



U.S. Department
of Transportation

**Federal Aviation
Administration**

FIXM-Mediated STDDS Data Overview

Version 2.0

SWIM Terminal Data Distribution System (STDDS)

October 31, 2017

History

Release	Date	Comment
	October 10, 2017	Original version.
Version 2.0	October 31, 2017	Added GUFU fields.

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1 SCOPE

The SWIM Program Office has developed automated mediation to publish FIXM (Flight Information Exchange Model)-formatted STDDS (SWIM [System Wide Information Management] Terminal Data Distribution System) data.

Mediation is a SWIM capability that can transform SWIM data in some manner. One example is Version Mediation which can transform newer message versions back to older versions (or even vice versa). STDDS FIXM data will be published by applying a mediation capability that transforms specific STDDS messages in the standard SimpleXML format to the FIXM format.

This document provides the information consumers will need to access, consume, and utilize STDDS messages in FIXM format.

1.1 Background

1.1.1 SWIM

The SWIM Program is a NAS (National Airspace System)-wide information system that supports NextGen (Next Generation Air Transportation System) goals.

SWIM facilitates data sharing requirements for NextGen by providing a digital data-sharing backbone. SWIM enables increased common situational awareness and improved NAS agility to deliver the right information to the right people at the right time. This information-sharing platform offers a single point of access for aviation data, with producers of data publishing only once and users accessing the information they need through a single connection.

For more information, see <https://www.faa.gov/nextgen/programs/swim>.

1.1.2 STDDS

STDDS provides SOA (Service Oriented Architecture) interfaces for tower and TRACON (Terminal Radar Approach Control) systems to send terminal events to NEMS (NAS Enterprise Messaging Service) for subscription by NAS and non-NAS consumers using SWIM-compliant infrastructure and interface standards. STDDS interfaces with RVR (Runway Visual Range), EFSTS (Electronic Flight Strip Transfer System), ASDE-X (Airport Surface Detection Equipment -- Model X), ASSC (Airport Surface Surveillance Capability), TDLS (Tower Data Link Service), and SFDPS (SWIM Flight Data Publication Service) at airports to accept, derive, and publish airport information.

STDDS also interfaces with the STARS (Standard Terminal Automation Replacement System) GeNUS (General NAS User Services) interface at TRACONs.

For more information, see <https://www.faa.gov/nextgen/programs/swim/stds> for the available STDDS services.

1.1.3 FIXM

FIXM is an international standard for the exchange of Flight-related data. It is based upon the ICAO (International Civil Aviation Organization) FF-ICE (Flight and Flow Information for a Collaborative Environment) concept. See <https://www.fixm.aero> for more information.

The FIXM-mediated transformation process produces FIXM-compliant XML (eXtensible Markup Language) messages from select STDDS messages published by SMES (Surface Movement Event Service) and TAIS (Terminal Aviation Information Service).

1.2 Intended Use

This document, as well as FIXM-mediated STDDS data, exist to support approved FAA (Federal Aviation Administration), industry, and research users.

2 MESSAGING DETAILS

The STDDS FIXM mediation process converts certain STDDS SimpleXML messages to FIXM representations. The converted message types are:

- SMES Cat11 positionReport messages
- SMES Cat10 MLATPlotReport messages
- SMES Cat10 ADSBPlotReport messages
- TAIS AIG200 TATrackAndFlightPlan messages

The FIXM target messages consist of collections of NasMessageType::NasFlightType messages as defined by the FIXM US Extension. The /NasMessage/metadata/@messageType attribute in the FIXM message body indicates the specific message type and whether the message was delta-encoded, as shown in the table below:

SimpleXML Message Type	Delta Encoded	FIXM Message Type
STDDS ASDE-X (SMES Cat11) positionReport	N	ASDEX_POSITION_REPORT
STDDS ASDE-X (SMES Cat11) positionReport	Y	ASDEX_POSITION_REPORT_DELTA
STDDS ASDE-X (SMES Cat10) mlatReport	N	ASDEX_MLAT_REPORT
STDDS ASDE-X (SMES Cat10) mlatReport	Y	ASDEX_MLAT_REPORT_DELTA
STDDS ASDE-X (SMES Cat10) adsbReport	N	ASDEX_ADSB_REPORT
STDDS ASDE-X (SMES Cat10) adsbReport	Y	ASDEX_ADSB_REPORT_DELTA
STDDS TAIS TATrackAndFlightPlan	N	TAIS_TRACK_AND_FLIGHT_PLAN

2.1 STDDS SimpleXML Source Messages

More details of the STDDS SimpleXML source message types can be found below.

2.1.1 SMES

STDDS SMES publishes surface track data received from ASDE-X and ASSC to authorized SWIM service consumers via NEMS. In addition, SMES extracts surface movement events from the ASDE-X/ASSC surveillance data (spot out, on, off, spot in) and sends this data to authorized SWIM service consumers via NEMS.

Information about the corresponding STDDS SMES messages (shown in the table below) can be found at <https://nsrr.faa.gov/services/stds-sme/profile>, and specifically in the JMSDD (JMS [Java Messaging Service] Description Document) for SMES in the Service Documents section (<https://nsrr.faa.gov/services/stds-sme/documents>).

Message Types:

Message Name	msgType
AsdexMessage (positionReport)	AT
AsdexMessage (adsbReport)	AD
AsdexMessage (mlatReport)	ML

Message Header (for all message types):

Data Element	Description	Type
msgType	Defines the type of message	string
version	Version number of STDDS schema	string
timestamp	UTC date and time of message generation	dateTime
tracon	FAA location identifier (three alphanumeric characters) of the producer STDDS installation	string
airport	ICAO code of the source airport	string
sendTo	Authorization flag; permissible value: all, authorized, or filtered	string

2.1.2 TAIS

TAIS publishes operational live flight plan data, track data, SISO (sign-in/sign-out) data, alert data, IMC (Instrument Meteorological Conditions) data, traffic count data, and performance monitoring data from STARS to authorized SWIM service consumers via NEMS.

Information about the corresponding STDDS TAIS messages (shown in the table below) can be found at <https://nsrr.faa.gov/services/stds-tais/profile>, and specifically in the JMSDD for TAIS in the Service Documents section (<https://nsrr.faa.gov/services/stds-tais/documents>).

Message Type:

Message Name	msgType
TerminalAutomationTrackAndFlightPlanData	FP

Message Header:

Data Element	Description	Type
msgType	Defines the type of message	string
version	Version number of STDDS schema	string
timestamp	UTC date and time of message generation	dateTime

tracon	FAA location identifier (three alphanumeric characters) of the producer STDDS installation	string
srcTracon	FAA location identifier (three alphanumeric characters) of the data source	string
srcVersion	Version number of input AIG message	string
sendTo	Authorization flag; permissible value: all, authorized, or filtered	string

2.2 FIXM Target Messages

The STDDS FIXM mediation process produces XML messages that are compliant with FIXM Core Release v4.0.0 and with the US v4.1.1 Extension of the FIXM Core. The extension schema encapsulates specific data that is required to support the FAA and its mission in the United States. See <https://www.fixm.aero> and https://www.fixm.aero/fixm_nas_extension_411.pl for more information.

Note that the message types and the message headers for the FIXM messages will be identical to those of the STDDS SimpleXML messages used to generate them. The FIXM messages will be distinguished from the source STDDS SimpleXML messages by means of the DEX_Source_Type, which will be used to identify the specific data format of the message body.

2.2.1 Sample FIXM Message (from TAIS source)

```
<?xml version="1.0" encoding="UTF-8"?>
<msg:MessageCollection xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:fn="http://www.w3.org/2005/xpath-functions"
xmlns:ta="urn:us:gov:dot:faa:atm:terminal:entities:v3-0:tais:terminalautomationinformation"
xmlns:ax="urn:us:gov:dot:faa:atm:terminal:entities:v3-0:smes:surfacemovementevent"
xmlns:nas="http://www.faa.aero/nas/4.1" xmlns:fb="http://www.fixm.aero/base/4.0"
xmlns:fx="http://www.fixm.aero/flight/4.0" xmlns:msg="http://www.fixm.aero/messaging/4.0"
xmlns:util="http://www.faa.gov" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.faa.aero/nas/4.1
C:/Users/test/FIXM/FIXM_4.1_US_Ext_4.1.1/schemas/extensions/nas/Nas.xsd">
  <msg:messageDateTime timeReference="UTC">2017-06-13T15:31:53Z</msg:messageDateTime>
  <msg:uniqueMessageIdentifier codeSpace="urn:uuid">4222d942-c228-40b6-833b-
32cb3e517ae4</msg:uniqueMessageIdentifier>
  <msg:message xsi:type="nas:NasMessageType">
    <msg:messageDateTime timeReference="UTC">2017-06-13T15:31:53Z</msg:messageDateTime>
    <msg:uniqueMessageIdentifier codeSpace="urn:uuid">72d7cb13-c733-452a-847e-
59b29c194b03</msg:uniqueMessageIdentifier>
    <nas:flight>
      <fx:aircraft>
        <fx:aircraftType>
          <fx:type xsi:type="fx:IcaoAircraftTypeReferenceType" icaoAircraftTypeDesignator="M20P"/>
        </fx:aircraftType>
      </fx:aircraft>
      <fx:destination xsi:type="nas:NasDestinationType">
        <fx:aerodrome xsi:type="fb:IcaoAerodromeReferenceType" locationIndicator="KGFL"/>
      </fx:destination>
      <fx:enRoute xsi:type="nas:NasEnRouteType">
        <fx:currentSsrCode>1570</fx:currentSsrCode>
      </fx:enRoute>
    </nas:flight>
  </msg:message>
</msg:MessageCollection>
```

```

<nas:aircraftPosition>
  <nas:position xsi:type="fb:PositionPointType">
    <fb:position srsName="urn:ogc:def:crs:EPSG::4326">
      <fb:pos>43.2195 -74.12442</fb:pos>
    </fb:position>
  </nas:position>
  <nas:positionTime timeReference="UTC">2017-02-24T19:50:59.957Z</nas:positionTime>
  <nas:reportedLevel>
    <fb:altitude uom="FT">8500</fb:altitude>
  </nas:reportedLevel>
  <nas:trackVelocity>
    <nas:x uom="KM_H">677</nas:x>
    <nas:y uom="KM_H">47</nas:y>
  </nas:trackVelocity>
  <nas:verticalRate uom="FT_MIN">-86</nas:verticalRate>
</nas:aircraftPosition>
</fx:enRoute>
<fx:filed>
  <fx:routeInformation xsi:type="nas:NasRouteInformationType" starsFlightRules="VFR"/>
</fx:filed>
<fx:flightIdentification aircraftIdentification="N131US"/>
<nas:additionalFlightInformation>
  <nas:nameValue name="FDPS_GUFI" value="us.fdpi.2017-06-13T15:31:53Z.000/12/300"/>
  <nas:nameValue name="ECID" value="103"/>
  <nas:nameValue name="TRACK_NUMBER" value="491"/>
  <nas:nameValue name="FLIGHT_PLAN_INDEX" value="58"/>
  <nas:nameValue name="PTD_TIME" value="1952"/>
</nas:additionalFlightInformation>
<nas:flightPlan identifier="KM67033300" starsFlightPlanStatus="ACTIVE"/>
<nas:flightStatus starsFlightStatus="ARRIVAL"/>
<nas:requestedAltitude>
  <nas:simple>
    <fb:altitude uom="FT">0</fb:altitude>
  </nas:simple>
</nas:requestedAltitude>
</nas:flight>
<nas:metadata messageType="TAIS_TRACK_AND_FLIGHT_PLAN">
  <nas:provenance tracon="ALB"/>
</nas:metadata>
</mesg:message>
<mesg:message xsi:type="nas:NasMessageType">
  <mesg:messageDateTime timeReference="UTC">2017-06-13T15:31:53Z</mesg:messageDateTime>
  <mesg:uniqueMessageIdentifier codeSpace="urn:uuid">dbb36f9a-dbee-48e5-98c7-
713ac7cf2313</mesg:uniqueMessageIdentifier>
  <nas:flight>
    <fx:enRoute xsi:type="nas:NasEnRouteType">
      <fx:currentSsrCode>2326</fx:currentSsrCode>
    </nas:aircraftPosition>
    <nas:position xsi:type="fb:PositionPointType">
      <fb:position srsName="urn:ogc:def:crs:EPSG::4326">
        <fb:pos>40.37285 -74.10879</fb:pos>
      </fb:position>
    </nas:position>
    <nas:positionTime timeReference="UTC">2017-02-24T19:50:58.437Z</nas:positionTime>
    <nas:reportedLevel>

```



```

    <fb:altitude uom="FT">17000</fb:altitude>
  </nas:reportedLevel>
  <nas:trackVelocity>
    <nas:x uom="KM_H">907</nas:x>
    <nas:y uom="KM_H">-796</nas:y>
  </nas:trackVelocity>
  <nas:verticalRate uom="FT_MIN">0</nas:verticalRate>
</nas:aircraftPosition>
</fx:enRoute>
<nas:additionalFlightInformation>
  <nas:nameValue name="TRACK_NUMBER" value="1393"/>
</nas:additionalFlightInformation>
<nas:flightPlan/>
<nas:flightStatus/>
</nas:flight>
<nas:metadata messageType="TAIS_TRACK_AND_FLIGHT_PLAN">
  <nas:provenance tracon="ALB"/>
</nas:metadata>
</mesg:message>
</mesg:MessageCollection>

```

2.3 Message Transformations

The source SMES and TAIS SimpleXML messages described in sections 2.1.1 and 2.1.2 are transformed to produce the FIXM messages delivered by the STDDS FIXM mediation process. See the message mapping tables below for details on this transformation, but also review both the JMSDD specifications for the sources messages and the FIXM schema. Note that these mappings are accurate as of STDDS Release 4.0.

The two FIXM fields below referring to a GUFU (Globally Unique Flight Identifier) -- from `eramGufu` and `sfdpsGufu` SimpleXML source fields -- will not appear in output STDDS FIXM messages until STDDS has upgraded to release 4.0.

2.3.1 STDDS ASDE-X (SMES Cat11) positionReport Message

STDDS ASDE-X (SMES Cat11) positionReport	FIXM
/asdexMsg/positionReport/time	/NasMessage/flight/enRoute/aircraftPosition/positionTime
/asdexMsg/positionReport/flightId/acAddress	/NasMessage/flight/aircraft/@aircraftAddress
/asdexMsg/positionReport/flightId/aircraftId	/NasMessage/flight/flightIdentification/@aircraftIdentification
/asdexMsg/positionReport/flightInfo/acType	/NasMessage/flight/aircraft/aircraftType/type/@icaoAircraftTypeDesignator
/asdexMsg/positionReport/manual/acType	/NasMessage/flight/aircraft/aircraftType/type/@icaoAircraftTypeDesignator
/asdexMsg/positionReport/flightInfo/fix	/NasMessage/flight/destination/arrivalFix/@designator or /NasMessage/flight/departure/departureFix/@designator
/asdexMsg/positionReport/manual/fix	/NasMessage/flight/destination/arrivalFix/@designator or /NasMessage/flight/departure/departureFix/@designator
/asdexMsg/positionReport/manual/callNum	/NasMessage/flight/flightIdentification/@aircraftIdentification
/asdexMsg/positionReport/movement/heading	/NasMessage/enRoute/aircraftPosition/track
/asdexMsg/positionReport/movement/speed	/NasMessage/enRoute/aircraftPosition/actualSpeed

/asdexMsg/positionReport/movement/vx	/NasMessage/flight/enRoute/aircraftPosition/trackVelocity/x
/asdexMsg/positionReport/movement/vy	/NasMessage/flight/enRoute/aircraftPosition/trackVelocity/y
/asdexMsg/positionReport/position/altitude	/NasMessage/flight/enRoute/aircraftPosition/reportedLevel/altitude
/asdexMsg/positionReport/position/latitude	/NasMessage/flight/enRoute/aircraftPosition/nas:position/fb:position/fb:pos
/asdexMsg/positionReport/position/longitude	/NasMessage/flight/enRoute/aircraftPosition/nas:position/fb:position/fb:pos
/asdexMsg/positionReport/flightId/mode3ACode	/NasMessage/flight/enRoute/currentSsrCode
/asdexMsg/positionReport/manual/mode3ACode	/NasMessage/flight/enRoute/currentSsrCode
/asdexMsg/positionReport/runway	/NasMessage/flight/destination/@runwayDirection or /NasMessage/flight/departure/@runwayDirection (or /NasMessage/flight/destination/@runwayUnassignedDesignator or /NasMessage/flight/departure/@runwayUnassignedDesignator if unassigned)
/asdexMsg/airport	/NasMessage/metadata/provenance/@airport
/asdexMsg/positionReport/seqNum	/NasMessage/metadata/@sequenceNumber
/asdexMsg/positionReport/track	/NasMessage/flight/additionalFlightInformation/nameValue/@name="TRACK _NUMBER" and @value
/asdexMsg/positionReport/manual/scratchpad1	/NasMessage/flight/additionalFlightInformation/nameValue/@name="SCRAT CHPAD1" and @value
/asdexMsg/positionReport/manual/scratchpad2	/NasMessage/flight/additionalFlightInformation/nameValue/@name="SCRAT CHPAD2" and @value
/asdexMsg/positionReport/movement/ax	/NasMessage/flight/enRoute/aircraftPosition/trackAcceleration/x and x/@uom
/asdexMsg/positionReport/movement/ay	/NasMessage/flight/enRoute/aircraftPosition/trackAcceleration/y and y/@uom
/asdexMsg/positionReport/status/vs	/NasMessage/flight/enRoute/aircraftPosition/verticalRate/@source
/asdexMsg/positionReport/status/vertRate and /asdexMsg/positionReport/status/ud	/NasMessage/flight/enRoute/aircraftPosition/verticalRate and verticalRate/@uom
/asdexMsg/positionReport/status/sil	/NasMessage/metadata/asdexConfidence/@sourceIntegrityLevel
/asdexMsg/positionReport/status/nic	/NasMessage/metadata/asdexConfidence/@navigationIntegrityCategory
/asdexMsg/positionReport/status/NACp	/NasMessage/metadata/asdexConfidence/@positionNavigationAccuracyCate gory
/asdexMsg/positionReport/enhancedData/eramGu fi	/NasMessage/flight/flightPlan/@identifier
/asdexMsg/positionReport/enhancedData/sfdpsGu fi	/NasMessage/flight/additionalFlightInformation/nameValue/@name="FDPS_ GUFi" and @value

2.3.2 STDDS ASDE-X (SMES Cat10) MLATPlotReport Message

STDDS ASDE-X (SMES Cat10) MLATPlotReport	FIXM
/asdexMsg/mlatReport/report/basicReport/time	/NasMessage/flight/enRoute/aircraftPosition/positionTime
/asdexMsg/mlatReport/report/acAddresss	/NasMessage/flight/aircraft/@aircraftAddress
/asdexMsg/mlatReport/report/basicReport/velocity/x	/NasMessage/flight/enRoute/aircraftPosition/trackVelocity/x
/asdexMsg/mlatReport/report/basicReport/velocity/y	/NasMessage/flight/enRoute/aircraftPosition/trackVelocity/y
/asdexMsg/mlatReport/report/basicReport/position/lat	/NasMessage/flight/enRoute/aircraftPosition/nas:position/fb:position/fb:pos
/asdexMsg/mlatReport/report/basicReport/position/lon	/NasMessage/flight/enRoute/aircraftPosition/nas:position/fb:position/fb:pos
/asdexMsg/mlatReport/report/mode3ACode	/NasMessage/flight/enRoute/currentSsrCode

/asdexMsg/mlatReport/report/level	/NasMessage/flight/enRoute/aircraftPosition/reportedLevel/altitude
/asdexMsg/airport	/NasMessage/metadata/provenance/@airport
/asdexMsg/mlatReport/report/basicReport/track	/NasMessage/flight/additionalFlightInformation/nameValue/@name="TRACK NUMBER" and @value

2.3.3 STDDS ASDE-X (SMES Cat10) ADSBPlotReport Message

STDDS ASDE-X (SMES Cat10) ADSBPlotReport	FIXM
/asdexMsg/adsbReport/report/basicReport/time	/NasMessage/flight/enRoute/aircraftPosition/positionTime
/asdexMsg/adsbReport/report/acAddress	/NasMessage/flight/aircraft/@aircraftAddress
/asdexMsg/adsbReport/report/basicReport/velocity/x	/NasMessage/flight/enRoute/aircraftPosition/trackVelocity/x
/asdexMsg/adsbReport/report/basicReport/velocity/y	/NasMessage/flight/enRoute/aircraftPosition/trackVelocity/y
/asdexMsg/adsbReport/report/basicReport/position/lat	/NasMessage/flight/enRoute/aircraftPosition/nas:position/fb:position/fb:pos
/asdexMsg/adsbReport/report/basicReport/position/lon	/NasMessage/flight/enRoute/aircraftPosition/nas:position/fb:position/fb:pos
/asdexMsg/adsbReport/report/mode3ACode	/NasMessage/flight/enRoute/currentSsrCode
/asdexMsg/adsbReport/report/level	/NasMessage/flight/enRoute/aircraftPosition/reportedLevel/altitude
/asdexMsg/airport	/NasMessage/metadata/provenance/@airport
/asdexMsg/adsbReport/report/basicReport/track	/NasMessage/flight/additionalFlightInformation/nameValue/@name="TRACK NUMBER" and @value

2.3.4 STDDS TAIS TATrackAndFlightPlan Message

STDDS TAIS TATrackAndFlightPlan	FIXM
/TATrackAndFlightPlan/record/track/mrtTime	/NasMessage/flight/enRoute/aircraftPosition/positionTime
/TATrackAndFlightPlan/record/track/acAddress	/NasMessage/flight/aircraft/@aircraftAddress
/TATrackAndFlightPlan/record/track/vx	/NasMessage/flight/enRoute/aircraftPosition/trackVelocity/x
/TATrackAndFlightPlan/record/track/vy	/NasMessage/flight/enRoute/aircraftPosition/trackVelocity/y
/TATrackAndFlightPlan/record/track/reportedBeaconCode	/NasMessage/flight/enroute/currentSsrCode
/TATrackAndFlightPlan/record/track/reportedAltitude	/NasMessage/flight/enRoute/aircraftPosition/reportedLevel/altitude
/TATrackAndFlightPlan/record/track/lat	/NasMessage/flight/enRoute/aircraftPosition/nas:position/fb:position/ fb:pos
/TATrackAndFlightPlan/record/track/lon	/NasMessage/flight/enRoute/aircraftPosition/nas:position/fb:position/ fb:pos
/TATrackAndFlightPlan/record/flightPlan/assignedBeaconCode	/NasMessage/flight/enroute/currentSsrCode
/TATrackAndFlightPlan/record/flightPlan/requestedAltitude	/NasMessage/flight/requestedAltitude/simple/altitude
/TATrackAndFlightPlan/record/flightPlan/acid	/NasMessage/flight/flightIdentification/@aircraftIdentification
/TATrackAndFlightPlan/record/flightPlan/acType	/NasMessage/flight/aircraft/aircraftType/type/@icaoAircraftTypeDesig nator
/TATrackAndFlightPlan/record/flightPlan/airport	/NasMessage/flight/destination/aerodrome or /NasMessage/flight/departure/aerodrome
/TATrackAndFlightPlan/record/flightPlan/ECID	/NasMessage/flight/additionalFlightInformation/nameValue/@name="ECID" and @value

/TATrackAndFlightPlan/record/flightPlan/entryFix	/NasMessage/flight/destination/aerodrome or /NasMessage/flight/departure/departureFix
/TATrackAndFlightPlan/record/flightPlan/exitFix	/NasMessage/flight/destination/aerodrome or /NasMessage/flight/departure/departureFix
/TATrackAndFlightPlan/record/flightPlan/ptdTime	/NasMessage/flight/additionalFlightInformation/nameValue/@name="PTD_TIME" and @value
/TATrackAndFlightPlan/record/flightPlan/runway	/NasMessage/flight/additionalFlightInformation/nameValue/@name="STARS_RUNWAY" and @value
/TATrackAndFlightPlan/record/flightPlan/flightRules	/NasMessage/flight/filed/routeInformation/@starsFlightRules
/TATrackAndFlightPlan/record/track/vVert	/NasMessage/flight/enRoute/aircraftPosition/verticalRate and verticalRate/@uom
/TATrackAndFlightPlan/src	/NasMessage/metadata/provenance/@tracon
/TATrackAndFlightPlan/record/track/trackNum	/NasMessage/flight/additionalFlightInformation/nameValue/@name="TRACK_NUMBER" and @value
/TATrackAndFlightPlan/record/flightPlan/sfpn	/NasMessage/flight/additionalFlightInformation/nameValue/@name="FLIGHT_PLAN_INDEX" and @value
/TATrackAndFlightPlan/record/flightPlan/scratchPad1	/NasMessage/flight/additionalFlightInformation/nameValue/@name="SCRATCHPAD1" and @value
/TATrackAndFlightPlan/record/flightPlan/scratchPad2	/NasMessage/flight/additionalFlightInformation/nameValue/@name="SCRATCHPAD2" and @value
/TATrackAndFlightPlan/record/flightPlan/type	/NasMessage/flight/flightStatus/@starsFlightStatus
/TATrackAndFlightPlan/record/flightPlan/status	/NasMessage/flight/flightPlan/@starsFlightPlanStatus
/TATrackAndFlightPlan/record/flightPlan/delete	/NasMessage/flight/flightPlan/@starsFlightPlanDeletedIndicator
/TATrackAndFlightPlan/record/flightPlan/suspended	/NasMessage/flight/flightPlan/@starsFlightPlanSuspendedIndicator
/TATrackAndFlightPlan/record/flightPlan/rnav	/NasMessage/flight/@rnavIndicator
/TATrackAndFlightPlan/record/enhancedData/eramGufi	/NasMessage/flight/flightPlan/@identifier
/TATrackAndFlightPlan/record/enhancedData/sfdpsGufi	/NasMessage/flight/additionalFlightInformation/nameValue/@name="FDPS_GUFI" and @value

2.4 Message Transformation Considerations

Not only are FIXM messages significantly different structurally than STDDS SimpleXML messages due to their fundamentally different schemas, but the data they contain may also be different due to conversions required to be compliant with FIXM.

For example, SimpleXML data elements may be handled in one of the following ways during conversion to FIXM:

1. Included in FIXM unchanged (e.g. for data originally entered manually)
2. Included in FIXM after a unit conversion (e.g. meters/second to kilometers/hour)
3. Included in FIXM with a fixed type conversion (e.g. "V" to "VFR", "active" to "ACTIVE", "DEN" to "KDEN", as required by FIXM)

In other cases, there may be no suitable data element defined in the FIXM schema to hold a certain SimpleXML value. This may be handled by using name-value pairs to hold the SimpleXML data or by excluding the data from the FIXM message when it is of lesser importance.

Other specific considerations are described below.

2.4.1 Delta Encoding

To save bandwidth, STDDS SMES SimpleXML messages can be delta-encoded, meaning that they would not include fields that had not changed since the previous message was sent. Non-delta-encoded (or "full") messages contain all fields and are sent once a minute. As described above, delta-encoded messages can be identified by a `/NasMessage/metadata/@messageType` attribute value ending in "DELTA" in the FIXM message body.

One side effect of delta encoding is that STDDS sends some SMES delta-encoded messages with only a latitude or longitude value, but not both. Since the FIXM schema requires both latitude and longitude values to define a geographical point, any occurrence of latitude or longitude by itself will not be transformed to FIXM.

Also, note that STDDS SMES SimpleXML messages can include an `r="1"` attribute on a field indicating that the field should no longer be considered valid. Since the FIXM schema does not contain a way to represent this concept, it is not included in the STDDS FIXM messages that are generated. However, the next non-delta-encoded message received (within a minute) will act as a reset for any fields that may have become invalid.

2.4.2 Target Type

STDDS SMES SimpleXML messages can include messages for ground vehicles as well as aircraft. However, the FIXM schema currently is not intended to include ground vehicles. This means that any SimpleXML messages with a `"tgtType"` value of "vehicle" (in ASDE-X [SMES Cat11] positionReport messages) or with a `"descriptor/tot"` value of "surface" (in STDDS ASDE-X [SMES Cat10] MLATPlotReport or ADSBPlotReport messages) will not be converted to FIXM.

2.4.3 Wake

Because of the difficulty in reliably translating wake category values originally obtained from STARS into categories used by ERAM (En Route Automation Modernization) and defined in the FIXM schema, any wake values in STDDS SimpleXML messages will not appear in resulting FIXM messages.

2.5 Consuming FIXM Messages

FIXM-mediated STDDS data will only be available via Solace queues and thus will need to be consumed using one of the Solace APIs (Application Programming Interfaces).

The current plan is that existing consumers of STDDS messages using other approaches (e.g. WebLogic) will have the option of converting to a Solace-only client or maintaining both Solace and non-Solace clients.

See <https://www.faa.gov/nextgen/programs/swim/documentation/> for more information on SWIM NEMS and consuming SWIM messages.

3 PROCESS DETAILS

3.1 FIXM-Mediated STDDS Data Availability

FIXM-mediated STDDS data is expected to be available in early 2018.

3.2 Requesting a Subscription

The standard on-ramping request and approval process will be used to provide access to FIXM-mediated STDDS data for approved organizations. There are two main categories of consumers, and the request and approval process will differ accordingly:

1. Current Solace Consumers
 - a. Request from their Engineering Services on-ramping Point-of-Contact a new Solace queue that subscribes to FIXM-mediated STDDS data.
2. Non-Solace Consumers
 - a. Request a Solace FNTB queue (this should be a queue with FIXM-mediated STDDS data).
 - b. Complete Qualification Testing with a Solace client.
 - c. A Solace OPS-IP queue can then be provisioned.

See https://nsrr.faa.gov/help/nsrr_help/on_ramping_form_help for more information.

NOTE: Consumers may want to receive only SMES FIXM data, only TAIS FIXM data, or both. The current plan is to support all of these options with a single Solace queue configured accordingly, but the details of how this will work have not yet been confirmed.

4 APPLICABLE DOCUMENTS

4.1 Government Documents

[FAA-STD-063] XML Namespaces, 1 May 2009.

<http://www.tc.faa.gov/its/worldpac/standards/faa-std-063.pdf>

[NAS-WSRD-4307-001] SWIM Terminal Data Distribution System (STDDS) Web Services Requirements Document (WSRD), R3.3 Rev A, 18 October, 2016.

https://nsrr.faa.gov/sites/default/files/NAS-WSRD-4307-001%20Rev%20A_0.pdf

[NAS-JMSDD-4307-003] SMES Java Messaging Service Description Document, Rev. A, 5 April 2017. <https://nsrr.faa.gov/sites/default/files/NAS-JMSDD-4307-003%20SMES%20JMSDD%20Rev%20A.pdf>

[NAS-JMSDD-4307-004] TAIS Java Messaging Service Description Document, Rev. A, 5 April 2017. <https://nsrr.faa.gov/sites/default/files/NAS-JMSDD-4307-004%20TAIS%20JMSDD%20Rev%20A.pdf>

4.2 Non-Government Standards and Other Publications

[W3C XML Recommendation] World Wide Web Consortium eXtensible Markup Language (XML) Version 1.9, Fifth edition, 26 Nov 2008. <http://www.w3.org/TR/2008/REC-xml-20081126/>

[W3C XSLT Recommendation] World Wide Web Consortium XSL Transformations (XSLT) Version 2.0, 23 January 2007. <https://www.w3.org/TR/2007/REC-xslt20-20070123/>

[W3C XPath Recommendation] World Wide Web Consortium XML Path Language (XPath) Version 2.0, 14 December 2010. <https://www.w3.org/TR/2010/REC-xpath20-20101214/>

5 ACRONYMS AND ABBREVIATIONS

API	Application Programming Interface
ASDE-X	Airport Surface Detection System — Model X
ASSC	Airport Surface Surveillance Capability
EFSTS	Electronic Flight Strip Transfer System
ERAM	En Route Automation Modernization
FAA	Federal Aviation Administration
FF-ICE	Flight and Flow Information for a Collaborative Environment
FIXM	Flight Information Exchange Model
FNTB	FTI National Test Bed
FTI	FAA Telecommunications Infrastructure
GeNUS	General NAS User Services
GUFID	Globally Unique Flight Identifier
ICAO	International Civil Aviation Organization
IMC	Instrument Meteorological Conditions
JMS	Java Messaging Service
JMSDD	Java Messaging Service Description Document
NAS	National Airspace System
NEMS	NAS Enterprise Messaging Service
NextGen	Next Generation Air Transportation System
OPS-IP	FTI Operational Network
RVR	Runway Visual Range

SFDPS	SWIM Flight Data Publication Service
SISO	Sign-in/Sign-out
SMES	Surface Movement Event Service
SOA	Service Oriented Architecture
STARS	Standard Terminal Automation Replacement System
STDDS	SWIM Terminal Data Distribution System
SWIM	System Wide Information Management (SWIM)
TAIS	Terminal Automation Information Service
TDLS	Tower Data Link Services
TRACON	Terminal Radar Approach Control
XML	eXtensible Markup Language