

NASA Commercial Smallsat Data Acquisition (CSDA) Program Cloud-based Data System Services

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1 February 2024

13B: Cloud-Based User Services to Support Data Use in the User Community

American Meteorological Society Annual Meeting 2024; Baltimore, MD



CSDA Program Overview

Pilot Program established in November 2017, transitioned to a sustained Program in early 2020

Objectives:

- Establish continuous and repeatable processes to onramp new commercial data vendors and evaluate data for its potential to advance NASA's Earth science research and application activities
- Enable the sustained use of purchased data for broader use and dissemination by the Earth scientific community
- Ensure long-term data preservation through the establishment of data management processes and systems to support rapid evaluation, access and distribution of purchased data, and long-term access to purchased data for scientific reproducibility
- Coordinate with other U.S. Government agencies and international partners on the evaluation and scientific use of commercial data

<https://earthdata.nasa.gov/csda>

Data Management Overview at MSFC

Evaluation

- PIs directly interact with vendors to request and access data
- Vendors provide an inventory of requested data
- NASA mirrors data

Transition

- Manage and archive **mirrored** data in NASA cloud
- Provide search and access to the data (SDX)
- Make data available to approved researchers
 - Verify users
 - Validate quotas

Long-term Sustained Use

- Users first search whether the desired data is already available in NASA catalog
- Users will directly interact with vendors for new orders
- Earthdata cloud will host the data long-term and provide an egress solution
- Make data available to approved researchers
 - Verify users

User Verification

All prospective users are subject to authorization prior to approving any data distribution request

- Agree to the vendor specific *science use* EULA
- Ability to copy, store, share and use data and derivatives including in scientific and technical articles and publishing academic, technical or professional journals, symposia proceedings, or similar works.

Authorized User Community	Type of EULA		
	Public Release	U.S.G. Plus	U.S.G.
U.S. Federal Government including: ○ U.S. State/Local/Tribal Government; Academia; Contractors and Grantees associated with Government Agency			X
U. S. Federal Government, Foreign Civil Partners		X	X
Public Release	X	X	X

Earthdata Username

An Earthdata profile is required for ordering data through the Virtual Data Explorer. If you don't already have one, you can register here.

Title

First Name*

Last Name*

Email Address*

Please provide a non-gov (preferred) or institutional email.

Position

Affiliation / Supporting Institution*

Please expand all acronyms or abbreviations. For example: University of Alabama in Huntsville or Goddard Space Flight Center.

Government Funding Agency*

(Bureau of Land Management)

Department

Please expand all acronyms or abbreviations. Examples include university departments and programs or subagency of the supporting institution.

Are you a US Government Civil Servant?*

☐ Yes
☒ No

A grant or contract number is required unless you are a Civil Servant.

Please provide the Grant or Contract Number under which this work will be performed*

Grant or Contract Number

Grant Start Date (Optional)

Grant End Date (Required)

+ Add another grant

Research Area*

Please provide a detailed description of how you will use the data*

Select Vendor(s)/Product*

☐ Maxar (NASA only)
☐ Maxar - WorldView 4 (NASA only)
☐ Maxar ICNOCIS (NASA only)
☐ EarthDEM
☐ Tetradyne Brown Engineering, Inc.
☐ Planet
☐ Spire Global, Inc.
☐ Airbus U.S.

For additional details on available data, please see the CSDA Program commercial data and frequently asked questions website.

I have read the Non-Disclosure Agreement(s) and End User License Agreement(s) above and agree to follow all policies and guidelines contained.*

☐

Scientific user: use by Licensed Users of the data products pursuant to a NASA-initiated, U.S. Government-funded, and/or U.S. Government-peer reviewed investigation established through a NASA Research Announcement or similar public notice of opportunity, and performed for the sole purpose of conducting experiments, evaluation, research, and/or development, including basic and applied research under a Government Science Program. Scientific use is not intended for the development of commercial products or services and does not include activities funded or sponsored by non-governmental organizations or activities outside of U.S. Government.

I have read the Scientific Use definition and acknowledge data acquired through the CSDA Program will be used in accordance with this definition as specified in the End User License Agreement(s)*

☐

Available Data

Vendor	Constellations/ Products	Availability Dates	Spatial Resolution
Planet	PlanetScope, RapidEye	12/31/2005 - Present	3 - 6.5 m
	SkySat	3/10/2015 - 12/12/2019	< 1 m
Spire Global, Inc	GNSS Radio Occultation and Grazing Angle Reflectometry, Satellite Precise Orbit Determination and Satellite Attitude, Total Electron Content, Ionospheric Profiles, Scintillation, Magnetometer, Bistatic radar, Ocean Winds, Soil Moisture	9/24/2018 - 4/18/2019 (partial) 11/1/2019 - Present (all)	
Maxar Technologies	Worldview 1-4, GeoEye-1, QuickBird, IKONOS	10/24/1999 - Present	0.31 - 4.0 m
Teledyne Brown Engineering, Inc.	DESI L1B, L1C, and L2A	11/21/2018 - Present	30 m
EarthDEM	Individual strips and Mosaics	2009 - Present	2 m
Airbus U.S.	TerraSAR-X, TanDEM-X, PAZ X	11/19/2007 - 11/4/2022	<1 - 50 m

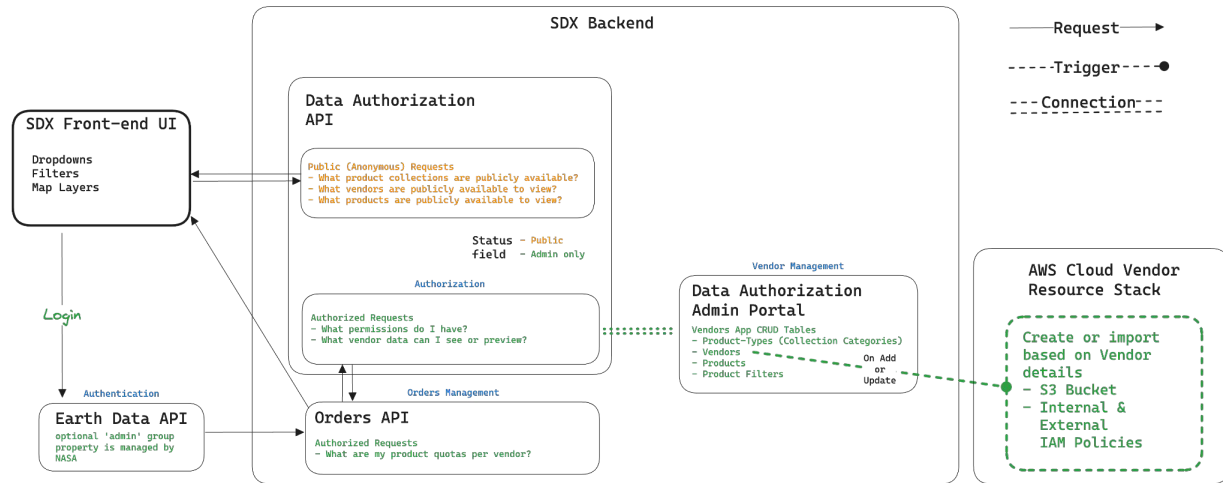
<https://www.earthdata.nasa.gov/esds/csda/commercial-datasets>

Data Publication - Vendor Management

Automatically create or update resources, workflows, interfaces for new data publication

- Create data delivery S3 buckets
- Initiate metadata conversion workflows
- Update SDX Home, Explore, and User Guide

CSDAP | Data-Driven UI



Smallsat Data Explorer (SDX)

Menu

Faceted Search Options

Filters

SAR
Collection Type

4 M km²
Area of Interest
Aug 1st, 2021 – Aug 31st, 2021
Date

0 – 50
Resolution range

Single Look Slant Range
Complex, Geocoded Ellipsoid
Corrected, +1
Product type

All
Instrument Mode

All
Orbit Direction

Results

Item (grouped by)	Title	Type	File Size	Actions
TDX1_SAR_SSC_HS_S_SRA_20210813T233936_20210813T233937	25 assets	6 distinct types	262.2 MB total	
TDX1_SAR_SSC_HS_S_SRA_20210814T114438_20210814T114439	25 assets	6 distinct types	279.2 MB total	
TDX1_SAR_SSC_SM_S_SRA_20210816T234858_20210816T234906	25 assets	6 distinct types	2.0 GB total	
TDX1_SAR_SSC_SM_S_SRA_20210816T234858_20210816T234906	25 assets	6 distinct types	2.5 GB total	

Nothing selected.

Get Download Script **Download Inventory**

Data Download

CSDA Smallsat Data Explorer (SDX) with thumbnails from Airbus U.S. displayed

Web application to search, discover, and download NASA acquired commercial data

Available archive:

- *Planet - 2.7 M sq km
- Spire - 78 TB
- EarthDEM - 13.8 TB
- Airbus U.S. - 4.1 TB

*Only SkySat data available through SDX

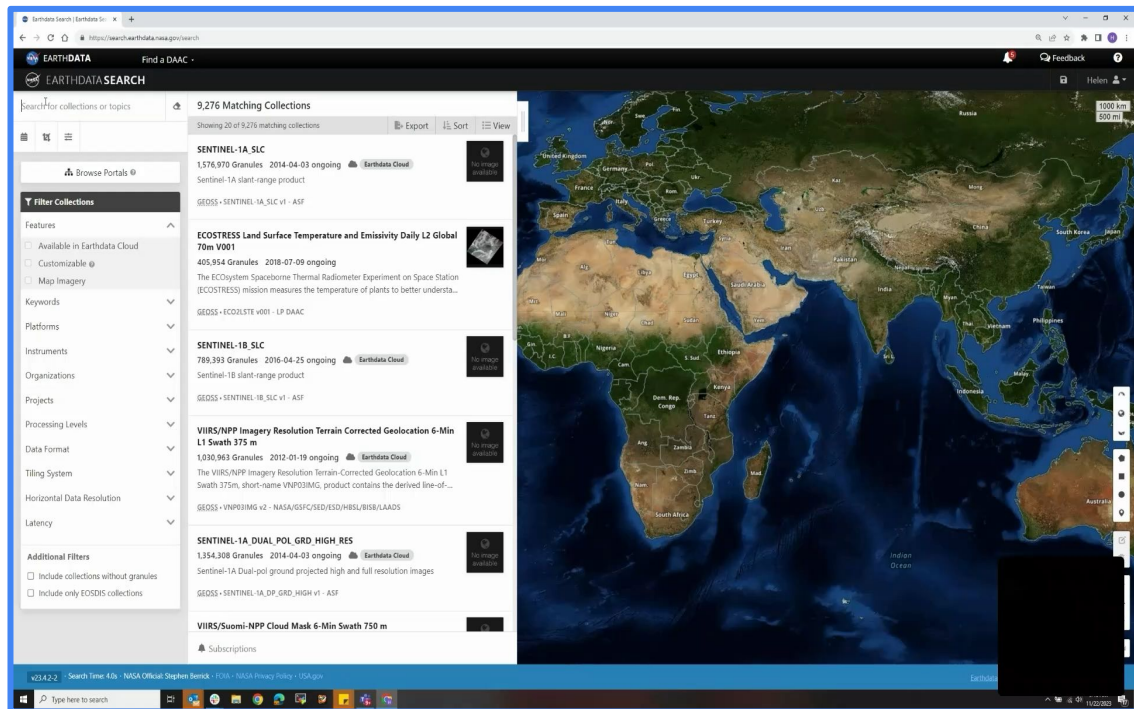
Earthdata Cloud

Reuse NASA ESDIS Enterprise Services for data publication

- Common Metadata Repository
- ESDIS managed DOI service
- Unified Metadata Model
- Metadata Management Tool
- Cumulus
- Earthdata Search Client

Data Archived:

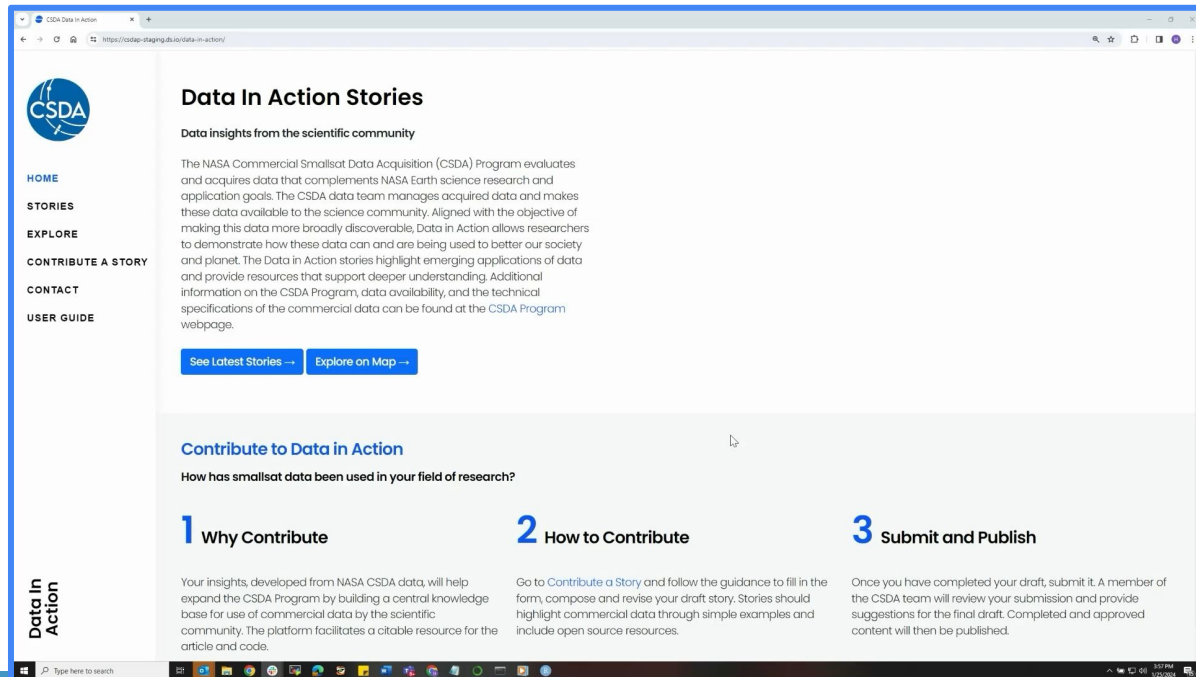
- Granules: ~16 Million
- Volume: 7.2 PB



The screenshot displays the Earthdata Search web application. The left sidebar contains a search bar and a 'Filter Collections' section with various criteria like 'Available in Earthdata Cloud', 'Customizable', and 'Map Imagery'. The main content area shows a list of 9,276 matching collections, with details for specific datasets such as 'SENTINEL-1A, SLC', 'ECOSTRESS Land Surface Temperature and Emissivity Daily L2 Global 70m V001', 'SENTINEL-1B, SLC', 'VIIRS/NPP Imagery Resolution Terrain Corrected Geolocation 6-Min L1 Swath 375 m', and 'SENTINEL-1A, DUAL POI, GRD, HIGH RES'. A world map is visible on the right side of the interface.

User Services - Data in Action

Goal: Communication and promote community use of commercial data



The screenshot shows the CSDA Data in Action website. The left sidebar contains a navigation menu with links: HOME, STORIES, EXPLORE, CONTRIBUTE A STORY, CONTACT, and USER GUIDE. The main content area is titled "Data In Action Stories" and includes a sub-header "Data insights from the scientific community". Below this is a paragraph describing the NASA Commercial Smallsat Data Acquisition (CSDA) Program and its goals. Two buttons are present: "See Latest Stories -->" and "Explore on Map -->". A section titled "Contribute to Data in Action" follows, with the question "How has smallsat data been used in your field of research?". Below this are three numbered steps: 1. Why Contribute, 2. How to Contribute, and 3. Submit and Publish. Each step has a brief description of the process. The bottom of the page shows a Windows taskbar with various application icons and a search bar.

Data In Action

HOME
STORIES
EXPLORE
CONTRIBUTE A STORY
CONTACT
USER GUIDE

Data In Action Stories

Data insights from the scientific community

The NASA Commercial Smallsat Data Acquisition (CSDA) Program evaluates and acquires data that complements NASA Earth science research and application goals. The CSDA data team manages acquired data and makes these data available to the science community. Aligned with the objective of making this data more broadly discoverable, Data In Action allows researchers to demonstrate how these data can and are being used to better our society and planet. The Data in Action stories highlight emerging applications of data and provide resources that support deeper understanding. Additional information on the CSDA Program, data availability, and the technical specifications of the commercial data can be found at the [CSDA Program](#) webpage.

[See Latest Stories -->](#) [Explore on Map -->](#)

Contribute to Data in Action

How has smallsat data been used in your field of research?

- 1 Why Contribute**
Your insights, developed from NASA CSDA data, will help expand the CSDA Program by building a central knowledge base for use of commercial data by the scientific community. The platform facilitates a citable resource for the article and code.
- 2 How to Contribute**
Go to [Contribute a Story](#) and follow the guidance to fill in the form, compose and revise your draft story. Stories should highlight commercial data through simple examples and include open source resources.
- 3 Submit and Publish**
Once you have completed your draft, submit it. A member of the CSDA team will review your submission and provide suggestions for the final draft. Completed and approved content will then be published.

Looking Forward

On-ramp #3 Evaluations

- GHGSat, Inc
- GeoOptics, Inc
- ICEYE US, Inc
- Capella Space

Data Management Activities

- Publish acquired data during the BlackSky evaluation (On-ramp #2)
- Continue Earthdata Cloud publication - support direct cloud access
- Make On-ramp #3 data available as evaluations are completed
- Enhance user services and data usability

Thank you!

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