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Contracted Air Operators Satellite Air Asset Tracking Unit Data Precision Requirements
and their Tracking Service Providers System requirements

Standardization

Prepared for:

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Prepared by:

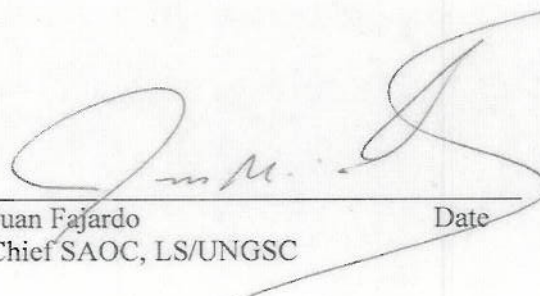
The Strategic Air Operations Centre


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0	01 Nov 14	Original
1	24 May 16	Change of paragraphs: 1. STC for aircraft type accepted by either the FAA or EASA to “possess a Supplemental Type Certificate for aircraft type approved by the governing authority of where the AC is registered.” 1.1 Security – from 256 to 128-bit encryption
2		
3		
4		

UNAGSTS TRACKING UNIT DATA STANDARDIZATION

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At present, all contracted DPKO/DFS/DPA Operators Air Assets are required to have an active compliant aircraft-tracking unit that transmits real-time automatic geospatial tracking flight data with event logging capabilities to the United Nations Aviation Global Satellite Tracking Service Provider. The UNAGSTS provides a necessary tool that allows United Nations personnel to observe, analyze, and report real-time flight activities.

Information provided within this document is accurate to date with no anticipated changes; however, contracted United Nations Air Operators and their service providers, shall acknowledge that as implementation of the program progresses and technology advances, some technical requirements are likely to require amendments.

As the United Nations Aviation Global Satellite Tracking Solution (UNAGSTS) continues its deployment and development of its tracking services throughout all United Nations Missions, the user community has matured to nearly 160 data users, while supporting on average 19 different Peacekeeping Missions Operations Centres. Through its growth, further development and knowledge has reaffirmed that the United Nations needs to adopt a standard transfer protocol, data format, and encryption method for its GPS tracked Air Assets. This standard protocol shall insure a secure means, designed to be flexible in order to accommodate new technologies and ensure a harmonized approach in data delivery as the UNAGSTS further integrates into the United Nations Global Aviation Management and Dispatch community. The standardization of data format, delivery and encryption will allow the existing UNAGSTS provider and potential future providers to consolidate and disseminate secure data using one single standardized secure format, consequently simplifying the review and approval process for Certification and Accreditation designed for United Nations Air Operators who wish to provide air services for the United Nations. This standard protocol provides framework that will be used for testing and evaluation of the tracking unit hardware, firmware, data and its distribution between Centres and UNAGSTS program objectives for further enhancement of their tracking software. This approach will secure increased telemetry reporting while lowering supporting costs; therefore, United Nations Air Operators aircraft tracking systems and their third party Satellite Tracking Service Provider are required to adapt to the following United Nations reporting standards.

Part 1 - AIR ASSET TRACKING UNIT DATA AND PRECISION REQUIREMENTS

1. Third Party Units and Services¹ shall be compatible with Iridium or Inmarsat satellite networks². The approved Aviation Global Satellite Aircraft Tracking unit³ shall meet RTCA/DO-160E aviation standard certification or possess a Supplemental Type Certificate for aircraft type approved by the governing authority of where the AC is registered. Further, the data service provided is required to meet United Nations Global Satellite Tracking Unit reporting standards. UN reporting standards require tracking units to be identified by their Satellite Identification (SATID) and Aircraft (AC) Registration to generate all data by means of Global Positioning System specified as follows; **Aircraft Position** by way of **UTC Date/Time, Latitude, Longitude, Altitude, Speed, Heading, Fix Type**, and at least one **Position Quality** metric is required for all aircraft position reports. Any data value that falls outside the acceptable range shall not be altered in order to meet an acceptable value.
 - 1.1. **Security** - At minimum, a 128-bit encryption is required to be used from the contracted Air Operators third party Satellite Tracking Unit. The UNAGSTS provider requires assurance that data transmitted to and from the tracking unit cannot be altered during and after transmission to and from the UNAGSTS system.
 - 1.2. **Position/Event reports** - UNAGSTS requires one Position Report every three minutes “Frequency” and an Event Report every occurrence. See UNAGSTS Data Types and Precision Table
 - 1.2.1. **Position Report** – Required to have **SATID, AC-Registration, UTC Date/Time, Latitude, Longitude, Altitude, Speed, Heading, Fix Type**, and at minimum one **Position Quality** metric. Any data value falling outside the acceptable range shall not be altered, so it can be reported.
 - 1.2.1.1. **SATID** - (Iridium or Inmarsat)
 - 1.2.1.1.1. **Iridium** uses (IMEI) International Mobile Station Equipment Identity - The IMEI (14 decimal digits plus a check digit) or IMEISV (16 digits) includes information on the origin, model, and serial number of the unit.
 - 1.2.1.1.2. **Inmarsat** uses a terminal ID or unique serial number (e.g. a DCC number)
 - 1.2.2. **Registration** - The aircraft registration in accordance with the Air carrier’s certificate of registration for the specific aircraft, which the fixed unit is installed. If any unit is cannibalized and installed on any contracted UN aircraft, the Air carrier will communicate the change with the United Nations service provider prior to releasing the AC as serviceable in order to verify the reporting is in compliance with all UN satellite reporting standards.

¹ Air Operators under contract with UN manage these services

² Global satellite coverage

³ Installation requires a fixed transmitter and antenna, which meets air carrier’s CAA approval along with operational procedures outlined within the operations manual.

- 1.2.3. **Date/Time** - will be the UTC time of the GPS position report, values may be truncated to the nearest second. Minimum acceptable time value is 00:00:00 maximum acceptable time value is 23:59:59.
- 1.2.4. **Latitude and Longitude** - Reported in decimal degrees using WGS84 or NAD83 with a precision capability of no less than 6 digits to the right of the decimal place. Maximum acceptable value for Latitude is 90; minimum acceptable value is -90. Maximum acceptable value for Longitude is 180 and the minimum acceptable value is -180.
- 1.2.5. **Altitude** – Reported as Meters from Mean Sea Level
- 1.2.6. **Speed** - Reported as Meters per Second or Centimetres per Second. Precision will not need to exceed whole meters per second.
- 1.2.7. **Heading** – Reported as track over ground referenced to true north. Precision will not need to exceed whole degrees. Minimum acceptable value is 0 degrees; the maximum acceptable value is 359 degrees.
- 1.2.8. **Event Reports** - The following categorized “Event Reports,” Safety Event, Text/Email Messaging Event, Automatic Events, Manual Events will be sent as follows. Contracted Air Carriers shall have clear on-board operational procedures within the operations manual outlining the use of this function.
- 1.2.8.1. **Safety Event (SE)** – Units will support an Automated Alert Function by a rapid rate of ascent and descent and furnish a clearly distinguishable Alert Button easily accessible for the flight crew while in flight. When the emergency features are activated, the unit shall immediately send a distress signal and relay position reports at 1-minute intervals as indicated within Figure 3 Ref. S.No 13. Contracted Air Carriers shall have clear on-board operational procedures within the operations manual outlining the use of this function.
- 1.2.8.2. **Text/Email Messaging Event (TEME)** – Units shall provide bi-directional minimum 300-character text/email communication capability with the aircrew and the UNAGSTS service as indicated within Figure 3 Ref. S.No 14. Contracted Air Carriers shall have clear on-board operational procedures within the operations manual outlining the use of this function.
- 1.2.8.3. **Automatic Events (AE)** - In Automatic mode, the following data shall be automatically generated and issued by the UNIT as indicated within Figure 3 Ref. S.No 15-18. Contracted Air Carriers shall have clear on-board operational procedures within the operations manual outlining the use of this function.
- 1.2.8.3.1. A-Block-Start (HH:MM) 1.2.8.3.3. A-Landing time (HH:MM)
 1.2.8.3.2. A-Take-Off (HH:MM) 1.2.8.3.4. A-Block-Stop (HH:MM)
- 1.2.8.4. **Manual Events (ME)** - In manual mode, the data is entered by the aircrew and sent through the tracking unit. Each Event Report shall include automatic data stamp detailed within section 1.2.1 *In order to reduce transmission frequency, crew reported data can be sent in two data packets (*) denotes first data packet and (**) denotes second packet as displayed in Figure 3 Ref. S.No 19-31.* Contracted Air

Carriers shall have clear on-board operational procedures within the operations manual outlining the use of this function.

- | | |
|--------------------------------------|--|
| 1.2.8.4.1. M-Block-Start (HH:MM)* | 1.2.8.4.8. M-Landing Time (HH:MM)** |
| 1.2.8.4.2. M-Fuel uplifted (litres)* | 1.2.8.4.9. M-Total Flight Time (hh:mm)** |
| 1.2.8.4.3. M-Starting Fuel (litres)* | 1.2.8.4.10. M-Ending Fuel (litres)** |
| 1.2.8.4.4. M-Endurance (hh:mm)* | 1.2.8.4.11. M-Fuel burn (litres)** |
| 1.2.8.4.5. M-Number of Passengers* | 1.2.8.4.12. M-Block Stop (HH:MM)** |
| 1.2.8.4.6. M-Cargo in kilo tonnage* | 1.2.8.4.13. M-Total Block Time (hh:mm)** |
| 1.2.8.4.7. M-Take-Off (HH:MM)* | |

Note 1: The United Nations foresees future requirements of UN operated helicopters shall be capable of event reporting when entering and exiting each hover and unloading a passenger manifest when operating in extreme remote locations.

- 1.2.9. **Quality** - The quality of the position report shall be reported. Quality indicators include type of position (invalid/2D/3D) and a position quality metric preferred GDOP (PDOP minimum). Only valid 3D position reports will be used for tracking.
- 1.2.9.1. **Fix Type** - will be the status of that GPS position. Valid report values are:
- 1.2.9.1.1. **3D** Three-dimensional position report
 - 1.2.9.1.2. **2D** Two-dimensional position report
 - 1.2.9.1.3. **Invalid** Not a valid report
- 1.2.9.2. **Not Available** - indicates unit is unable to report **fix type**. (e.g. firmware version of this unit does not report **fix type**, but could with another version of firmware)
- 1.2.9.3. **None** - indicates unit cannot report **fix type** (e.g. unit is not capable of reporting a **fix type** under any conditions).
- 1.2.9.4. **Position Quality** - Position reports with DOPs less than 1 or greater than 98 shall be deemed invalid. The United Nations AFF will collect the DOP as an indicator of three-dimensional positioning accuracy as consequence of relative position of GPS satellites with respect to a GPS receiver and use the existing AFF Global reporting standard to rate the quality of the reporting.
- 1.2.9.5. **Position Quality Metrics** - can be any of the following combination of precision:
- 1.2.9.5.1. PDOP : Position Dilution of Precision (measure of accuracy in 3-D position is an accumulation of HDOP and VDOP), also called spherical DOP
 - 1.2.9.5.1.1. HDOP : Horizontal Dilution of Precision (measure of accuracy in 2-D position, for example Latitude and Longitude)
 - 1.2.9.5.1.2. VDOP : Vertical Dilution of Precision (Height)
- 1.2.10. **Latency** – Position/Event reports must be able to be delivered to the UNAGSTS Provider in less than 2 minutes of the GPS position calculation time. Any message

received outside the 2-minute requirement shall be considered not valid which will reflect in the air carrier performance.

- 1.3. **Reliability** - Scoring United Nations Contracted Air Operators tracking Unit reporting performance shall be performed by the UNAGSTS provider. The scoring process is a 5 step scoring process, subject to change is required for each flight in order to ensure the performance reliability and compliance for the contracted flight tracking service. The number of lost/invalid position/event reports shall not fall below the rating of Usually Reliable “4” as described in Para 1.3.5.2, which will reflect on the air carrier performance report. Service providers forwarding tracked information in accordance with part 2 of this document shall also provide their Unit scoring performance upon request and when the reliability score is rated as Usually Reliable “4”. See Figure 1: — High Level Diagram for reference.

1.3.1. **Convert Total flight time into (TiM) Time in Minutes**

- 1.3.1.1. $hh:mm*24*60$ (hh:mm is the total flight time per leg)

1.3.2. **Calculate Position Reports (PR) into Position Report Score (PRS)**

- 1.3.2.1. Find (**TPPR**) Total Possible Position Reports ($TiM/Frequency = TPPR$ (*Frequency Paragraph 1.2*))
- 1.3.2.2. Find (**APRR**) Actual Position Reports Received = All Position Reports UNAGSTS provider received.
- 1.3.2.3. Calculate (**PRD**) Position Report Difference ($APRR-TPPR = PRD$)
- 1.3.2.4. $PRD*3 = PRS$ *Note: Each Position Report has a 3 point value.*

1.3.3. **Calculate Automatic Event Reports (AER) to obtain the Automatic Event Report Score (AERS)**

- 1.3.3.1. Calculate the Automatic Required Event Report (ARER). *The ARER = 4 points due to the number of required ARER as listed under 1.2.10.1 AE.*
- 1.3.3.2. Sum up the **Actual Automatic Event Reports (AAER)** received
- 1.3.3.3. Calculate the Automatic Event Report Difference (AERD) by subtracting AAER from ARER and you will have AERD. $(AERD)=ARER-AAER$
- 1.3.3.4. To get your AERS you need to multiply AERD by 6 ($AERD *6$).

1.3.4. **Calculate Manual Event Reports (MER) to obtain the Manual Event Report Score (MERS)**

- 1.3.4.1. Calculate the Manual Required Event Report (MRER). *The MRER = 4 points due to the number of required MRER as listed under 1.2.10.2 ME.*
- 1.3.4.2. Sum up the **Actual Manual Event Reports (AMER)** received
- 1.3.4.3. Calculate the Manual Event Report Difference (MERD) by subtracting AMER from MRER and you will have MERD. $(MERD)=MRER-AMER$
- 1.3.4.4. To get your MERS you need to multiply MERD by 2 ($AERD *2$).

1.3.5. **Calculate Total Flight Report Range (TFRR) = $100-(PRS+AERS+MERS)$ = Flight Report/Event Rating (FRER)**

- 1.3.5.1. If value is between 96-100% is Consistently Reliable and rated 5 as an approved UN standard.
- 1.3.5.2. If value is between 87-96% is Usually Reliable and rated 4 UN reporting standards Usually Reliable on average must not exceed .02% of all reports within a 7 day running average.
- 1.3.5.3. If value is between 77-86% is Fairly Reliable and rated 3 UN reporting standards Usually Reliable on average must not exceed .01% of all reports within a 7 day running average.
- 1.3.5.4. If value is between 67-76% is Not Reliable and rated 2 UN reporting standards "Fairly Reliable" 2 as UN reporting standards is not acceptable and requires HQ on the spot notification.
- 1.3.5.5. If value is between 0-66% "Cannot determine Reliability" and rated 1 as UN reporting standards is not acceptable and requires HQ on the spot notification.

UNAGSTS Tracking Unit Reliability Scoring requirements										
Rating (FRER)	Classification									% Range
5	Consistently Reliable									96-100%
4	Usually Reliable									87 -96%
3	Fairly Reliable									77-86%
2	Not Reliable									67-76%
1	Cannot determine Reliability									0-66%
1. Flight Time	2. PR			3. (AER)			4. (MER)			5. TFRR
02:00	TPPR	APPR	PRS	ARER	AAER	AERS	MRER	AMER	MERS	100-(PRS+AERS+MERS)
TIM	40	39	PRD	4	3	AERD	13	13	MERD	91.00
hh:mm*24*60	(PRD)=APRR-TPPR		* 3	(AERD)=ARER-AAER		*6	(MERD)=MRER-MAER		*2	(FRER)
120	1		3	1		6	0		0	4
A - Event Message=6 Points for each of the required 4 messages listed under 1.2.10.1 AE										
M - Event Message= 2 Points for each of the required 13 messages listed under 1.2.10.2 ME										
A - Position Reports=3 Points for each of the required 3 minute position report listed under 1.2 "Frequency"										

Figure 1: — High Level Diagram (HLD) of UNAGSTS Tracking Unit Reliability scoring requirements

- 1.4. **Storage** - United Nations Air Operators third party Satellite Tracking Service Provider tracking units shall supply an internal Data storage capability that retains at minimum a 30-day supply of historical tracked data described in paragraph 1.2, based on a 40-hour flight week.
- 1.5. **Firmware and Software** - Upgradable to meet United Nations reporting standards, as the program progresses and technology advances some technical requirements may require revision.
- 1.6. **Area of Coverage** - The tracking communication link must be either Iridium or Inmarsat satellite networks and fully operational worldwide.

- 1.7. **Scheduled and Unscheduled Changes and Outages** - The data provider shall ensure they have support capability as defined under paragraph 2.6 (HDSSC), below. UNAGSTS shall be immediately notified upon all service outages.

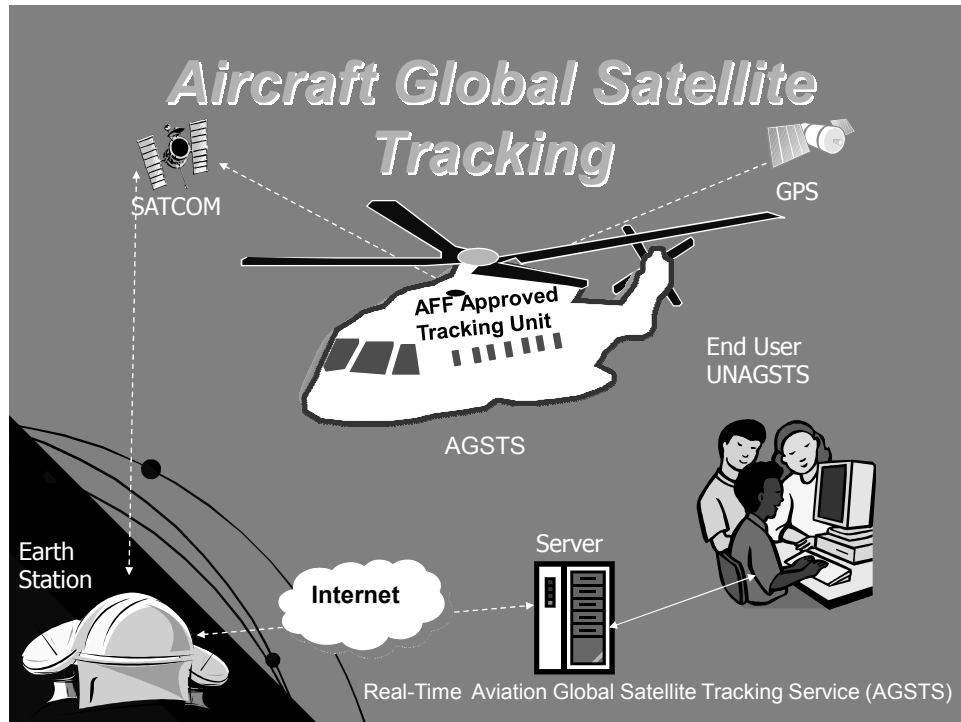


Figure 2: — (HLD) of Tracking Unit Primary Connectivity to the UNAGSTS

The High Level Diagram depicts the preferred AFF reporting through the UNAGSTS, which is the preferred method of reporting for the United Nations.

1. Tracking unit receives GPS data
2. Tracking unit transmits data over satellite carrier.
3. Satellite carrier ground station receives data from tracking unit.
4. Ground station sends data over internet to Vendor Network Operations Centre.
5. Vendor Network Operations Centre sends data over internet to (UNAGSTSS)
6. (UNAGSTSS) disseminates data for display on a mapping system for end users.

UNAGSTS Data Types and Precision

S.No	Description (Standard Position Report Data Ref. S.No 1-12)	Data Type
1	Equipment Serial Number	String
2	Aircraft Registration	String
3	Date Time UTC	DateTime
4	Latitude	Location
5	Longitude	
6	Speed	Integer
7	Heading	Integer
8	Altitude	Integer
9	Fix Type	String
10	PDOP	Integer
11	GDOP	Integer
Event -Emergency Alert		
13	Alert – Panic button activation, Rate-of-Ascent or Decent limitations warning message including Standard Position Report Data stamp (Ref. S.No 1-12)	String
Event -Text/Email Messaging		
14	300 Character txt message including Standard Position Report Data stamp (Ref. S.No 1-12)	String
EVENT Reports (13-16 Automatic Events) (17-29 Manual Events) Manual reported data can be sent in two data packets (*) denotes first data packet and (**) denotes second data packet. All reports shall be sent prior to issuance of the next Position/Event report and if not met shall be considered invalid if 1.2.12 Latency requirements are not met.		
15	A-Block-Start (HH:MM) - Block Start – For Fixed Wing Aircraft is when the aircraft moves under its own power for taking off and for helicopters, when the aircraft engages its rotors including Standard Position Report Data stamp (Ref. S.No 1-12)	String
16	A-Take-Off (HH:MM) - Unit automatically indicates time Aircraft took-off including Standard Position Report Data stamp (Ref. S.No 1-12)	String
17	A-Landing time (HH:MM) - Unit automatically indicates time Aircraft landed including Standard Position Report Data stamp (Ref. S.No 1-12)	String
18	A-Block-Stop (HH:MM) - Block end for Fixed Wing Aircraft is when the aircraft comes to rest prior to shutdown at the end of the flight and for helicopters is when the engines are switched off after landing including Standard Position Report Data stamp (Ref. S.No 1-12)	String
19	M-Block-Start (HH:MM)* - Block Start - for Fixed Wing Aircraft is when the aircraft moves under its own power for taking off and for helicopters when the aircraft engages its rotor including Standard Position Report Data stamp (Ref. S.No 1-12)	String
20	M-Fuel uplifted (litres)* - Fuel uplift indicates litres uplifted at point of origin Ref. S.No 4&5 including Standard Position Report Data stamp (Ref. S.No 1-12)	String

21	M-Starting Fuel (litres)* - Indicates litres onboard at point of origin Ref. S.No 4&5 including Standard Position Report Data stamp (Ref. S.No 1-12)	String
22	M-Endurance (hh:mm)* - Endurance is operational time that the aircraft can sustain safe flight during the planned segment of flight between Ref. S.No 16 & 17 including Standard Position Report Data stamp (Ref. S.No 1-12)	String
23	M-Number of Passengers* - This will indicate the total number of passengers on-board the aircraft for the segment of flight between Ref. S.No 16 & 17 including Standard Position Report Data stamp (Ref. S.No 1-12).	String
24	M-Cargo in kilo tonnage* - This will indicate the amount of cargo on-board the aircraft reported as tonnage to the nearest tenth of a ton for the segment of flight between Ref. S.No 16 & 17 including Standard Position Report Data stamp (Ref. S.No 1-12).	String
25	M-Take-Off (HH:MM)* - Crew indicates time aircraft took-off including Standard Position Report Data stamp (Ref. S.No 1-12)	String
26	M-Landing Time (HH:MM)** - Crew indicates time aircraft landed including Standard Position Report Data stamp (Ref. S.No 1-12).	String
27	M-Total Flight Time (hh:mm)** - Crew Indicates total flight time the aircraft sustained during segment of flight between Ref. S.No 25 and Ref. S.No 26 including Standard Position Report Data stamp (Ref. S.No 1-12).	String
28	M-Ending Fuel (litres)** - Indicates amount in litres onboard at the end of segment of flight including Standard Position Report Data stamp (Ref. S.No 1-12).	String
29	M-Fuel burn (litres) ** - Indicates amount of litres consumed between segment of flight between Ref. S.No 19 and Ref. S.No 26 including Standard Position Report Data stamp (Ref. S.No 1-12)	String
30	M-Block Stop (HH:MM)** - Block end for Fixed Wing Aircraft is when the aircraft comes to rest prior to shutdown at the end of the flight and for helicopters is when the engines are switched off after landing including Standard Position Report Data stamp (Ref. S.No 1-12).	String
31	M-Total Block Time (hh:mm)** - Indicates total time of segment between Ref. S.No 19& Ref. S.No 30 including Standard Position Report Data stamp (Ref. S.No 1-12).	String

Figure 3: — UNAGSTS Data Types and Precision

Part 2 - The Contracted Air Operators Satellite Tracking Service Providers System requirements for Delivery, Frequency, Archiving and Quality Service Coverage as depicted in the High Level Diagram Figure 4.

2. Through careful coordination, the United Nations Aviation Global Satellite Tracking Solution will require all incoming data feeds to conform to the following new standards and shall acknowledge that as implementation of the program progresses and technology advances some technical requirements are likely to require amendment. A current United Nations Data-Link Security Agreement (D-LSA) United Nations Interconnect Data Security Agreement between the contracted Air Operators third party satellite tracking system service provider and the UNAGSTS provider and the United Nations must be in place.
 - 2.1. **Delivery Method.** HTTPS will be used for data exchange. The request page will be username and password protected. Post method will be used to request data.
 - 2.2. **System Health Validation-** required (referred to as “position pulse” or “heartbeat”)
 - 2.2.1. **Position Pulse** - One computer generated position report every 30 seconds to verify the query is retrieving current data from the service provider data server.
 - 2.2.2. One **end-to-end position report** is required from the tracking unit using the same hardware and satellite segment as production tracking units every 60 minutes to verify that the system is working from end-to-end. New firmware may be tested using the end-to-end unit. 2D positions are acceptable for end-to-end “position pulse” position reports.
 - 2.3. **Frequency** - The UNAGSTS server shall not request data more frequently than every 30 seconds.
 - 2.3.1. **Data Format** - Data will be formatted into a well-formed XML document as defined by the UNAGSTS schema. The server date and time, will be the subject of data requests from UNAGSTS Provider. The **acPos** data will be sorted in ascending order by the requested time stamp. No other sort criteria will be used for the **posList**.
 - 2.3.2. **Bandwidth-** Registered third party Satellite Tracking Service Providers must be able to deliver all reported data over a 60-second interval in less than 30 seconds from time of request. The UNAGSTS Provider may have more than one server requesting position reports. UNAGSTS Provider data requests will not be synchronized.
 - 2.4. **Storage.** The United Nations Air Operators third party Satellite Tracking Service Providers service shall be able to service any requests for positions up to 365 days prior to the date of request.
 - 2.5. **Reliability** - Air Operators third party Satellite Tracking Service Provider must be capable of meeting these global requirements 99.97% on a 7 day running average.
 - 2.6. **Contracted Air Operators Tracking Supplier Data Flow to the UNAGSTS provider shall be “Performance Based” and “XML Data Standard”.**
 - 2.6.1. **Async** request type will be the only request type catered for, and is for data that will not arrive in sequence by position time. The asynchronous query will return data from the third-party data centre’s database, based on the date/time the position was inserted into

that database. Position data will be sorted from least current to most recent based on the query field. Other data requests are likely to be desired in the future. Where possible, no change will be made to the schema. These new requests will be defined, adopted and published. The response document should include a schema **version** number, and may also include a **sysID** and **rptTime** attribute to facilitate debugging. **sysID** is a unique identifier to help the company identify what server(s) generated the report and the **rptTime** is the time the server created the document. **source** is the source unit that created the position (e.g. GPS, Iridium, Inmarsat). **fix**: indicates the **fix type**. **mode**: is the indicator of GPS mode (e.g. A=Autonomous, D=Differential, E=Estimated). Other modes may be defined in the future. **dataCtr**: is the company name of the unit producing the data, and may abbreviated. **dateTime**: is the position report time. **dataCtrDateTime**: is the time the position report was inserted into the database.

- 2.6.2. **Asynchronous Data Query** The asynchronous method allows for position data to arrive at the data centre out of time order. This method does require that the servers collecting data will be synchronized to UTC time, and the server time will not drift sufficiently to impact data delivery. This method also requires a date time field that records the date and time the position data is inserted in the third-party database. UNAGSTS will send a **msgRequest** element with the text “**Async**” in the **subject** attribute. If the data centre supports asynchronous data requests, it will query for all data greater than and equal to the date time specified in the **body**. The response document shall include the **dataCtrDateTime** attribute for each position.
- 2.6.3. **Error Responses** The **msg** element should be used to report errors to UNAGSTS data requests. The **to** field in the response should be the **from** field value of the request. The **msgType** should be the text “**ERROR**” and the **subject** may be blank or a categorical description of the error. The **dateTime** will be the time the **msg** was created, and the **body** may contain a verbose description of the specific error. As patterns of errors are seen, categories to be used in the **subject** will be defined, adopted and published. This will not require a Schema change.
- 2.7. **Help Desk System Service Coverage (HDSSC)** – The Data exchange Centre shall ensure Help Desk System Services are available. The centre shall also guarantee at minimum an uptime of 99.97% for the United Nations tracking services and data transfer while connecting to the UNAGSTS in order to ensure global flight tracking services. The UN will monitor the service uptime through the United Nations Aviation Global Satellite Tracking Service Providers solution.
- 2.7.1. Service Availability - The HDSSC must be available on a 24/7 basis.
- 2.7.1.1. The HDSSC response time - All questions or enquires shall be documented and responded to in less than one (1) business day, maximum two (2) business days (depending on type of outage). Proposals must specify the type and level of customer support as well as the response time for each type of request of non-technical nature.
- 2.7.1.2. Web Support. The service provider shall provide 24/7 service desk database access to properly log/review/track user and administrator queries.
- 2.7.1.3. Service Desk. The support service must include single point of contact and each trouble report must be acknowledged with a tracking ticket number. The provider shall submit a clear procedure for escalation of incidents, with different contact options as phone, email, web, and fax. The provider shall also indicate the estimated time of repair or downtime, where downtime is considered the duration of time when the connection is not available, excluding the case of maintenance.

- 2.7.1.4. The Service provider shall provide a service that notifies (via email / telephone call and Daily Operational Service report) to the UN service provider immediately (within 15 min of outage initiation) of unplanned service outages, tracking solution changes, schedule maintenance, and planned outages in order for the UN to take appropriate actions.

2.7.2.Scheduling Maintenance and response to Service Outages

- 2.7.2.1. **Regular maintenance:** Must be scheduled in order to minimize impact to tracking services, i.e. on Saturdays and Sundays. Maintenance shall be scheduled with ten (10) working days advance notice and shall not to exceed three (1) hour in a given 24 hour calendar day. In a 365 day, calendar year scheduled maintenance may not exceed more than 6 hours.
- 2.7.2.2. **Average Incident Resolution Time.** Maximum acceptable average Incident Resolution Time on a monthly basis shall be 24 hrs.
- 2.7.2.3. **Daily Operational Service report-** The Service provider shall submit on a daily basis no later than 0700 UTC to the Global Satellite Tracking Solution provider a Daily Operational Service report outlining the status of the service for the operational day and forecasted planned outages covering a 3 day period. This plain language message shall describe the operational conditions experienced within the 24-hour service window, services outages incurred or in progress, and a three-day service outlook.
- 2.7.2.4. **Service Outage Report** - Upon completion of each Maintenance or Outage effecting United Nations Global Satellite Tracking Operations, a Service Outage report shall be forwarded to the UN indicating the time the service was affected circumstances and when the service became fully operational, which will reflect on the monthly Outage Report. The duration of an outage is computed as the time period between when an equipment item became unserviceable and when it was restored to serviceable, not counting scheduled outages
- 2.7.2.5. **Monthly Operational Service Outage Reports.** The service provider shall submit a written report NLT than the 5th working day of the following month via email keeping the Strategic Air Operations Centre abreast of service interruptions and its impact on service provided to the United Nations. The report shall include the amount of service outage time both planned and unplanned.

Note 2: Monthly uptime percentage rates should be calculated using information from locally maintained outage logs and include only unscheduled maintenance outages. To calculate the maintenance uptime percentage for services provided, all unscheduled outages on the provided service shall be subtracted from the total potential operational tracking time available for the month (based on the 24 hour UTC time clock). The duration of an outage is computed as the time-period between when an equipment item became unserviceable and when it was restored to service. Scheduled outages, Preventative Maintenance Inspections, shall not be included as part of an outage.

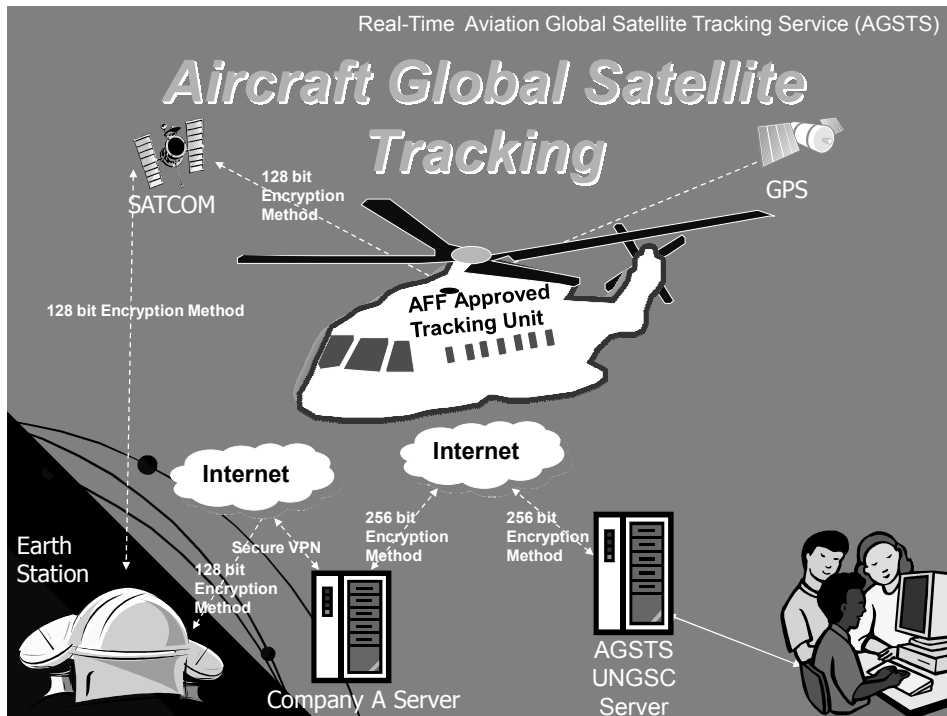


Figure 4: — (HLD) of delivery routing from 3rd party Tracking Service to the UNAGSTS
 The above High Level Diagram depicts indirect reporting through the service provider to the UNAGSTS.

- (DFS) United Nations Department of Field Support
- (DPA) United Nations Department of Political Affairs
- (DPKO) United Nations Department of Peacekeeping Operations
- (hh:mm) Hour Hour Minute Minute (12 hour time format)
- (HH:MM) Hour Hour Minute Minute (UTC 24 hour time format)
- (HLD) High Level Diagram
- (UNAGSTS) United Nations Aviation Global Satellite Tracking Solution
- (UNAGSTSS) United Nations Aviation Global Satellite Tracking Solution Service
- 2D Two-dimensional position report
- 3D Three-dimensional position report
- Block End for Fixed Wing Aircraft is when the aircraft comes to rest at the end of the flight and for helicopters is when the engines are switched off after landing.
- Block Start - Fixed Wing Aircraft is when the aircraft moves under its own power for the purpose of taking off and for helicopters it is when the aircraft engages its rotor
- dataCtr: is the company name of the unit producing the data, and may abbreviated.
- dataCtrDateTime: is the time the position report was inserted into the database.
- dateTime: is the position report time.
- DOP - Dilution of Precision
- fix: indicates the **fix type**.
- HTTPS Hypertext Transfer Protocol Secure
- IMEI International Mobile Equipment Identity (IMEI)
- mode: is the indicator of GPS mode (e.g. A=Autonomous, D=Differential, E=Estimated). Other modes may be defined in the future.
- NOC Network Operations Center(s)
- Source is the source unit that created the position (GPS).
- SSL Secure Socket Layer
- UTC Universal Time Coordinated
- WGS World Geodetic System
- XML Extensible Mark-up Language (as defined by the W3 Consortium)
- GDOP : Geometrical Dilution of Precision, (measure of accuracy in 3-D position and time)
- PDOP : Position Dilution of Precision (measure of accuracy in 3-D position), also called spherical DOP
- HDOP : Horizontal Dilution of Precision (measure of accuracy in 2-D position, for example Latitude and Longitude)
- VDOP : Vertical Dilution of Precision (measure of accuracy in 1-D position, Height)
- TDOP : Time Dilution of Precision (measure of accuracy in Time)