a prefix.

item Specifically, a data item. A discrete, non-decomposable unit of data, usually a single word or value in a data record, or a single value from a data array. The representation of a single GLAS data value within a data array or a GLAS Data Element.

label The text and/or binary information records, record set, block, header, or headers prefacing a data file or linked to a data file sufficient to form a labeled data product. A label may consist of a single header as well as multiple headers and markers depending on the defining authority.

Level 0 The level designation applied to an EOS data product that consists of raw instrument data, recorded at the original resolution, in time order, with any duplicate or redundant data packets removed.

Level 1A The level designation applied to an EOS data product that consists of reconstructed, unprocessed Level 0 instrument data, recorded at the full resolution with time referenced data records, in time order. The data are annotated with ancillary information including radiometric and geometric calibration coefficients, and georeferencing parameter data (i.e., ephemeris data). The included, computed coefficients and parameter data have not however been applied to correct the Level 0 instrument data contents.

Level 1B The level designation applied to an EOS data product that consists of Level 1A data that have been radiometrically corrected, processed from raw data into sensor data units, and have been geolocated according to applied georeferencing data.
Level 2 The level designation applied to an EOS data product that consists of derived geophysical data values, recorded at the same resolution, time order, and georeference location as the Level 1A or Level 1B data.

Level 3 The level designation applied to an EOS data product that consists of geophysical data values derived from Level 1 or Level 2 data, recorded at a temporally or spatially resampled resolution.

Level 4 The level designation applied to an EOS data product that consists of data from modeled output or resultant analysis of lower level data that are not directly derived by the GLAS instrument and supplemental sensors.

metadata The textual information supplied as supplemental, descriptive information to a data product. It may consist of fixed or variable length records of ASCII data describing files, records, parameters, elements, items, formats, etc., that may serve as catalog, data base, keyword/value, header, or label data. This data may be parsable and searchable by some tool or utility program.

orbit revolution The passage of time and spacecraft travel signifying a complete journey around a celestial or terrestrial body. For GLAS and the EOS ICESat spacecraft each orbit revolution count starts at the time when the spacecraft is on the equator traveling toward the North Pole, continues through the equator crossing as the spacecraft ground track moves toward the South Pole, and terminates when the spacecraft has reached the equator moving northward from the South Polar region.

parameter Specifically, an EOS Data Parameter. This is a defining, controlling, or constraining data unit associated with a EOS science community approved algorithm. It is identified by an EOS Parameter Number and Parameter Name. An EOS Data Parameter within the GLAS Data Product is composed of one or more GLAS Data Elements.

pass A sub-segment of an orbit, it may consist of the ascending or descending portion of an orbit (e.g., a descending pass would consist of the ground track segment beginning with the northernmost point of travel through the following southernmost point of travel), or the segment above or below the equator (e.g., either the northern or southern hemisphere portion of the ground track on any orbit).

product Specifically, the Data Product or the EOS Data Product. This is implicitly the labeled data product or the data product as produced by software on the DAAC or SCF. A GLAS data product refers to the data file or record collection either prefaced with a product label or standard formatted data label or linked to a product label or standard formatted data label file. Loosely used, it may indicate the entire set of product files contained in a data repository.

record A specific organization or aggregate of data items. It represents the collection of EOS Data Parameters within a given time interval, such as a one-second data record. It is the first level decomposition of a product file.

Standard Data Product Specifically, a GLAS Standard Data Product. It represents an EOS ICESat/GLAS Data Product produced on the DAAC or on the SCF. It is routinely produced and is intended to be archived in the EOSDIS data repository for EOS user community-wide access and retrieval.

variable Usually a reference in a computer program to a storage location.