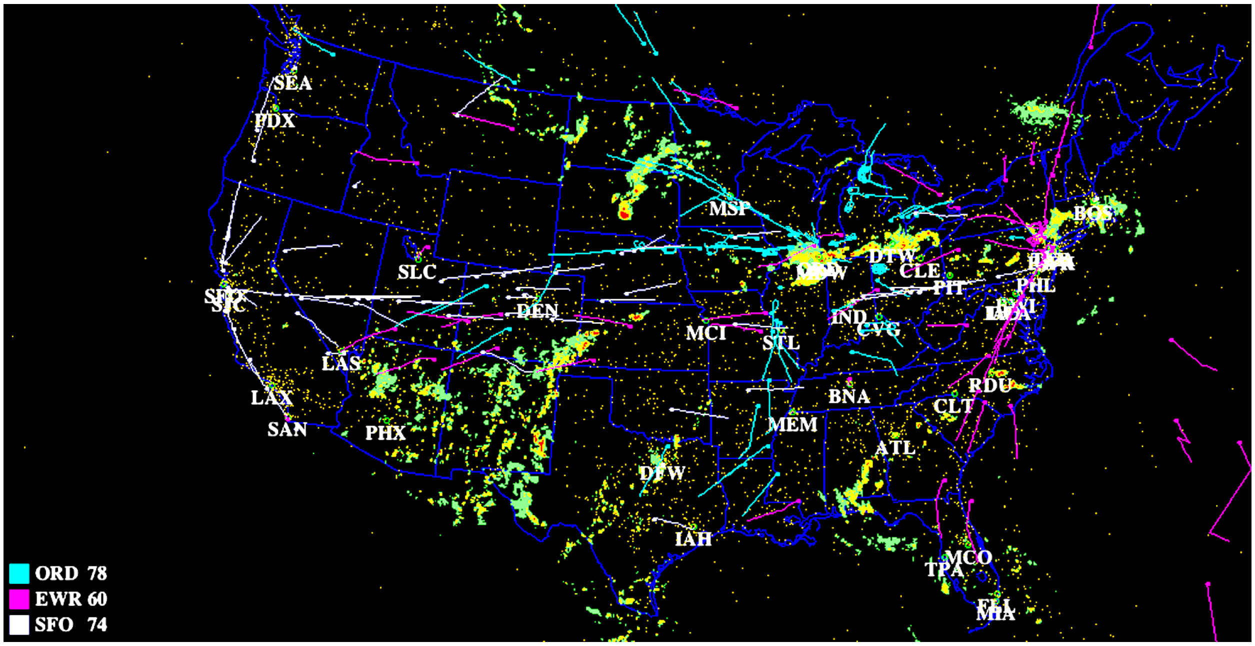

Future ATM Concepts and Evaluation Tool (FACET)

Interface Control Document

Version 070717a

07/07/2017

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1. Purpose of Interface Control

This Interface Control Document (ICD) documents the airspace adaptation and air traffic inputs of NASA's Future ATM Concepts and Evaluation Tool (FACET). Its intended audience is the project manager, project team, development team, and stakeholders interested in interfacing with the system.

FACET equips Air Traffic Management (ATM) researchers and service providers with a way to explore, develop and evaluate advanced air transportation concepts before they are field-tested and eventually deployed.

FACET is a flexible software tool that is capable of quickly generating and analyzing thousands of aircraft trajectories. It provides researchers with a simulation environment for preliminary testing of advanced ATM concepts. Using aircraft performance profiles, airspace models, weather data, and flight schedules, the tool models trajectories for the climb, cruise, and descent phases of flight for each type of aircraft. An advanced graphical interface displays traffic patterns in two and three dimensions, under various current and projected conditions for specific airspace regions or over the entire continental United States. The system is able to simulate a full day's dynamic national airspace system (NAS) operations, model system uncertainty, measure the impact of different decision-makers in the NAS, and provide analysis of the results in graphical form, including sector, airport, fix, and airway usage statistics. NASA researchers test and analyze the system-wide impact of new traffic flow management algorithms under anticipated air traffic growth projections on the nation's air traffic system.

In addition to modeling the airspace system for NASA research, FACET has also successfully transitioned into a valuable tool for operational use. Federal Aviation Administration (FAA) traffic flow managers and commercial airline dispatchers have used FACET technology for real-time operations planning. FACET integrates live air traffic data from FAA radar systems and weather data from the National Weather Service to summarize NAS performance. This information allows system operators to reroute flights around congested airspace and severe weather to maintain safety and minimize delay. FACET also supports the planning and post-operational evaluation of reroute strategies at the national level to maximize system efficiency. For the commercial airline passenger, strategic planning with FACET can result in fewer flight delays and cancellations.

The performance capabilities of FACET are largely due to its architecture, which strikes a balance between flexibility and fidelity. FACET is capable of modeling the airspace operations for the continental United States, processing thousands of aircraft on a single computer. FACET was written in Java and C, enabling the portability of its software to a variety of operating systems. In addition, FACET was designed with a modular software architecture to facilitate rapid prototyping of diverse ATM concepts. Several advanced ATM concepts have already been implemented in FACET, including aircraft self-separation, prediction of aircraft demand and sector congestion, system-wide impact assessment of traffic flow management constraints, and wind-optimal routing.

For more information on the Future ATM Concepts Evaluation Tool (FACET), please visit:
www.aviationsystems.arc.nasa.gov.

2. Introduction

This ICD specifies the interface requirements that the airspace adaptations and historical air traffic data archives must meet.

For each interface, the ICD provides the following information:

- A description of the data format
- A general description of the data elements
- Assumptions where appropriate
- Sample data messages

3. Overview

Figure 1 illustrates the architecture of the route parsing and trajectory prediction modules in FACET, which are two of the core capabilities of the system. These modules are highlighted in this ICD to provide the reader with insight into how FACET makes use of the airspace adaptation data and the historical air traffic data. The module labeled 31 in Figure 1 provides wind data and information from a route navigation module (33) to determine aircraft heading dynamics, which are received by a heading dynamics module (41). The heading dynamics module optionally includes information on maximum banking angle at one or more altitudes and maximum turn rate at one or more altitudes. The route navigation module (33) receives information from a direct routing module (35) or, alternatively, from a flight plan routing module (37) and provides destination coordinates. An airspace module (39) provides information to a flight option logic module (40) that determines whether the flight is simulated according to direct-to routing or according to flight plan routing or optionally replayed from a historical data archive provided by module 50. Where a flight plan is filed and followed, the flight plan routing module (37) may provide coordinates of one or more waypoints for the flight route. The flight plan and any optional flight plan amendments are obtained from the trafkc flight plan and scheduled data module (50)

An aircraft performance database (44) provides relevant performance information on more than 500 aircraft, optionally including data for each aircraft on maximum airspeed in the absence of wind, fuel consumption at different altitudes, different air speeds and different payload weights, maximum climb rate at one or more altitudes, aircraft weight range (empty to fully loaded), practical maximum flight altitude, and angle of attack at initiation of stall (optional). This information is provided for and used by an aircraft performance module (45) that models a selected aircraft's performance and in turn, provides airspeed command and performance limits information for an airspeed dynamics module (47). The aircraft performance module (45) also provides altitude command and performance limits information for an altitude kinematics module (49). The airspeed dynamics module (47) provides relevant, processed airspeed and altitude information to the latitude and longitude kinematics command module (43) and to the heading dynamics module (41). The latitude and longitude (LLK) module (43) also receives relevant, processed information from the altitude kinematics module (49) and information on flight path angle. The wind data module (31), the airspace module (39), the aircraft performance module (45), the LLK module (43) provide output information that is received by the graphical user interface.

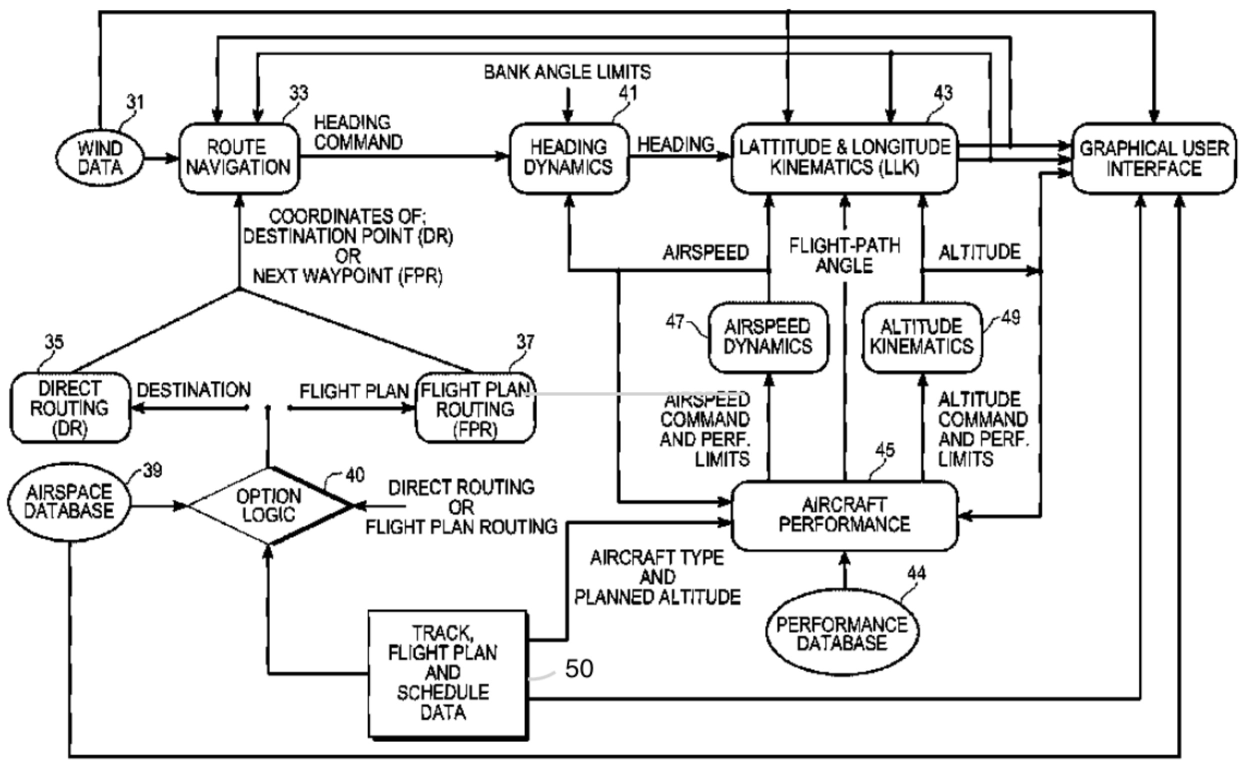

Figure 1: Architecture of FACET's routing parsing and trajectory prediction module.

This ICD is predominantly focused on describing the airspace database (see module 39) and the track flight plan and schedule data modules (module 50).

4. Detailed Airspace Adaptation Interface Requirements

This section describes the data fields and formats for the airspace adaptation files required for FACET. Each airspace adaptation element (e.g., Navigational Aid, Waypoint, Airport, etc.) is described in a separate subsection, and each subsection subsequently provides a review of assumptions, data field descriptions and sample data records for clarity.

4.1 Requirements for Navigational Aids (NAVAID)

An electronic device on the earth's surface which provides point to point guidance information or position data to aircraft in flight.

4.1.1 Assumptions

Identifier:

Will contain up to four characters specifying the identification assigned to the NAVAID by the controlling authority.

Latitude/Longitude:

The geographic coordinate location of the NAVAID. The format shall include one letter identifying the hemisphere (N, E, S, W) followed by degrees, minutes and seconds. Decimal degrees will be of length 10 for latitude and length 11 for longitude.

Elevation:

The elevation, measured in feet, at the base of the antenna from mean sea level. If unknown, "U" shall be entered.

Format:

ASCII tab delimitated fields. One NAVAID per line.

4.1.2 Message Format (or Record Layout)

Table 1 NAVAID message format

Field 1	Identifier
Field 2	N/S hemisphere designator and 2 digit latitude degrees
Field 3	2 digit latitude minutes
Field 4	5 digit latitude seconds
Field 5	W/E hemisphere designator and 2 digit

	longitude degrees
Field 6	2 digit longitude minutes
Field 7	5 digit longitude seconds
Field 8	Elevation in feet

4.1.3 Sample Messages

Table 2 NAVAID sample messages

HET	N35	24	16.366	W096	00	49.997	1000
HEU	N42	51	10.674	W073	56	03.448	1200

4.2 Requirements for Waypoints

A predetermined geographical position, used for route or instrument approach definition or progress reporting purposes, that is defined relative to a known position. Also, a point or series of points in space to which an aircraft may be vectored.

4.2.1 Assumptions

Identifier:

This five character alpha/numeric field shall contain the name or series of characters with which the waypoint is identified.

Latitude/Longitude:

The geographic coordinate location of the Waypoint. The format shall include one letter identifying the hemisphere (N, E, S, W) followed by degrees, minutes and seconds. Decimal degrees will be of length 10 for latitude and length of 11 for longitude.

Elevation:

The elevation, measured in feet, at the base of the antenna from mean sea level. If unknown, “U” shall be entered.

Format:

ASCII tab delimitated fields. One Waypoint per line.

4.2.2 Message Format (or Record Layout)

Table 3 Waypoint message format

Field 1	Identifier
Field 2	N/S hemisphere designator and 2 digit latitude degrees
Field 3	2 digit latitude minutes
Field 4	5 digit latitude seconds
Field 5	W/E hemisphere designator and 2 digit longitude degrees
Field 6	2 digit longitude minutes
Field 7	5 digit longitude seconds
Field 8	Elevation in feet

4.2.3 Sample Messages

Table 4 Waypoint sample messages

HETIK	N33	05	38.602	W094	57	51.660	1100
HIBOX	N32	13	44.152	W080	41	41.449	1500

4.3 Requirements for Airways

A specified route designed for channeling the flow of traffic as necessary for the provision of air traffic services (a generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service, approach control service, etc.).

The two primary types of airways used in FACET are jet routes and victor airways. Jet routes are high altitude airways (from 18,000 ft MSL to FL450) based on VOR stations and are prefixed by the letter “J”. Victor airways are low altitude airways (below 18,000 ft MSL) that are based on VOR stations and are designed with the prefix “V”.

Additionally, FACET processes RNAV related routes, which are not based on VOR stations. Low altitude RNAV routes are preceded with the letter "T" and high airway routes are designed with the letter "Q".

4.3.1 Assumptions

Identifier:

This four-character alpha/numeric field shall contain the name or series of characters with which the airway is identified. The first character is assumed to be alphanumeric and specify the airway type (e.g., "J", "V", "T" or "Q"). The remaining three characters are assumed to be numeric.

Airway Definition:

Tab delimitated sequence of NAVAIDS and Waypoints which are defined in the accompanying NAVAIDS and Waypoints ASCII files. Elements describing an airway that are not contained within the accompanying NAVAIDS and Waypoint ASCII files will be omitted from the definition of the airway, which can result in airway processing and visualization errors.

Airway Length:

The maximum number of NAVAIDS and/or waypoints that can be used to describe an airway is currently 100.

Format:

ASCII tab delimitated fields. One Airway per line.

4.3.2 Message Format (or Record Layout)

Table 5 Airway message format

Field 1	Alpha/numeric identifier
Field 2	Waypoint/NAVAID 1
Field 3	Waypoint/NAVAID 2
Field N	Waypoint/NAVAID N

4.3.3 Sample Messages

Table 6 Airway sample messages

J476	YYC	ALOMO	YEA	YQV				
J507	BRW	SCC	FYU	ORT	BORAN	YAK		
V111	BSR	SNS	HENCE	CATHE	KARNN	WINDY	PATYY	MOD

4.4 Requirements for Airport Locations

Airport is defined as an area of land that is used or intended to be used for the landing and take-off of aircraft, and includes its buildings and facilities, if any. The terms "aerodrome" and "airfield" are considered to be synonymous with the term "airport".

4.4.1 Assumptions

Name:

The official name for an airport as designated by the operating agency or by official publications of the country in which the air facility is located. Assumed to be alpha/numeric with spaces replaced by underbars (_). Max name length shall not exceed 100 characters

Unique Identifier:

Will contain up to four characters specifying the unique identification assigned to the Airport by the controlling authority.

Latitude/Longitude:

The geographic coordinate location of the Airport. The format shall include one letter identifying the hemisphere (N, E, S, W) followed by degrees, minutes and seconds. Decimal degrees will be of length 9 for latitude and length of 10 for longitude.

Elevation:

The highest point of an airport's usable runways measured in feet from Mean Sea Level.

Format:

ASCII tab delimitated fields. One Airport per line.

4.4.2 Message Format (or Record Layout)

Table 7 Airport location message format

Field 1	Name
Field 2	Identifier
Field 3	N/S hemisphere designator and 2 digit latitude degrees
Field 4	2 digit latitude minutes
Field 5	4 digit latitude seconds
Field 6	W/E hemisphere designator and 2 digit longitude degrees
Field 7	2 digit longitude minutes
Field 8	4 digit longitude seconds
Field 9	Elevation in feet

4.4.3 Sample Messages

Table 8 Airport location sample messages

SAN_FRANCISCO_INTERN_CA	KSFO	N37	37	08.40	W122	22	29.40	13
SLEETMUTE_AK	KSLQ	N61	42	33.50	W095	37	16.02	489
HUNTER_AAF_GA	KSVN	N32	00	34.70	W081	08	44.40	42

4.5 Requirements for Flight Information Region (FIR) Description

Designated airspace within which some or all aircraft may be subject to air traffic control. For United States operations, the FIR is defined in terms of a collection of Centers. A Center typically accepts traffic from and ultimately passes traffic to the control of a Terminal Control Center or another Center. The Center is subsequently subdivided into smaller regions of airspace referred to as Sectors, which are defined in the next section.

4.5.1 Assumptions

Name:

The official name assigned to the specific airspace boundary by the controlling authority. Assumed to be alpha/numeric with spaces replaced by underbars (_). Max name length shall not exceed 100 characters

Unique Identifier:

Will contain up to four characters specifying the unique identification assigned to the FIR/Center by the controlling authority.

Latitude/Longitude:

A series of latitude/longitude coordinates describing the polygon bounding the FIR/Center. The format shall include one letter identifying the hemisphere (N, E, S, W) followed by degrees, minutes and seconds. Decimal degrees will be of length 9 for latitude and length of 10 for longitude.

Upper Effective Altitude:

The highest altitude (ceiling) Above Mean Sea Level (AMSL) in feet for the upper vertical limit of the given airspace.

Lower Effective Altitude:

The lower altitude (floor) Above Mean Sea Level (AMSL) in feet for the lower vertical limit of the given airspace.

Format:

ASCII tab delimitated fields.

4.5.2 Message Format (or Record Layout)

Table 9 FIR/Center message format

Field 1	Name
Field 2	Identifier
Field 3	Lower Effective Altitude
Field 4	Upper Effective Altitude
Field 5	N/S hemisphere designator and 2 digit latitude degrees for the 1st point describing the

	FIR/Center
Field 6	2 digit latitude minutes or the 1st point describing the FIR/Center
Field 7	4 digit latitude seconds or the 1st point describing the FIR/Center
Field 8	W/E hemisphere designator and 2 digit longitude degrees or the 1st point describing the FIR/Center
Field 9	2 digit longitude minutes or the 1st point describing the FIR/Center
Field 10	4 digit longitude seconds or the 1st point describing the FIR/Center
Field 11 through Field N	Remaining latitude/longitude points describing the FIR/Center

4.5.3 Sample Messages

Table 10 FIR/Center sample message

Albuquerque_Center					
ZAB					
0	450000				
N36	43	00.00	W105	20	30.00
N36	43	00.00	W105	00	00.00
N37	18	30.00	W103	09	00.00
N37	30	00.00	W102	33	30.00
N37	30	00.00	W102	33	00.00

4.6 Requirements for Sector Description

For air traffic operations in the United States, Centers (see above) are subsequently subdivided into smaller volumes of airspace referred to as sectors. Sectors use distinct radio frequencies for commination with aircraft. Each sector is subsequently staffed by one or more controllers which typically manage ten to fifteen aircraft on average.

4.6.1 Assumptions

Unique Identifier:

Will contain up to ten characters specifying the unique identification assigned to the Sector by the controlling authority.

Latitude/Longitude:

A series of latitude/longitude coordinates describing the polygon bounding the Sector. The format shall include one letter identifying the hemisphere (N, E, S, W) followed by degrees, minutes and seconds. Decimal degrees will be of length 9 for latitude and length of 10 for longitude.

Upper Effective Altitude:

The highest altitude (ceiling) Above Mean Sea Level (AMSL) in feet for the upper vertical limit of the given sector.

Lower Effective Altitude:

The lower altitude (floor) Above Mean Sea Level (AMSL) in feet for the lower vertical limit of the given sector.

Format:

ASCII tab delimitated fields.

Note:

Sectors can have complex three-dimensional shapes. Sectors with non-trivial vertical topologies should be described in terms of a collection of simpler subsectors each of which share a common upper/lower effective altitude. A naming convention for these complex sector geometries should be adopted to ensure that the resulting sector can be constructed in terms of the sub-sectors. For examples, a sector ZSE48 can be designated in terms of sub-sectors ZSE48a, ZSE48b and ZSE48c where each of the sub-sectors share common effective lower/upper altitude bounds.

4.6.2 Message Format (or Record Layout)

Table 11 Sector message format

Field 1	Identifier
Field 2	Lower Effective Altitude
Field 3	Upper Effective Altitude
Field 4	N/S hemisphere designator and 2 digit latitude degrees for the 1st point describing the sector
Field 5	2 digit latitude minutes or the 1st point describing the sector
Field 6	4 digit latitude seconds or the 1st point describing the sector
Field 7	W/E hemisphere designator and 2 digit longitude degrees or the 1st point describing the sector
Field 8	2 digit longitude minutes or the 1st point describing the sector
Field 9	4 digit longitude seconds or the 1st point describing the sector
Field 10 through Field N	Remaining latitude/longitude points describing the sector

4.6.3 Sample Messages

Table 12 Sector sample message

ZAB					
24000	60000				
N47	01	18.33	W105	54	27.86
N46	43	05.56	W105	30	19.41
N47	28	11.11	W103	44	20.44
N47	30	22.21	W102	33	30.00
N47	30	00.00	W102	33	00.00

4.7 Requirements for Special Use Airspace (SUA) Descriptions

A Special Use Airspace is an area in which air traffic operations may be limited for flights not specifically participating in the operations associated with this region of airspace. Often these operations are of a military nature.

4.7.1 Assumptions

A complete SUA consists of the following three individual types of records:

- SUA1: the records associated with this data block contains the SUA type, name, location and State
- SUA2: contains the active start and stop times for the SUA
- SUA3: upper and lower effective altitudes of the SUA
- SUA7: contains the latitude/longitude coordinates of the SUA

Unique Identifier:

Will contain up to ten characters specifying the unique identification assigned to the Sector by the controlling authority.

SUA Types:

Can be one of the following: “ALERT”, “MILITARY”, “PROHIBITED”, “RESTRICTED”, “WARNING” or “USER”

Effective Times:

Can be one of the following: start/stop times in HHMMZ-HHMMZ format, “CONTINUOUS”, “SR-SS” (sunrise to sunset) or “INTERMITTENTLY”.

Latitude/Longitude:

A series of latitude/longitude coordinates describing the polygon bounding the Sector. The format shall include a one letter identifying the hemisphere (N, E, S, W) followed by degrees, minutes and seconds. Decimal degrees will be of length 9 for latitude and length of 10 for longitude.

Upper Effective Altitude:

The highest altitude (ceiling) Above Mean Sea Level (AMSL) in feet for the upper vertical limit of the given sector.

Lower Effective Altitude:

The lower altitude (floor) Above Mean Sea Level (AMSL) in feet for the lower vertical limit of the given sector.

Format:

ASCII tab delimitated fields. The SUA1, SUA2, SUA3 and SUA7 fields are on separate lines. One SUA7 record is provided for each latitude/longitude pair comprising the SUA boundary.

4.7.2 Message Format (or Record Layout)

Table 13 SUA1 message format

Field 1	"SUA1" followed by SUA type
Field 2	Name
Field 3	Location (typically a city or military installation)
Field 4	Location (State)

Table 14 SUA2 message format

Field 1	"SUA2" followed by SUA type
Field 2	Name
Field 3	*start/stop times in HHMMZ-HHMMZ format, "CONTINUOUS", "SR-SS" (sunrise to sunset) or "INTERMITTENTLY"*

Table 15 SUA3 message format

Field 1	"SUA3" followed by SUA type
Field 2	Name
Field 3	Lower Effective Altitude (ft)
Field 4	Upper Effective Altitude (ft)

Table 16 SUA7 message format

Field 1	"SUA7" followed by SUA type

Field 2	Name
Field 5	2 digit latitude minutes or the 1st point describing the sector
Field 6	4 digit latitude seconds or the 1st point describing the sector
Field 7	W/E hemisphere designator and 2 digit longitude degrees or the 1st point describing the sector
Field 8	2 digit longitude minutes or the 1st point describing the sector
Field 9	4 digit longitude seconds or the 1st point describing the sector

4.7.3 Sample Messages

Table 17 SUA1 sample message

SUA1ALERT	211	Moffett Field	CA		

Table 18 SUA2 sample message

SUA2ALERT	211	0800Z-2000Z			

Table 19 SUA3 sample message

SUA3ALERT	211	SURFACE to 4500’			

Table 20 SUA7 sample messages

SUA7ALERT	211	N47	01	18.33	W105	54	27.86

SUA7ALERT	211	N46	43	05.56	W105	30	19.41
SUA7ALERT	211	N47	30	22.21	W102	33	30.00
SUA7ALERT	211	N47	30	00.00	W102	33	00.00

4.8 Requirements for Sector Capacities

Nominal capacity for a sector which establishes a numerical trigger to provide notification to facility personnel that sector efficiency may be degraded during specific periods of time due to potentially high controller workload

4.8.1 Assumptions

Unique Identifier:

Will contain up to four characters specifying the unique identification assigned to the sector by the controlling authority.

Capacity:

Number of unique aircraft observed in a sector over a 15-minute time horizon.

Format:

ASCII tab delimitated fields. One sector capacity per line.

4.8.2 Message Format (or Record Layout)

Table 21 Sector capacity message format

Field 1	Sector Name
Field 2	Capacity

4.8.3 Sample Messages

Table 22 Sector capacity sample messages

ZAB49	12
ZAB47	18

ZAB17	18

4.9 Requirements for Nominal Airport Capacities

Nominal capacity for an airport under the predominant configuration under good weather conditions which establishes a numerical trigger to provide notification to facility personnel that airport efficiency may be degraded during specific periods of time due to potentially high controller workload.

4.9.1 Assumptions

Unique Identifier:

Will contain up to four characters specifying the unique identification assigned to the airport by the controlling authority.

Capacity:

Number of unique aircraft landing and departing at an airport over a 15-minute time horizon.

Format:

ASCII tab delimitated fields. One airport capacity per line.

4.9.2 Message Format (or Record Layout)

Table 23 Airport capacity message format

Field 1	Airport Identifier
Field 2	Departure Capacity
Field 3	Arrival Capacity

4.9.3 Sample Messages

Table 24 Airport capacity sample messages

KORD	55	20

KCLT	60	15
KMDW	35	8

4.10 Requirements for Standard Arrival and Departure Routes

A system of routes designed to minimize route changes typically during the arrival and departure phases of flight and to aid in the efficient management of air traffic.

.

4.10.1 Assumptions

Preferred Route Identifier:

Will contain up to 50 characters specifying the unique identification assigned to the route by the controlling authority.

Preferred Route Name:

Will contain up to 50 characters specifying the unique name assigned to the route by the controlling authority.

Unique Segment Number:

Will contain up to five alpha/numeric characters specifying the unique identification assigned to the airport by the controlling authority.

Latitude/Longitude:

A series of latitude/longitude coordinates describing the route. The format shall include a one letter identified of the hemisphere (N, E, S, W) followed by degrees, minutes and seconds. Decimal degrees will be of length 9 for latitude and length of 10 for longitude.

Format:

ASCII tab delimitated fields. One route per line. The first record associated with a new standard arrival or departure route will contain the preferred route identifier and preferred route name. Latitude/longitude record will be followed by an optional NAVAID/Waypoint name if the point coincides with a names NAVAID/Waypoint.

4.10.2 Message Format (or Record Layout)

Table 25 Standard arrival and departure route message format

Field 1	Alpha/numeric identifier
Field 2	Latitude
Field 3	Longitude
Field 4	Route identifier if first record for a new route
Field 5	Route name if first record for a new route

4.10.3 Sample Messages

Table 26 Standard departure and arrival route sample message

S0005	N40	57	16.00	W082	28	39.90	ABERZ.ABEERZ1	ABERZ ONE
S0005	N41	17	38.08	W082	01	42.20	JAKEE	
S0005	N41	24	42.00	W081	50	59.20	CLE	

5. Detailed Air Traffic Data Interface Requirements

This section describes FACET's TRX (track) data format, which contains historical position and flight plan information for a collection of flights. This file contains three predominant message types: TRACK_TIME, TRACK and FP_ROUTE. A brief description of the content of each of these messages follows:

- TRACK_TIME: Unix epoch (or Unix time or POSIX time or Unix timestamp), which is the number of seconds that have elapsed since January 1, 1970 (midnight UTC/GMT)
- TRACK: contains the unique aircraft identifier, aircraft type, current latitude/longitude position, ground speed, flight level, heading, current FIR/Center, current sector (optional)
- FP_ROUTE: current filed/flown flight plan which reflects any flight plan amendments

5.1 Requirements for TRX (track) Data Format

5.1.1 Assumptions

Time Stamp:

Unix epoch (or Unix time or POSIX time or Unix timestamp), which is the number of seconds that have elapsed since January 1, 1970 (midnight UTC/GMT)

Latitude/Longitude:

The geographic coordinate location of the aircraft. The format shall assume a North and West hemisphere convention when specifying the coordinates. Latitude is specified by six characters (DDMMSS) and longitude by seven character (DDDMMSS).

Flight Level:

Aircraft's current vertical altitude at standard pressure expressed in hundreds of feet.

Ground Speed:

Aircraft's current ground speed in knots.

Heading:

Aircraft's current heading in degrees.

Format:

ASCII tab delimitated fields. TRACK_TIME, TRACK and FP_ROUTE specified on separate lines.

Note:

TRACK_TIME message is followed by the TRACK and FP_ROUTE messages for all known flights at this time.

5.1.2 Message Format (or Record Layout)

Table 27 TRACK_TIME message format

Field 1	"TRACK_TIME"
Field 2	Unix epoch time in seconds

Table 28 TRACK message format

Field 1	"TRACK"
Field 2	Aircraft identifier
Field 3	Aircraft type
Field 4	Current latitude (DDMMSS)
Field 5	Current longitude (DDDMMSS)
Field 6	Current Ground Speed (kts)
Field 7	Current Flight Level
Field 8	Current Heading (deg)
Field 9	Current Center/FIR
Field 10	Current Sector (optional)

Table 29 FP_ROUTE message format

Field 1	"FP_ROUTE"
Field 2	Flight Plan String

5.1.3 Sample Messages

Table 30 TRACK_TIME sample message

TRACK_TIME	1124841777

Table 31 TRACK sample message

TRACK	NASA1	B772	375900	835700	516	366	69	ZID	ZID93

Table 32 FP_ROUTE sample message

FP_ROUTE	KDFW./.MEM359067..RBV..RIFLE..ACK..TUSKY.YQX.NATY.LIMRI.DOLIP.CRK.EXMOR.GIBSO.EGKK

Appendix A: Record of Changes

Table 33 - Record of Changes

Version Number	Date	Author/Owner	Description of Change
0.1	*07/01/2017*	*S. Grabbe*	*Initial version*

Appendix B: Acronyms

Table 34 - Acronyms

Acronym	Literal Translation
ATM	*Air Traffic Management*
FACET	*Future ATM Concepts and Evaluation Tool*
FIR	*Flight Information Region*
FL	*Flight level*
MSL	*Mean Sea Level*
NAS	*National Airspace System*
NAVAID	*Navigational Aid*
SUA	*Special Use Airspace*
TRX	*Track*