NAS-WSRD-4307-001
14 January 2016

U.S. Department
of Transportation
**Federal Aviation
Administration**

Web Service Requirements Document

SWIM Terminal Data Distribution System (STDDS)

WEB SERVICE REQUIREMENTS DOCUMENT
APPROVAL SIGNATURE PAGE

SWIM Terminal Data Distribution System (STDDS)

Approval Signatures

Name	Organization	Signature	Date Signed
AJM	Enterprise Programs		
ANG	NAS Requirements and Interface Management Group		

This page intentionally left blank

REVISION RECORD			
Revision	**Description**	**Date**	**Entered By**
DRAFT – R3 Version 1.1	Initial draft version	31 May, 2012	Adriana King
Draft – R3 Version 1.2	Incorporated reviewer feedback and changes from NEMS 6/14 meeting	28 June, 2012	Adriana King
Draft – R3 Version 1.3	Incorporated internal reviewer feedback	16 July, 2012	Adriana King
Draft – R3 Version 1.4	Modified format of ASDEXPositionReport message to match legacy payload. Incorporated reconstitution request requirements.	24 July, 2012	Adriana King
Draft – R3 Version 1.5	Updated Figure 1 with sensitive data flow.	2 August, 2012	Adriana King
Draft – R3 Version 1.6	Incorporated changes resulting from discussions with NEMS.	7 September, 2012	Adriana King
Draft – R3 Version 1.7	Added ANON option for Aircraft Type of the ASDEXPositionReport message. Added timestamp field to ReconstituteSubscriptionToDepartureData message	14 September, 2012	Adriana King
Draft – R3 Version 1.8	Updated SMES message payload to include Airport ID in response to IR-1218.	1 October, 2012	Adriana King
Draft – R3 Version 1.9	Incorporated feedback from internal review. Aligned SMES data with ASDE-X ICD v9.	26 October, 2012	Adriana King
Draft – R3 Version 1.10	Aligned with ASDE-X ICD v10. Added 8 new fields in the ASDEXPositionReport message and adjusted the length of the TrackStatus field to be varied.	16 January, 2013	Adriana King
Draft – R3 Version 1.11	Added a body to the ReconstituteSubscriptionToDepartureDat a Message to comply with Camel message requirements.	4 February, 2013	Adriana King
Draft – R3 Version 1.12	Removed track status from Table 5 ASDEXPositionReport Message Payload Data Elements.	March 26, 2013	Adriana King

Draft – R3.1 Version 1	Added changes to support ASSC.	January 29, 2014	Adriana King
NAS-WSRD-4307-001	Added R3.2 requirements	January 14, 2016	Adriana King

Table of Contents

1 SCOPE 1

2 APPLICABLE DOCUMENTS 2

2.1 Government Documents 2

2.2 Non-Government Standards and Other Publications 3

3 DEFINITIONS 4

3.1 Terms and Definitions 4

3.2 Acronyms and Abbreviations 6

4 SERVICE INFORMATION 8

4.1 Service Characteristics 8

4.2 Service Provider 9

4.3 Service Consumers 10

5 FUNCTIONAL REQUIREMENTS 11

5.1 Service Business Function Requirements 11

5.2 Service Interface Requirements 11
5.2.1 Operations 11
5.2.2 Messages 11
5.2.3 Faults 13
5.2.4 Data Elements 14
5.2.4.1 Data Elements of TDES Messages 14
5.2.4.1.1 TowerDepartureEvent Message 14
5.2.4.1.2 TowerDepartureEventServiceStatus Message 16
5.2.4.1.3 ReconstituteSubscriptionToDepartureData Message 17
5.2.4.1.4 ReconstitutionRequestStatus Message 17
5.2.4.1.5 TowerDepartureEventReconstitutionStart Message 18
5.2.4.1.6 TowerDepartureEventReconstitutionComplete Message 19
5.2.4.2 Data Elements of APDS Messages 20
5.2.4.2.1 RVRDataUpdate Message 20
5.2.4.2.2 AirportDataServiceStatus Message 22
5.2.4.3 Surface Movement Event Service 23
5.2.4.3.1 SurfaceMovementEvent Message Data Elements 23
5.2.4.3.2 ASDEXPositionReport Message 25
5.2.4.3.3 ASDEXSystemStatus Message 33

5.2.4.3.4 SurfaceMovementEventServiceStatus Message 34
5.2.4.4 Terminal Automation Information Service 35
5.2.4.4.1 TerminalAutomationStatus Message 36
5.2.4.4.2 TerminalAutomationTrackAndFlightPlanData Message 37
5.2.4.4.3 TerminalAutomationAlertDataRaw Message 43
5.2.4.4.4 TerminalAutomationSISOEventRaw Message 44
5.2.4.4.5 TerminalAutomationIMCStatusRaw Message 45
5.2.4.4.6 TerminalAutomationTrafficCountRaw Message 45
5.2.4.4.7 TerminalAutomationPerformanceMonitoringRaw Message 46
5.2.4.4.8 TerminalAutomationInformationServiceStatus Message 47

6 NON-FUNCTIONAL REQUIREMENTS 48

6.1 Quality of Service Requirements 48

6.2 Security Requirements 49

7 IMPLEMENTATION REQUIREMENTS 50

7.1 Binding Requirements 50

7.2 Processing Requirements 50

7.3 Operational Environment Requirements 51

8 QUALITY ASSURANCE PROVISIONS 52

8.1 Responsibility for Verification 52

8.2 Special Verification Requirements 52
8.2.1 International Standards Organization (ISO) Conformance 52
8.2.2 ISO Interoperability 52
8.2.3 Non-ISO Interoperability 52

8.3 Verification Requirements Traceability Matrix 52
8.3.1 Verification Levels 59
8.3.2 Verification Methods 60

Tables

Table 5-1 STDDS Messages 12
Table 5-2 TowerDepartureEvent Header Data Elements 14
Table 5-3 TowerDepartureEvent Message Payload Data Elements 14
Table 5-4 TowerDepartureEventServiceStatus Header Data Elements 16
Table 5-5 TowerDepartureEventServiceStatus Message Payload Data Elements 16
Table 5-6 TDLS/EFSTS Link Data Elements 16
Table 5-7 ReconstituteSubscriptionToDepartureData Header Data Elements 17
Table 5-8 ReconstituteSubscriptionToDepartureData Message Payload Data Elements 17
Table 5-9 ReconstitutionRequestStatus Header Data Elements 18
Table 5-10 ReconstitutionRequestStatus Message Payload Data Elements 18
Table 5-11 TowerDepartureEventReconstitutionStart Header Data Elements 18
Table 5-12 TowerDepartureEventReconstitutionStart Message Payload Data Elements 19
Table 5-13 TowerDepartureEventReconstitutionComplete Header Data Elements 19
Table 5-14 TowerDepartureEventReconstitutionComplete Message Payload Data Elements 19
Table 5-15 RVRDataUpdate Header Data Elements 20
Table 5-16 RVRDataUpdate Payload Data Elements 20
Table 5-17 RVRDataUpdate Runway Data Object Elements 21
Table 5-18 AirportDataServiceStatus Header Data Elements 22
Table 5-19 AirportDataServiceStatus Message Payload Data Elements 23
Table 5-20 RVR Link Data Elements 23
Table 5-21 RVR Connection Data Elements 23
Table 5-22 SurfaceMovementEvent Header Data Elements 24
Table 5-23 SurfaceMovementEvent Message Payload Data Elements 24
Table 5-24 ASDEXPositionReport Header Data Elements 25
Table 5-25 ASDEXPositionReport Message Payload Data Elements 26
Table 5-26 ASDEXSystemStatus Header Data Elements 34
Table 5-27 ASDEXSystemStatus Message Payload Data Elements 34
Table 5-28 SurfaceMovementEventServiceStatus Header Data Elements 34
Table 5-29 SurfaceMovementEventServiceStatus Message Payload Data Elements 35
Table 5-30 ASDE-X/ASSC Link Data Elements 35
Table 5-31 ASDE-X/ASSC Connection Data Elements 35
Table 5-32 TerminalAutomationStatus Header Data Elements 36
Table 5-33 TerminalAutomationStatus Message Payload Data Elements 36
Table 5-34 TerminalAutomationTrackAndFlightPlanData Header Data Elements 37
Table 5-35 TerminalAutomationTrackAndFlightPlanData Message Payload Data Elements 38
Table 5-36 Track Object Data Elements 38
Table 5-37 Flight Plan Object Elements 40
Table 5-38 TerminalAutomationAlertDataRaw Header Data Elements 44
Table 5-39 TerminalAutomationSISOEventRaw Header Data Elements 44
Table 5-40 TerminalAutomationIMCStatusRaw Header Data Elements 45
Table 5-41 TerminalAutomationTrafficCountRaw Header Data Elements 46
Table 5-42 TerminalAutomationPerformanceMonitoringRaw Header Data Elements 46
Table 5-43 TerminalAutomationInformationServiceStatus Header Data Elements 47
Table 5-44 TerminalAutomationInformationServiceStatus Message Payload Data Elements 47
Table 5-45 STARS Link Data Elements 48
Table 5-46 STARS Connection Data Elements 48
Table 6-1 STDDS QoS Parameters 48
Table 7-1 Communication Layers 50
Table 8-1 Verification Requirements Traceability Matrix 52

Figures

Figure 1-1 System Context 1

1 SCOPE

This Web Services Requirements Document (WSRD) has been prepared in accordance with [FAA-STD-070] and provides the design characteristics for an interface between the System-Wide Information Management (SWIM) Terminal Data Distribution System (STDDS) and the NAS Enterprise Messaging Service (NEMS) for subscription by NAS and non-NAS consumers using SWIM compliant infrastructure and interface standards.

The purpose of this WSRD is to define web services requirements for the Airport Data Service (APDS), Surface Movement Event Service (SMES), Tower Departure Event Service (TDES) and Terminal Automation Information Service (TAIS) provided by the STDDS.

The STDDS services are designed to provide a SWIM compliant interface for tower and Terminal Radar Approach Control (TRACON) systems that currently use point to point communications technology.

The STDDS services described in this document send Runway Visual Range (RVR) observations, surface movement events, departure events, surface track data and terminal automation data to NEMS.

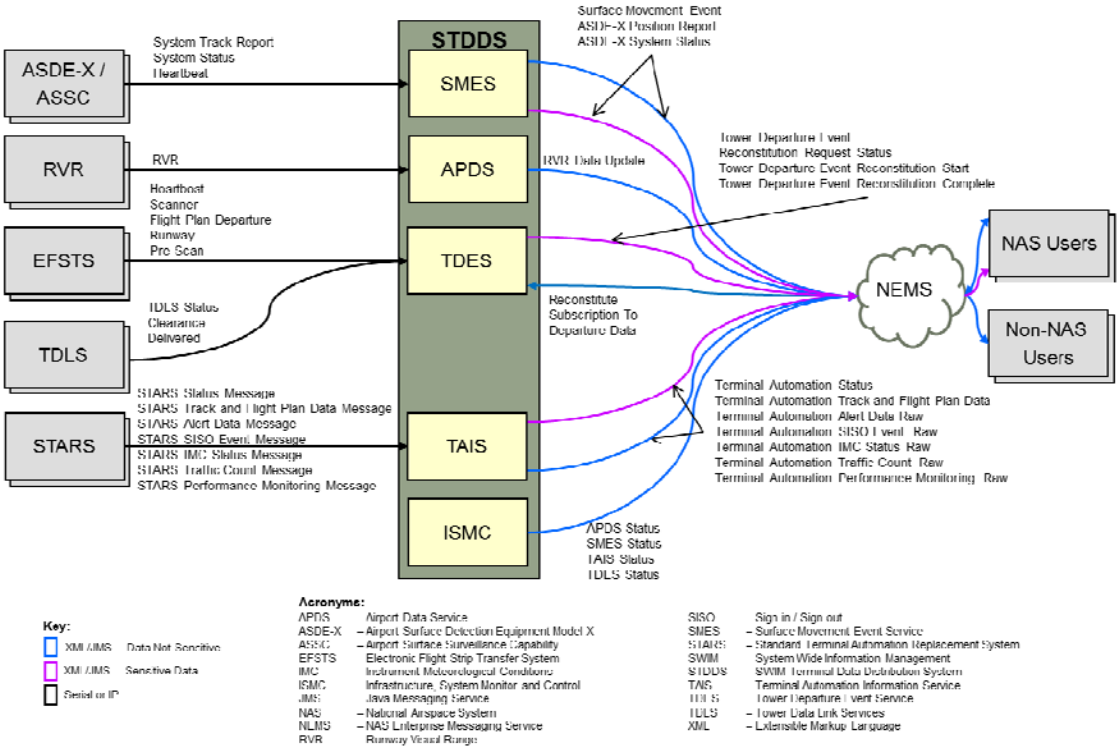

Figure 1-1 System Context

The STDDS interfaces with the following tower systems:

- Runway Visual Range (RVR) - STDDS receives RVR observations and sends them to NEMS via the APDS.

- Airport Surface Detection Equipment Model X (ASDE-X) and Airport Surface Surveillance Capability (ASSC) - STDDS receives surveillance data, extracts Surface Movement Event (SME) data from the surveillance data (e.g. spot out, takeoff, landing, spot in) and sends the event data to NEMS via the SMES. In addition, STDDS sends surface track data to NEMS via the SMES.
- Electronic Flight Strip Transfer System (EFSTS) - STDDS receives controller entered departure events (e.g. taxi start, takeoff) and sends them to NEMS via the TDES.
- Tower Data Link Services (TDLS) - STDDS receives clearance delivery information from TDLS and sends it as departure events to NEMS via the TDES.

The STDDS also interfaces with the Standard Terminal Automation Replacement System (STARS) General NAS User Services (GeNUS) interface at TRACONs. STDDS receives selected operational live flight plan data, track data, alert data, Sign-in / Sign-out (SISO) data, Instrument Meteorological Conditions (IMC) data, traffic count data, and performance monitoring data from STARS and sends them to NEMS via the Terminal Automation Information Service (TAIS).

2 APPLICABLE DOCUMENTS

2.1 Government Documents

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

[FAA-STD-064] Web Service Registration, 1 May 2009.

[FAA-STD-066] Web Service Taxonomies, 26 February 2010.

[FAA-STD-068] Preparation of Standards, 4 December 2009.

[FAA-STD-065] Preparation of Web Service Description Documents, 26 February 2010.

[FAA-STD-070] Preparation of Web Service Requirements Documents, Draft, 11 July 2011.

[SWIM CAD] System Wide Information Management (SWIM) Core Architecture Description, Revision 1.1, 28 March 2008.

[NAS 1370-500.5] National Airspace System (NAS) FAA Enterprise Network Internet Protocol Version 4 (Ipv4) Address Assignment Plan, Revision 1.3, 13 May 2006.

[NAS-IR-22034307] Interface Requirements Document (IRD) STDDS to Tower Data Link

Services (TDLS), Revision A, July 1, 2013.

[NAS-IR-82514307] IRD STDDS to Electronic Flight Strip Transfer System (EFSTS), Draft Revision 1.1, September 7, 2012.

[NAS-IR-33104307] IRD STDDS to Runway Visual Range (RVR), Revision A, August 15, 2013.

[NAS-IC-34180001] Interface Control Document (ICD) for the Airport Surface Detection Equipment - Model X (ASDE-X) Data Distribution (DD) to End Users, Version 10, August 10 2012.

[ASSC 790-034480] Interface Control Document (ICD) Airport Surface Surveillance Capability (ASSC) Data Distribution (DD) to End Users, Version 2, November 22, 2013.

[NAS-IC-21050001-01 Rev -] Interface Control Document (ICD) Standard Terminal Automation Replacement System (STARS) General NAS User Services (GeNUS), Rev -, May 27, 2010.

[NAS-IC-21050001-01 Rev E] Interface Control Document (ICD) Standard Terminal Automation Replacement System (STARS) General NAS User Services (GeNUS), Rev E, March 27, 2015.

2.2 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/

[IEE 802.3] Information Technology – Telecommunication & Information Exchange between Systems – LAN/MAN – Specific Requirements – Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications, 2002.

[WSDR] Web Services Description Requirements, W3C Working Draft, 28 October 2002. http://www.w3.org/TR/2002/WD-ws-desc-reqs-20021028/

[RFC 2119] Key words for Use in RFCs to Indicate Requirement Levels, Network Working Group, March 1997. http://www.rfc-editor.org/rfc/rfc2119.txt

[ISO/IEC 11179-1] Information Technology – Metadata Registries (MDR) – Part 1: Framework, 15 September 2004. http://metadata-standards.org/11179/

[WS Glossary] Web Services Glossary, W3C Working Draft, 14 November 2002. http://www.w3.org/TR/2002/WD-ws-gloss-20021114/

[WSA] Web Services Architecture, W3C Working Group Note, 11 February 2004. http://www.w3.org/TR/ws-arch

3 DEFINITIONS

3.1 Terms and Definitions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", “MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119. **These keywords are capitalized when used to unambiguously specify requirements. When these words are not capitalized, they are meant in their natural-language sense.**

Binding	An association between an interface, a concrete protocol, and a data format. A binding specifies the protocol and data format to be used in transmitting messages defined by the associated interface. [WSDR]
Data Element	A unit of data for which the definition, identification, representation, and permissible values are specified by means of a set of attributes. [ISO/IEC 11179-1]
Discovery	The processes through which a service consumer may search for and find services, (generally done by providing criteria to search for against a corpus of service metadata which service providers have provided to describe their services). [FAA-STD-065]
Message	An identifiable collection of units of information (data elements), presented in a manner suitable for communication, interpretation, or processing within a context of interacting Service Oriented Architecture (SOA) components.
Metadata	Data that defines or describes other data. [ISO/IEC 11179 -1]
Message Exchange Pattern (MEP)	A template, devoid of application semantics, that describes a generic pattern for the exchange of messages between agents. It describes the relationships (e.g., temporal, causal, sequential, etc.) of multiple messages exchanged in conformance with the pattern, as well as the normal and abnormal termination of any message exchange conforming to the pattern. [WS Glossary]
Namespace	A collection of names, identified by a URI reference, that are used in XML documents as element types and attribute names. The use of XML namespaces to uniquely identify metadata terms allows those terms to be unambiguously used across applications, promoting the possibility of shared semantics.

Protocol	A formal set of conventions governing the format and control of interaction among communicating functional units.
Quality of Service Characteristic	A parameter that specifies and measures the value of a provided service.
Registry	An enabling infrastructure that uses a formal registration process to store, catalog, and manage metadata relevant to the services. A registry supports the search, identification, and understanding of resources, as well as query capabilities. [FAA-STD-064]
Service Interface	An abstract boundary that a Web service exposes. It defines the types of messages and the message exchange patterns that are involved in interacting with the Web service, together with any conditions implied by those messages. [WSA]
Service Provider	An organization that offers the use of capabilities by means of a service.

3.2 Acronyms and Abbreviations

ACRONYM	DESCRIPTION
AIG	Application Interface Gateway
AMS	Acquisition Management System
APDS	Airport Data Service
ASCII	American Standard Code for Information Interchange
ASDE-X	Airport Surface Detection Equipment Model X
ASSC	Airport Surface Surveillance Capability
CAT11	Category 11
CID	Computer Identification
EFSTS	Electronic Flight Strip Transfer System
FAA	Federal Aviation Administration
FTI	Federal Telecommunications Infrastructure
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
IP	Internet Protocol
IRD	Interface Requirements Document
ISMC	Infrastructure System Monitor and Control
ISO	International Standards Organization
JMS	Java Messaging Service
NAS	National Airspace System
NEMS	NAS Enterprise Messaging Service
RVR	Runway Visual Range
SISO	Sign-in/Sign-out
SMES	Surface Movement Event Service
SOA	Service Oriented Architecture
SOAP	Simple Object Access Protocol
STARS	Standard Terminal Automation Replacement System
STDDS	SWIM Terminal Data Distribution System

SWIM	System-Wide Information Management
TAIS	Terminal Automation Information Service
TCP	Transmission Control Protocol
TDLS	Tower Data Link Service
TDES	Tower Departure Event Service
TLS	Transport Layer Security
TRACON	Terminal Radar Approach Control facility
UTC	Universal Time Coordinated/ Coordinated Universal Time
VFR	Visual Flight Rules
VRTM	Verification Requirements Traceability Matrix
WAN	Wide Area Network
WJHTC	William J. Hughes Technical Center
WSDL	Web Services Description Language
XML	eXtensible Markup Language

4 SERVICE INFORMATION

4.1 Service Characteristics

The STDDS sends flight data, airport data, surface movement event data, and terminal automation data to NEMS via the Java Messaging Service (JMS). STDDS provides the following web services: APDS, SMES, TDES, and TAIS. The characteristics of each service are described in detail below.

APDS Service Characteristics	
Name	Airport Data Service
Description	The Airport Data Service publishes runway visual range observations for all towers associated with an STDDS TRACON.
Namespace	us:gov:dot:faa:atm:terminal:entities:apds:v2-0
Version	1.0
Service category	FAA-STD-066 category 1.3.1.2.1, Air Traffic Command and Control Information Exchange Service
Lifecycle stage	Production
Service criticality	Essential

SMES Service Characteristics	
Name	Surface Movement Event Service
Description	The Surface Movement Event Service publishes derived surface movement events for all aircraft monitored at towers associated with an STDDS TRACON. In addition, the service publishes track positions for all aircraft and vehicles collected from towers associated with a TRACON.
Namespace	us:gov:dot:faa:atm:terminal:entities:smes:v2-0
Version	1.0
Service category	FAA-STD-066 category 1.3.1.2.1, Air Traffic Command and Control Information Exchange Service
Lifecycle stage	Production
Service criticality	Essential

TDES Service Characteristics	
Name	Tower Departure Event Service
Description	The Tower Departure Event Service publishes departure events for all flights from all towers associated with an STDDS TRACON. In addition, the service provides a reconstitution mechanism for end-users interested in receiving historic departure events upon startup.
Namespace	us:gov:dot:faa:atm:terminal:entities:tdes:v2-0
Version	1.0
Service category	FAA-STD-066 category 1.3.1.2.1, Air Traffic Command and Control Information Exchange Service
Lifecycle stage	Production
Service criticality	Essential

TAIS Service Characteristics	
Name	Terminal Automation Information Service
Description	The Terminal Automation Information Service publishes operational live flight plan data and track data for aircraft collected from STARS TRACONs associated with an STDDS TRACON. In addition, the service publishes terminal automation alert, Sign-In/Sign-Out (SISO), Instrument Meteorological Conditions (IMC), traffic count and performance monitoring terminal automation data.
Namespace	us:gov:dot:faa:atm:terminal:entities:tais:v2-0
Version	1.0
Service category	FAA-STD-066 category 1.3.1.2.1, Air Traffic Command and Control Information Exchange Service
Lifecycle stage	Development
Service criticality	Essential

4.2 Service Provider

The STDDS services are provided by FAA Air Traffic Organization- Terminal Automation (ATO-T). The namespace for ATO-T is us:gov:dot:faa:atm:terminal.

Point of Contact	
Name	Jeri Groce
Organization	Federal Aviation Administration Enterprise Programs
Title	STDDS PM
Phone	202-267-7212
Email	Jeri.Groce@faa.gov

4.3 Service Consumers

STDDS publishes data to NEMS. NEMS is the enterprise service bus that delivers data to service consumers. Service consumers "on-ramp" (i.e. connect) to NEMS and subscribe for access SWIM/STDDS data.

5 FUNCTIONAL REQUIREMENTS

5.1 Service Business Function Requirements

Service consumers of the Airport Data Service would use RVR information to determine runway visibility to support flight planning.

Service consumers of the Surface Movement Event Service would monitor movement of aircraft and vehicles on the surface of the airport. Notification of movement events such as takeoff would be used to support business activities such as strategic and tactical decisions.

Service consumers of the Tower Departure Event Service would be expected to use departure event information derived from controller actions to support business decisions and planning based on improved knowledge of aircraft flight progress.

Service consumers of the Terminal Automation Information Service would be expected to use the published data to support business activities such as:

- Flight plan and track data can support strategic and tactical decision making, as well as monitoring and statistical analysis.
- Alert data can support training.
- Sign-on/Sign-off data along with traffic count data and instrument meteorological condition data can be used for strategic planning and accounting.

5.2 Service Interface Requirements

STDDS services **SHALL** be built using SWIM compliant infrastructure and interface standards.

STDDS services **SHALL** send terminal data to NEMS via JMS using the message broker Apache ActiveMQ.

STDDS **SHALL** provide routing information in each output message header for NEMS to determine the authorized recipient of the data.

5.2.1 Operations

The TDES, APDS, TAIS and SMES **SHALL** be of type Plain Old XML (POX) over JMS. There is no concept of operation with a POX/JMS service.

5.2.2 Messages

STDDS services send messages to NEMS asynchronously, using an Out Only Message Exchange Pattern (MEP). The reconstitution request message is consumed by the TDES, using an In Only MEP.

Message accuracy **SHALL** be ensured via checksum at the network layer or below. No provision is made for message retransmission.

STDDS services **SHALL** send to NEMS and receive from NEMS the messages described in the following table.

Table 5-1 STDDS Messages

Message	Direction	Service	Description
TowerDepartureEvent	OUT	TDES	Sent upon the receipt of a corresponding event from EFSTS and/or TDLS.
TowerDepartureEventServiceStatus	OUT	TDES	Provides the status of the service and external links associated with the service.
ReconstituteSubscriptionToDepartureData	IN	TDES	End-user request for a reconstitution of tower departure events.
ReconstitutionRequestStatus	OUT	TDES	Response to a reconstitution request.
TowerDepartureEventReconstitutionStart	OUT	TDES	Indicates the beginning of a set of reconstituted messages.
TowerDepartureEventReconstitutionComplete	OUT	TDES	Indicates the end of a set of reconstituted messages.
RVRDataUpdate	OUT	APDS	Sent upon the receipt of RVR data.
AirportDataServiceStatus	OUT	APDS	Provides the status of the service and external links associated with the service.
SurfaceMovementEvent	OUT	SMES	Provides surface movement events derived from ASDE-X position data.
ASDEXPositionReport	OUT	SMES	Sent upon the receipt of a System Track message from ASDE-X.
ASDEXSystemStatus	OUT	SMES	Sent periodically and upon change to indicate the status of the input ASDE-X system.
SurfaceMovementEventServiceStatus	OUT	SMES	Provides the status of the service and external links associated with the service.

Message	Direction	Service	Description
TerminalAutomationStatus	OUT	TAIS	Sent upon receipt of an AIG100 message from STARS.
TerminalAutomationTrackAndFlightPlanData	OUT	TAIS	Sent upon the receipt of an AIG200 message from STARS.
TerminalAutomationAlertDataRaw	OUT	TAIS	Sent upon the receipt of an AIG300 message from STARS. Message body is in base64 format.
TerminalAutomationSISOEventRaw	OUT	TAIS	Sent upon the receipt of an AIG500 message from STARS. Message body is in base64 format.
TerminalAutomationIMCStatusRaw	OUT	TAIS	Sent upon the receipt of an AIG502 message from STARS. Message body is in base64 format.
TerminalAutomationTrafficCountRaw	OUT	TAIS	Sent upon the receipt of an AIG510 message from STARS. Message body is in base64 format.
TerminalAutomationPerformanceMonitoringRaw	OUT	TAIS	Sent upon the receipt of an AIG700 message from STARS. Message body is in base64 format.
TerminalAutomationInformationServiceStatus	OUT	TAIS	Provides the status of the service and external links associated with the service.

The data elements comprising each message are defined in section 5.2.4

5.2.3 Faults

The STDDS services do not provide fault messages.

5.2.4 Data Elements

5.2.4.1 Data Elements of TDES Messages

The TDES provides tower departure events. Upon the receipt of a reconstitution request from an end-user, STDDS **SHALL** send past TowerDepartureEvent messages for events that occurred within the past 30 minutes for currently active flights at an airport.

5.2.4.1.1 TowerDepartureEvent Message

STDDS **SHALL** send a TowerDepartureEvent message each time a departure event is detected.

STDDS **SHALL** include in each TowerDepartureEvent message at least the required data elements in Table 5-2 and Table 5-3. The items that are listed as not required will be sent when available unless otherwise noted.

Table 5-2 TowerDepartureEvent Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: “DE” – normal departure event messages “DR” – reconstituted departure event messages.
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer
Airport ID	Y	ICAO code of the source airport.
Send To	Y	Authorization flag. Permissible value: “authorized”. See Note 1.
Client ID	N	For reconstituted messages (Message Type = “DR”), include the NEMS provided end-recipient username. This field will not be included when the message type is “DE”.

Table 5-3 TowerDepartureEvent Message Payload Data Elements

Data Element	Required	Description
Message Sequence ID	Y	Message Sequence Identifier.
Recon Message Sequence ID	N	Reconstitution Message Sequence Identifier. This field will not be included when the message type is “DE”.
Event Time	Y	UTC date and time at which the departure event occurred.
Flight ID	N	Global unique flight identifier.

Data Element	Required	Description
Aircraft ID	Y	Aircraft callsign.
Computer Identification (CID)	Y	NAS computer identification number/ERAM ID, may contain Alpha in position 3. In the future the CID may also take the form of NAA, as well as NNA.
Departure Airport	Y	ICAO departure airport code.
Destination Airport	N	ICAO destination airport code.
Clearance Delivery Time	N	UTC date and time at which a departure clearance was issued as reported by TDLS. Note: TDLS sends a Clearance Delivery message after the Airlines Operations Center acknowledged receiving the clearance.
Parking Gate	N	Aircraft parking gate information.
Taxi Start Time	N	UTC date and time at which taxi start event was detected by STDDS.
Takeoff Time	N	UTC date and time at which takeoff event was detected by STDDS.
Takeoff Runway ID	N	Two digit runway heading number. Permissible values: 01-36.
Takeoff Runway Sub-identifier	N	Single character runway sub-identifier. Permissible values: • L – Left • C – Center • R – Right
Notes: 1. TowerDepartureEvent messages are provided only to end-users that are internal to the NAS. All such end-users are authorized to receive sensitive data.		

On start-up STDDS **SHALL** set the Message Sequence ID field of the TowerDepartureEvent message to 0.

When the Message Sequence ID field of the TowerDepartureEvent message reaches the maximum value (Long.MAX_VALUE), the system **SHALL** set it back to 1.

STDDS **SHALL** increment the Message Sequence ID field of the TowerDepartureEvent message upon the generation of every new output message.

STDDS **SHALL** set the Recon Message Sequence ID field of reconstituted TowerDepartureEvent messages to 1 upon the start of TDES message reconstitution.

When the value of the Recon Message Sequence ID field of reconstituted TowerDepartureEvent messages reaches Long.MAX_VALUE, STDDS **SHALL** set the value of the field to 1.

STDDS **SHALL** increment the Recon Message Sequence ID field of reconstituted TowerDepartureEvent messages upon the generation of every new reconstituted output message.

5.2.4.1.2 TowerDepartureEventServiceStatus Message

STDDS **SHALL** send a TowerDepartureEventServiceStatus message every 60 seconds.

STDDS **SHALL** include the data elements in Table 5-4, Table 5-5 and Table 5-6 in each TowerDepartureEventServiceStatus message.

Table 5-4 TowerDepartureEventServiceStatus Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: "TS".
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer
Send To	Y	Authorization flag. Permissible value: "all".

Table 5-5 TowerDepartureEventServiceStatus Message Payload Data Elements

Data Element	Required	Description
Service Status	Y	Status of the service. Permissible values: "Available", "Degraded", or "Unavailable".
TDLS Link Data	Y	List of external links configured to provide TDLS updates. See Table 5-6 below for details..
EFSTS Link Data	Y	List of external links configured to provide EFSTS updates. See Table 5-6 below for details.

Table 5-6 TDLS/EFSTS Link Data Elements

Data Element	Required	Description
Link Name	Y	Name of the external link.
Link Status	Y	Status of the link. Permissible values: "Normal" "Failed", or "Unknown".

5.2.4.1.3 ReconstituteSubscriptionToDepartureData Message

Upon the receipt of a TDES data reconstitution request from an end-user, NEMS **SHALL** publish a ReconstituteSubscriptionToDepartureData message containing the data items listed in Table 5-7 and Table 5-8 to the reconstitution request topic.

STDDS, at each TRACON, **SHALL** subscribe to the reconstitution request topic.

Table 5-7 ReconstituteSubscriptionToDepartureData Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: “TR”.
Client ID	Y	End-recipient username provided by NEMS
Airport ID	Y	Reconstitution ICAO airport ID that the end-user is interested in.
Timestamp	Y	Timestamp of message creation provided by end-user.

Table 5-8 ReconstituteSubscriptionToDepartureData Message Payload Data Elements

Data Element	Required	Description
ReconstituteSubscriptionToDepartureDataMessage	Y	Message body.

STDDS will include the NEMS provided client identifier in the JMS header of the reconstituted TowerDepartureEvent messages to allow end-users to receive only the messages associated with their reconstitution request.

5.2.4.1.4 ReconstitutionRequestStatus Message

Upon receipt of a ReconstituteSubscriptionToDepartureData message which contains an adapted Airport ID, STDDS **SHALL** send a ReconstitutionRequestStatus message.

STDDS **SHALL** include the data elements listed in Table 5-9 and Table 5-10 in each ReconstitutionRequestStatus message.

Table 5-9 ReconstitutionRequestStatus Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible values: “RA” - Reconstitution Request Accepted “RF” - Reconstitution Request Failed
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Send To	Y	Authorization flag. Permissible value: “authorized”.
Client ID	Y	End-recipient username that identifies the receiver of a ReconstitutedRequestStatus message.

Table 5-10 ReconstitutionRequestStatus Message Payload Data Elements

Data Element	Required	Description
Airport ID	Y	Reconstitution ICAO airport
Reason for Failure	N	Sent if Message Type is “RF”. Permissible values: **“**CR” **–** End-user already receiving reconstitution

5.2.4.1.5 TowerDepartureEventReconstitutionStart Message

Upon the start of reconstitution, STDDS **SHALL** send a TowerDepartureEventReconstitutionStart message.

STDDS **SHALL** include the data elements listed in Table 5-11 and Table 5-12 in each TowerDepartureEventReconstitutionStart message.

Table 5-11 TowerDepartureEventReconstitutionStart Header Data Elements

Data Elements	Required	Description
Message Type	Y	Defines the type of message. Permissible value: “RS”
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Send To	Y	Authorization flag. Permissible value: “authorized”.
Client ID	Y	End-recipient username that identifies the receiver of the message.

Table 5-12 TowerDepartureEventReconstitutionStart Message Payload Data Elements

Data Element	Required	Description
Airport ID	Y	Reconstitution ICAO airport

STDDS **SHALL** send reconstituted TowerDepartureEvent messages interleaved in the steady state publication stream of TowerDepartureEvent messages.

STDDS will include reconstitution sequence identifiers in the message payload. The use of these sequence identifiers is to corroborate the proper ordering of both types of messages.

5.2.4.1.6 TowerDepartureEventReconstitutionComplete Message

Upon completion of a reconstitution, STDDS **SHALL** send a TowerDepartureEventReconstitutionComplete message.

STDDS **SHALL** include the data elements listed in Table 5-13 and Table 5-14 in each TowerDepartureEventReconstitutionComplete message.

Table 5-13 TowerDepartureEventReconstitutionComplete Header Data Elements

Data Elements	Required	Description
Message Type	Y	Defines the type of message. Permissible value: “RC”
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Send To	Y	Authorization flag. Permissible value: “authorized”.
Client ID	Y	End-recipient username that identifies the receiver of the message.

Table 5-14 TowerDepartureEventReconstitutionComplete Message Payload Data Elements

Data Element	Required	Description
Airport ID	Y	Reconstitution ICAO airport

Data Element	Required	Description
Number of Recon Messages	Y	The total number of reconstitution messages sent.

5.2.4.2 Data Elements of APDS Messages

The STDDS Airport Data Service **SHALL** provide RVR data from all available runway sensors at an airport. There will be no reconstitution capability offered by this service.

5.2.4.2.1 RVRDataUpdate Message

Upon receipt of an Application Data Unit message from RVR (nominally every 2 seconds), STDDS **SHALL** send an RVRDataUpdate message to NEMS.

STDDS **SHALL** include the header data elements described in Table 5-15 in each RVRDataUpdate message.

STDDS **SHALL** include the payload data elements described in Table 5-16 and Table 5-17 for each runway at an airport in each RVRDataUpdate message.

Table 5-15 RVRDataUpdate Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: “RR”.
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Airport ID	Y	ICAO code of the source airport.
Link ID	Y	Link ID of RVR feed.
Send To	Y	Authorization flag. Permissible values: “all”.

Table 5-16 RVRDataUpdate Payload Data Elements

Data Element	Required	Description
Runway Data	N	A list of 0 to 20 runway data objects, one per runway as reported by the RVR system. The data elements for each runway are defined in Table 5-17.

Table 5-17 RVRDataUpdate Runway Data Object Elements

Data Element	Required	Description
Runway ID	Y	Two digit runway heading number. Permissible values: 01-36
Runway Sub-identifier	Y	Permissible values: • L – Left • C – Center • R – Right • ASCII blank – no sub-identifier
Touchdown Visual Range	Y	Permissible values: • 2 digits indicating hundreds of feet of visibility. • 2 ASCII blank characters - no sensor configured for that point of the runway. • FF - invalid data or sensor out of service.
Touchdown Trend	Y	Permissible values: • S – Steady • I – Increasing visibility • D – Decreasing visibility • + - Visibility greater than 6000 feet • ASCII blank – no sensor configured for that point • F – invalid data or sensor out of service.
Midpoint Visual Range	Y	Permissible values: • 2 digits indicating hundreds of feet of visibility. • 2 ASCII blank characters - no sensor configured for that point of the runway. • FF - invalid data or sensor out of service.
Midpoint Trend	Y	Permissible values: • S – Steady • I – Increasing visibility • D – Decreasing visibility • + - Visibility greater than 6000 feet • ASCII blank – no sensor configured for that point • F – invalid data or sensor out of service.
Rollout Visual Range	Y	Permissible values: • 2 digits indicating hundreds of feet of visibility. • 2 ASCII blank characters - no sensor configured for that point of the runway. • FF - invalid data or sensor out of service.

Data Element	Required	Description
Rollout Trend	Y	Permissible values: • S – Steady • I – Increasing visibility • D – Decreasing visibility • + - Visibility greater than 6000 feet • ASCII blank – no sensor configured for that point • F – invalid data or sensor out of service.
Edge Light Setting	Y	Permissible values: • 0 - Off, • 1 to 4 - Increasing light intensities • 5 - Maximum intensity • F – sensor failure or invalid data
Center Light Setting	Y	Permissible values: • 0 - Off, • 1 to 4 - Increasing light intensities • 5 - Maximum intensity • F – sensor failure or invalid data • ASCII blank - no lights configured for given runway

5.2.4.2.2 AirportDataServiceStatus Message

STDDS **SHALL** send the AirportDataServiceStatus message every 60 seconds.

STDDS **SHALL** include the data elements inTable 5-18, Table 5-19, Table 5-20 and

Table **5-21** in each AirportDataServiceStatus message.

Table 5-18 AirportDataServiceStatus Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: “AS”.
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Send To	Y	Authorization flag. Permissible value: “all”.

Table 5-19 AirportDataServiceStatus Message Payload Data Elements

Data Element	Required	Description
Service Status	Y	Status of the service. Permissible values: "Available", "Degraded", or "Unavailable".
RVR Link Data	Y	List of external links configured to provide RVR updates. See Table 5-20 below for details.

Table 5-20 RVR Link Data Elements

Data Element	Required	Description
Link Name	Y	Name of the external link.
Link Status	Y	Status of the link. Permissible values: "Normal", "Degraded", "Failed", "Unknown". A link status of "Degraded" indicates that one of the connections is Failed.
Connection Data	N	List of connections associated with the link. See Table 5-21 below for details.

Table 5-21 RVR Connection Data Elements

Data Element	Required	Description
Connection Name	Y	Name of the external link connection.
Connection Status	Y	Status of the connection. Permissible values: "Normal", "Failed", "Unknown".

5.2.4.3 Surface Movement Event Service

The STDDS Surface Movement Event Service will send to NEMS derived surface event data and position reports (CAT11) generated from ASDE-X.

STDDS **SHALL** discard received ASDE-X data if the input ASDE-X system is reported to be in maintenance mode.

STDDS **SHALL** discard received ASSC data if the input ASSC system is reported to be in maintenance mode.

There will be no reconstitution capability offered by this service.

5.2.4.3.1 SurfaceMovementEvent Message Data Elements

Upon receipt of a System Track Report from ASDE-X and detection that an aircraft surface movement event has occurred, STDDS **SHALL** send a SurfaceMovementEvent message.

Upon receipt of a System Track Report from ASSC and detection that an aircraft surface movement event has occurred, STDDS **SHALL** send a SurfaceMovementEvent message.

Each SurfaceMovementEvent message **SHALL** contain the data elements in Table 5-22 and Table 5-23. The items that are listed as not required will be sent when available unless otherwise noted.

Table 5-22 SurfaceMovementEvent Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: "SE".
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Airport ID	Y	ICAO code of the source airport.
Send To	Y	Authorization flag. Permissible values: "all", "authorized", or "filtered".

Table 5-23 SurfaceMovementEvent Message Payload Data Elements

Data Element	Required	Description
Track ID	Y	The track number assigned to the aircraft / vehicle. It is defined as xs:short. This field is in the range of 0 to 4095.
Event Time	Y	UTC date and time of generated event data
Event Type	Y	Spot-in, spot-out, on, off
Aircraft ID	Y	Aircraft callsign or "ANON" when blocked for distribution to unauthorized end-users.
Mode 3A Code	Y	Four octal digit beacon code assigned to a target. "ANON" when blocked for distribution to unauthorized end-users.
Position	Y	Latitude, Longitude
Altitude	Y	Altitude in feet
STDDS Surface Track Id	Y	Unique identifier assigned by STDDS. This field has up to 8 characters.
Surface State	Y	Movement area (on surface), Non-movement area (on ramp), Airborne, Undefined (status is not yet determined)
Aircraft Address	N	Mode S assigned address of the airframe or ground vehicle, expressed in six hexadecimal digits.
Past Surface Movement Events	N	List of surface movement events for the aircraft. The list will contain an event type and the UTC,

Data Element	Required	Description
		derived by automation

5.2.4.3.2 ASDEXPositionReport Message

Upon receipt of a System Track Report from ASDE-X, STDDS **SHALL** send an ASDEXPositionReport message.

Upon receipt of a System Track Report from ASSC, STDDS **SHALL** send an ASDEXPositionReport message.

STDDS **SHALL** include the data elements in Table 5-24 in each ASDEXPositionReport message.
STDDS **SHALL** include one or more position reports consisting of the data elements in Table 5-25 in each ASDEXPositionReport message.

STDDS **SHALL** send all data elements listed in Table 5-23 and Table 5-24 to NEMS every *N* seconds (*N* is nominally 60 seconds).

If a System Track Report for a particular flight/track number is received and less than *N* seconds (*N* is nominally 60 seconds) have elapsed since the last full ASDEXPositionReport message was sent, STDDS **SHALL** send an ASDEXPositionReport message including the elements that have changed or have been deleted since the last update.

NOTE: Deleted elements will be tagged with an r="1" attribute and the last known value will be included in cases where a value is needed for XML validity.

STDDS **SHALL** batch ASDEXPositionReport messages by originating airport and authorization.

Table 5-24 ASDEXPositionReport Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: "AT".
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Airport ID	Y	ICAO code of the source airport.

Data Element	Required	Description
Send To	Y	Authorization flag. Permissible values: “all”, “authorized”, or “filtered”.

Table 5-25 ASDEXPositionReport Message Payload Data Elements

Data Element	Required	Description
Airport ID	Y	ICAO code of the source airport.
ASDE-X Sequence Number	Y	Sequence numbers are incremented each time a System Track Report is transmitted by ASDE-X. This field is in the range of 0 to 255.
STDDS Surface Track Id	Y	Unique identifier assigned by STDDS. This field has up to 8 characters.
Time	Y	Time of the track update. Format: yyyy-mm-ddThh:mm:ss.sssZ
Track Id	Y	The track number assigned to this aircraft / vehicle. It is defined as xs:short. This field is in the range of 0 to 4095.
A9S	N	Binary value indicating state of the ASR9 source fused bit.
AA	N	Binary value indicating if there is an SBS target associated with track.
Acceleration X	N	X component of the fused track acceleration
Acceleration Y	N	Y component of the fused track acceleration
Aircraft Address	N	Mode S assigned address of the airframe or ground vehicle, expressed in six hexadecimal digits.
Aircraft ID	N	Aircraft callsign or “ANON” when blocked for distribution to unauthorized end-users. This field is omitted for ground vehicles.
Aircraft Type	N	ICAO format with two to four characters being composed of letters and digits. The first character must be a letter. “ANON” when blocked for distribution to unauthorized end-users. The field is omitted for ground vehicles. Some examples are ‘G4’, ‘B737’ or ‘A310’.
Alert Ground Indicator	N	Possible values: “unknown”, “onground”, or “arrival”.
Alert Filter	N	Permissible values: ‘unfiltered’, ‘filtered’ or ‘highlight’
Altitude	N	Altitude in feet above MSL of the fused track.

Data Element	Required	Description
AP	N	Coast in apron indicator.
AQ	N	Binary value indicating state of the coast association question indicator is set to true.
AQ1090	N	Address Qualifier from CAT033 report (if S1 bit is set). Possible values: “adsbicao”, “adsbsa”, “tisbicao”, “tisbfti”, “vehicle”, “beacon”.
AQUAT	N	Address Qualifier from CAT033 report (if SU bit is set) Possible values: “adsbicao”, “adsbsa”, “tisbicao”, “tisbfti”, “vehicle”, “beacon”.
AS	N	Binary value indicating state of the ADSB source fused bit.
AT	N	Binary value indicating state of the ATCRBS source fused bit.
ATCRBS X Indicator	N	Binary value indicating the state of the ATCRBS X bit.
AV	N	SBS ADSB Lat/Lon validation status based on comparison with other sensor data. Possible values: “unknown”, “invalid”, “reserved”, or “valid”
Coast Number	N	Coasted track number has the range of 300 to 999.
DA	N	Binary value indicating duplicate discrete Mode A
DF	N	Binary value indicating duplicate flight id.
DI	N	Permissible values: 0: do not display 1: display
End Azimuth	N	SMR target extent end azimuth. This field can have values from 0 to 360 degrees.
End Range	N	SMR target extent end range. This field can have values from 0 to 65535
Estimate	N	This field can have values ranging from 0 to 127 and corresponds to the Extent field in the ASDE-X and ASSC ICDs. Note: If the data originates from ASDE-X, this field will be set to 0 for targets which never had SMR support, and to previous value for targets

Data Element	Required	Description
		which lose SMR support.
Extended X	N	X component of the Cartesian coordinates. Each unit represents one meter from the ASDE-X/ASSC reference point. This is typically the control tower. The range is +/ -1159548. These are for aircraft over 17NM from the airport.
Extended Y	N	Y component of the Cartesian coordinates. Each unit represents one meter from the ASDE-X/ASSC reference point. This is typically the control tower. The range is +/ -1159548. These are for aircraft over 17NM from the airport.
Fix	N	First three characters of the departure fix or the three letter airport name for arrival flights.
Flight Level	N	Flight level of the aircraft within the range of -12 to 1500.
GBS	N	This field indicates if the aircraft is not on the ground by setting it to be true. This is a pass through from the transponder from the 'weight on wheels' switch. This may not be valid for all tracks.
GM	N	This field is set to 1 if the GPS position is more than 100 feet from the multilaterated position.
Heading	N	Smoothed heading of the vehicle/aircraft.
Latitude	N	Latitude component of the aircraft / vehicle position. This is a double precision floating point value with a maximum of eight fractional digits. Positive values are in the northern hemisphere.
Local Average Number	N	Local aircraft vehicle list number has the range of 101 to 276.
Local Vehicle Association	N	Binary value indicating state of the local vehicle association bit.
Longitude	N	Longitude component of the aircraft / vehicle position. This is a double precision floating point value with a maximum of eight fractional digits.
Lost Coast Sensor Indicator	N	Binary value indicating state of the lost coast sensor support indicator
LV1090	N	Derived from expansion field 1090LV link version. Permissible range: 0-7.
LVUAT	N	Derived from expansion field UATLV link version. Permissible range: 0-7.
M3C	N	Binary value indicating a change in the mode 3/A code.
Manual Aircraft ID	N	Aircraft callsign obtained via manual tag. "ANON" when blocked for distribution to

Data Element	Required	Description
		unauthorized end-users.
Manual Aircraft Type	N	Aircraft type obtained via manual tag. "ANON" when blocked for distribution to unauthorized end-users.
Manual Category	N	Wake class of the airframe obtained via manual tag. The value of this field can be any alphabetic character or "none". Possible values: "B" = Heavy with RNAV "F" = B757 "H" = Heavy "J" = A380 "L" = B757 with RNAV "M" = A380 with RNAV "R" = RNAV "X" = High Performance Turbo-prop
Manual Fix	N	First three characters of the departure fix or the three letter airport name for arrival flights obtained via manual tag.
Manual Mode 3A Code	N	Four octal digit beacon code assigned to a target obtained via manual tag. "ANON" when blocked for distribution to unauthorized end-users.
Mode 3A Code	N	Four octal digit beacon code assigned to a target. "ANON" when blocked for distribution to unauthorized end-users.
MON	N	Binary value indicating if a track is a monosensor track.
MRH	N	Indicates that the reported altitude is either "barometric" from aircraft sensors or "geometric" from multilat.
MS	N	Binary value indicating state of Mode S source fused bit.

Data Element	Required	Description
NACp	N	Navigation Accuracy Category for Position Possible values: 0:≥ 10 NM 1:< 10 NM 2:< 4 NM 3:< 2 NM 4:< 1 NM 5:< 0.5 NM 6:< 0.3 NM 7:< 0.1 NM 8:< 0.05 NM 9:< 30 m 10:< 10 m 11:< 3 m
NC	N	Binary value indicating state of multipath non-cooperative bit.
NIC	N	Navigation Integrity Category Possible values: 0:≥ 20 NM or Unknown 1:< 20 NM 2:< 8 NM 3:< 4 NM 4:< 2 NM 5:< 1 NM 6:< 0.6 NM 7:< 0.2 NM 8:< 0.1 NM 9:< 75 m 10:< 25 m 11:< 7.5 m
OP	N	Binary value indicating state of coast in oscillation period indicator bit.
Plot Count	N	This field can have values ranging from 0 to 14.
Quality	N	This field can have values ranging from 0 to 100.
RDR	N	Radar source. Permissible values: ‘smr1’, ‘smr2’, ‘smr3’ ‘smr4’, or ‘asscrdr1’. These represent the four possible combinations of expansion field RS1..RS14.
RT	N	Binary value indicating the state of the reference transmitter track bit. Display track only if in maintenance mode.
Runway	N	Departure or arrival runway name. This can be one to three characters with the first one or two

Data Element	Required	Description
		characters in the range of 1 to 36 and the next optional character being one of ‘L’, ‘R’ or ‘C’. This field can also contain the keyword ‘filtered’ or ‘unassigned’.
S1	N	Binary value indicating if the SBS 1090ES ADSB source was fused for this track.
Scratch Pad 1	N	First line of free form text obtained via manual tag. Up to seven characters long. This field has a value of “none” when input data is not available.
Scratch Pad 2	N	Second line of free form text obtained via manual tag. Up to seven characters long. This field has a value of “none” when input data is not available.
SI	N	Binary value indicating if the safety logic processing has been inhibited on the track bit.
SIL	N	Source Integrity Level – probability of exceeding NIC Containment Radius. Possible values: 0: Unknown 1: $< 10^{-3}$ 2: $< 10^{-5}$ 3: $< 10^{-7}$
SIM	N	Binary value indicating if the track is from live data (0), or data in engineering playback mode (1).
Source Type	N	Fused height source. Possible values: "none", "adsb", "modec", "multilat", "ground", "multiple"
Speed	N	Smoothed speed of the vehicle/aircraft in knots.
SPI	N	Binary value indicating if the last report contained Special Purpose Indicator (SPI). A transponder can be configured to provide this signal to aid in distinguishing between non-discretes.
SS	N	Binary value indicating the state of the SMR source fused bit.
ST	N	Binary value indicating the state of the suspended track indicator bit.
Start Azimuth	N	SMR target extent start azimuth. This field can have values from 0 to 360 degrees
Start Range	N	SMR target extent start range. This field can

Data Element	Required	Description
		have values from 0 to 65535
SU	N	Binary value indicating if the SBS UAT ADSB source was fused for this track.
Suspended Track Number	N	Valid range of 1 to 26.
Target Type	N	Permissible values: “unknown”, “aircraft”, “vehicle”, or “unknown_aircraft”.
TC	N	Binary value indicating the state of the manual/automatic tag indicator bit.
Track Service End Indicator	N	Binary value indicating if this is the last message for the track.
UA	N	Binary value indicating if the UAT source was fused for this track.
UD	N	Binary value indicating the vertical rate direction. Permissible values: “up” or “down”
Uncorr Baro Alt	N	Most recent barometric pressure altitude reported by the aircraft; coasted for a maximum time of 5 seconds. Permissible values: “unavailable” -8191 : -204775 feet - 8190 : -204750 feet *** -2 : -50 feet -1 : - 25 feet 0 : 0 feet 1 : 25 feet 2 : 50 feet *** 8190 : 204750 feet 8191 : >= 204775 feet
Velocity X	N	Calculated X component of the aircraft velocity in m/sec
Velocity Y	N	Calculated Y component of the aircraft velocity in m/sec
Vert Rate	N	Vertical rate of the current track that indicates if the aircraft is climbing or descending. Permissible values: “unavailable” 0: 0

Data Element	Required	Description
		1: 32 2: 64 *** 1021: 32672 1022: > 32688
VS	N	Binary value indicating the source of the data used to compute the vertical rate. Permissible values: “geometric” or “barometric”
Wake	N	Wake class of the airframe. Permissible values: "L", “H", "M" or another character received from the flight plan interface.
X	N	X component of the Cartesian coordinates. Each unit represents one meter from the ASDE-X/ASSC reference point. This is typically the control tower.
Y	N	Y component of the Cartesian coordinates. Each unit represents one meter from the ASDE-X/ASSC reference point. This is typically the control tower.

5.2.4.3.3 ASDEXSystemStatus Message

STDDS **SHALL** send an ASDEXSystemStatus message every *N* seconds (*N* is nominally 60 seconds) and upon change of any published fields in the ASDE-X System Status message.

STDDS **SHALL** send an ASDEXSystemStatus message every *N* seconds (*N* is nominally 30 seconds) and upon change of the input ASSC link status.

STDDS **SHALL** include the data elements listed in Table 5-26 and Table 5-27 in each ASDEXSystemStatus message.

STDDS **SHALL** send ASDEXSystemStatus messages during operational and maintenance modes of the input ASDE-X system.

STDDS **SHALL** send ASDEXSystemStatus messages during operational and maintenance modes of the input ASSC system.

Table 5-26 ASDEXSystemStatus Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: "AY".
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Airport ID	Y	ICAO code of the source airport.
Send To	Y	Authorization flag. Permissible value: "all".

Table 5-27 ASDEXSystemStatus Message Payload Data Elements

Data Element	Required	Description
Airport ID	Y	ICAO code of the source airport.
Mode	Y	Mode of input ASDE-X/ASSC link. Permissible values: "operational" or "maintenance".
System State	Y	System state of the input ASDE-X/ASSC link. Permissible values: "startup", "online", "degraded", "shutdown", "offline".

5.2.4.3.4 SurfaceMovementEventServiceStatus Message

STDDS **SHALL** send a SurfaceMovementEventServiceStatus message every 60 seconds.

The SurfaceMovementEventServiceStatus message **SHALL**, contain the data elements in Table 5-28, Table 5-29, Table 5-30 ASDE-X/ASSC Link Data ElementsTable 5-30 and Table 5-31.

Table 5-28 SurfaceMovementEventServiceStatus Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: "SS".
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.

Data Element	Required	Description
Send To	Y	Authorization flag. Permissible value: “all”.

Table 5-29 SurfaceMovementEventServiceStatus Message Payload Data Elements

Data Element	Required	Description
Service Status	Y	Status of the service. Permissible values: “Available”, “Degraded”, or “Unavailable”.
ASDE-X/ASSC Link Data	Y	List of external links configured to provide ASDE-X/ASSC updates. See Table 5-30 below for details.

Table 5-30 ASDE-X/ASSC Link Data Elements

Data Element	Required	Description
Link Name	Y	Name of the external link.
Link Status	Y	Status of the link. Permissible values: “Normal”, “Degraded”, “Failed”, “Unknown”. A link status of “Degraded” indicates that one of the connections is Failed.
Connection Data	N	List of connections associated with the link. See Table 5-31 below for details.

Table 5-31 ASDE-X/ASSC Connection Data Elements

Data Element	Required	Description
Connection Name	Y	Name of the external link connection.
Connection Status	Y	Status of the connection. Permissible values: “Normal”, “Failed”, “Unknown”.

5.2.4.4 Terminal Automation Information Service

The STDDS Terminal Automation Information Service will send to NEMS operational live flight plan data, track data, alert data, Sign-in / Sign-out (SISO) data, Instrument Meteorological Conditions (IMC) data, traffic count data, and performance monitoring data generated from STARS.

STARS will provide data through the Applications Interface Gateway (AIG) processor to STDDS. The term “(AIG###) message” as used in this document refers to a logical grouping of data elements. STDDS parses and sends XML versions of the *STARS Status (AIG100)* message and the *Track and Flight Plan Data (AIG200)* message to NEMS. STDDS will send all other AIG messages in XML wrapped base64 encoded version to NEMS. The *Track and Flight Plan Data (AIG200)* message can contain one or more Track and Flight Plan records.

AIG### messages contain an interface version number in the message header. STDDS will support the interface versions up to and including those specified in the STARS GeNUS ICD [NAS-IC-21050001-01 Rev E].

The format of AIG### messages is described in detail in the GeNUS ICD referenced in section 2.1

5.2.4.4.1 TerminalAutomationStatus Message

Upon receipt of a STARS Status (AIG100) message from STARS, STDDS **SHALL** send a TerminalAutomationStatus message.

STDDS **SHALL** send TerminalAutomationStatus messages during normal and test modes of the input STARS system.

STDDS **SHALL** include the data elements in Table 5-32 and Table 5-33 in each TerminalAutomationStatus message.

Table 5-32 TerminalAutomationStatus Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: "ST".
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Source TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the data source.
Source Interface Version	Y	Version number of input AIG message.
Send To	Y	Authorization flag. Permissible value: "all".

Table 5-33 TerminalAutomationStatus Message Payload Data Elements

Data Element	Required	Description
Source TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the data source.
Mode	Y	Mode of input STARS system. Permissible values: "normal" or "test".
Error code	Y	Indicates a processing error of the input STARS system. This field can have values from 0 to

Data Element	Required	Description
		255. A value of 0 indicates no error, while a value of 1 indicates RDP failure. Note: Error codes 2-255 are not assigned a specific value at present.

5.2.4.4.2 TerminalAutomationTrackAndFlightPlanData Message

Upon receipt of a Track and Flight Plan Data Message (AIG200) from STARS, STDDS **SHALL** send a TerminalAutomationTrackAndFlightPlanData message.

STDDS **SHALL** discard received AIG200 messages if the input STARS system is reported to be in test mode.

STDDS **SHALL** batch TerminalAutomationTrackAndFlightPlanData messages by authorization.

STDDS **SHALL** include the data elements in Table 5-34 in each TerminalAutomationTrackAndFlightPlanData message.

STDDS **SHALL** include the payload data elements described in Table 5-35, Table 5-36, and Table 5-37 for each Track and Flight Plan data record in each TerminalAutomationTrackAndFlightPlanData message.

Table 5-34 TerminalAutomationTrackAndFlightPlanData Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: “FP”.
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Source TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the data source.
Source Interface Version	Y	Version number of input AIG message.
Send To	Y	Authorization flag. Permissible values: “all”, “authorized”, or “filtered”.

Table 5-35 TerminalAutomationTrackAndFlightPlanData Message Payload Data Elements

Data Element	Required	Description
Source TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the data source.
TrackandFlightPlanRecords	Y	A list of 1 to N track and flight plan records, which may contain a track object as defined in Table 5-36, a flight plan object as defined in Table 5-37, or both a track object and a flight plan object.

Table 5-36 Track Object Data Elements

Data Element	Required	Description
Pseudo Track	Y	Binary value indicating if this is a pseudo track or unsupported flight. Note: For pseudo tracks and unsupported flights, some data elements are not applicable. In particular, the only fields that will be published when pseudo track is 1 are: Pseudo Track, System Track Number, System Plane X-position, and System Plane Y-Position.
System Track Number	Y	System identifier for the track and associated data in this message. This field can have values from 0 to 65535. Note: STDDS will publish a value of 0 for this field if Pseudo Track is set to 1.
System Plane X-position	Y	System plane X smooth position output by MRT. This field can have values from 0 to 2097151. Units are 1/256 nautical miles.
System Plane Y-position	Y	System plane Y smooth position output by MRT. This field can have values from 0 to 2097151. Units are 1/256 nautical miles.
ADS-B Indicator	N	Binary value indicating if ADS-B contributed to track position. Note: STDDS will not publish this field when the received AIG200 message indicates an interface version of 0.

Data Element	Required	Description
Aircraft Address	N	ICAO address of aircraft expressed in six hexadecimal digits. Also referred to as Aircraft Address or Target Address. A value of 0 indicates that the track does not have an ICAO address. Note: STDDS will not publish this field when the received AIG200 message indicates an interface version of 0.
Frozen Track	N	Binary value indicating the sub status of this track. Note: STDDS will not publish this field if Pseudo Track is set to 1.
MRT Timestamp	N	Timestamp provided by the Multi Radar Tracker. The precision of this field is in milliseconds. Note: STDDS will not publish this field if Pseudo Track is set to 1.
New Track	N	Binary value indicating if this is a new track. Note: STDDS will not publish this field if Pseudo Track is set to 1.
Reported Altitude	N	Reported Mode C altitude corrected for barometric pressure. This field can have values from -100000 to 100000 ft.
Reported Beacon Code	N	The beacon code of the target reported by the secondary radar expressed as 12 bit octal SSR code. This field can have values from 0 to 7777 octal. "ANON" when blocked for distribution to unauthorized end-users.
Track Status	N	Indicates the status of track. Possible values: "active", "coasting", "drop". Note: STDDS will not publish this field if Pseudo Track is set to 1.
Vertical Velocity Smooth	N	The vertical velocity of the System Track. This field can have values from -48000 ft/min to 47999 ft/min. Negative values indicate descent, while positive values indicate ascent. Note: STDDS will not publish this field if Pseudo Track is set to 1.
X Velocity Smooth	N	Smoothed system plane X-velocity. This field can have values from -7200 knots to 7200 knots. Note: STDDS will not publish this field if Pseudo Track is set to 1.
Y Velocity Smooth	N	Smoothed system plane Y-velocity. This field can have values from -7200 knots to 7200 knots. Note: STDDS will not publish this field if Pseudo Track is set to 1.

Table 5-37 Flight Plan Object Elements

Data Element	Required	Description
Delete Flight Plan	Y	Binary value indicating if a flight plan and associated data are deleted.
Entry Fix	Y	Flight plan assigned entry fix. “unassigned” if entry fix is not assigned.
Exit Fix	Y	Flight plan assigned exit fix. “unassigned” if entry fix is not assigned.
Flight Rules	Y	The format of this field is a single letter or “IFR”. Possible values: ‘V’ indicating VFR, ‘P’ indicating VFR on Top,or ‘E’ indicating Enroute IFR. If the input data is none of the values above, then STDDS will send “IFR”.
Flight Type	Y	Type of flight. Possible values: ‘A’ for arrival, ‘P’ or ‘D’ for departure, ‘E’ for enroute.
Flight Plan Status	Y	Possible values: “pending”, “active”, “passive” or “terminated”.
Flight Plan Suspended	Y	Binary value indicating if a flight plan is suspended.
System Flight Plan Number	Y	STARS flight plan index. This field can have values from 1 to 65535.
Aircraft Category	N	Aircraft Category/RNAV (when Re-categorization is disabled) or Aircraft Wake Turbulence Category status (when Re-categorization is enabled) as displayed to the controller in the STARS data block. Possible values: When Re-categorization is disabled: “B” = Heavy with RNAV “F” = B757 “H” = Heavy “J” = A380 “L” = B757 with RNAV “M” = A380 with RNAV “R” = RNAV “X” = High Performance Turbo-prop Additional values for a given facility may be set in STARS adaptation.

Data Element	Required	Description
		When Re-categorization is enabled: An alphabetic character as set in STARS adaptation together with the associated category name. Initial values are A-F.
Aircraft ID	N	Aircraft callsign or “ANON” when blocked for distribution to unauthorized end-users.
Aircraft Type	N	ICAO format with two to four characters being composed of letters and digits. The first character must be a letter. “ANON” when blocked for distribution to unauthorized end-users.
Airport	N	3 or 4 character abbreviation of the origin airport for departures or the destination airport for arrivals.
Assigned Beacon Code	N	Assigned SSR code in 12 bit octal. This field can have values from 0 to 7777 octal. “ANON” when blocked for distribution to unauthorized end-users.
Assigned Runway	N	If Scratch Pad 2 contains a valid runway identifier, then Assigned Runway will contain the same value as Scratch Pad 2. If Scratch Pad 1 contains a valid runway identifier, then Assigned Runway will contain the same value as Scratch Pad 1.
Controller Position Symbol	N	One or two alphanumeric characters that identify either the controller position to which an intrafacility handoff has been initiated (when Ownership Change Reason is set to "pending") or the controller position that is controlling the aircraft. Allowable values for a given facility are set in STARS adaptation. Note: This field contains only the controller position that is controlling the aircraft in AIG200 version 0.
Data Block Indicators	N	Provides a list of currently active indicators in the track’s data block. The list may contain any of the following: “DM”, “CX”, “FP”, “IF”, “AMB”, “NAT”, “OLD”, “Auto-handoff disable”. Note: STDDS will not publish this field when the received AIG200 message indicates an interface version of 0.

Data Element	Required	Description
Enroute Computer ID	N	The ECID associated with the flight plan. The format of this field is one digit followed by two alphanumeric characters. A value of "FFF" indicates that the ECID is unavailable.
Leader Line Direction	N	Orientation of the track's full data block relative to the track location at the track owner's display. Possible values: "undefined", "NW", "N", "NE", "W", "E", "SW", "S", "SE". Note: STDDS will not publish this field when the received AIG200 message indicates an interface version of 0.
Ownership Change Reason	N	Indicates the reason for the most recent change in the ownership of the track. Possible values: "no change" : Ownership has never changed since the flight plan became active. "consolidation": Ownership changed due to consolidation. "normal handoff": Ownership changed due to normal inbound or outbound interfacility handoff. "directed handoff": Ownership changed due to directed inbound or outbound interfacility handoff where new owner differs from pending owner. "intrafacility handoff": Ownership changed due to intrafacility handoff (initiate followed by acceptance). "manual": Ownership changed due to manual (i.e. controller-entered) intrafacility transfer. "automatic": Ownership changed due to automatic (i.e. due to a system filter) intrafacility transfer. "pending": Pending change of intrafacility owner (i.e. intrafacility handoff has been initiated, but is still subject to redirection or recall). Note: STDDS will not publish this field when the received AIG200 message indicates an interface version of 0.

Data Element	Required	Description
PTD Time	N	Planned Time of Departure (PTD) or coordination time. PTD is available for departure flights only. Coordination time is available for arrival flights only. The format of this field is HHMM. The field is not available for enroute flights.
Requested Altitude	N	Requested altitude in feet as an interfacility message for a departure track. This field can have values of 1 to 99900 ft.
RNAV Indicator	N	Binary value, indicating if the track is on an RNAV route. Note: STDDS will not publish this field when the received AIG200 message indicates an interface version of 0.
Scratch Pad 1	N	First four characters of free form text obtained via manual tag. Note: This field is three characters in AIG200 version 0.
Scratch Pad 2	N	First four characters of free form text obtained via manual tag. Note: This field is three characters in AIG200 version 0.

5.2.4.4.3 TerminalAutomationAlertDataRaw Message

Upon receipt of a STARS Alert Data Message (AIG300) from STARS, STDDS **SHALL** send a TerminalAutomationAlertDataRaw message.

STDDS **SHALL** discard received AIG300 messages if the input STARS system is reported to be in test mode.

STDDS **SHALL** include the data elements in Table 5-38 in each TerminalAutomationAlertDataRaw message.

STDDS **SHALL** include the base64 encoded contents of each STARS Alert Data Message (AIG300) message in each TerminalAutomationAlertDataRaw message payload.

Table 5-38 TerminalAutomationAlertDataRaw Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: "AR".
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Source TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the data source.
Source Interface Version	Y	Version number of input AIG message.
Send To	Y	Authorization flag. Permissible value: "authorized".

5.2.4.4.4 TerminalAutomationSISOEventRaw Message

Upon receipt of a STARS SISO Event Message (AIG500) from STARS, STDDS **SHALL** send a TerminalAutomationSISOEventRaw message.

STDDS **SHALL** discard received AIG500 messages if the input STARS system is reported to be in test mode.

STDDS **SHALL** include the data elements in Table 5-39 in each TerminalAutomationSISOEventRaw message.

STDDS **SHALL** include the base64 encoded contents of each STARS SISO Event Message (AIG500) message in each TerminalAutomationSISOEventRaw message payload.

Table 5-39 TerminalAutomationSISOEventRaw Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: "SI".
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Source TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the data source.
Source Interface Version	Y	Version number of input AIG message.

Data Element	Required	Description
Send To	Y	Authorization flag. Permissible value: "authorized".

5.2.4.4.5 TerminalAutomationIMCStatusRaw Message

Upon receipt of an IMC Status Message (AIG502) from STARS, STDDS **SHALL** send a TerminalAutomationIMCStatusRaw message.

STDDS **SHALL** discard received AIG502 messages if the input STARS system is reported to be in test mode.

STDDS **SHALL** include the data elements in Table 5-40 in each TerminalAutomationIMCStatusRaw message.

STDDS **SHALL** include the base64 encoded contents of each STARS IMC Status Message (AIG502) message in each TerminalAutomationIMCStatusRaw message payload.

Table 5-40 TerminalAutomationIMCStatusRaw Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: "IR".
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Source TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the data source.
Source Interface Version	Y	Version number of input AIG message.
Send To	Y	Authorization flag. Permissible value: "all".

5.2.4.4.6 TerminalAutomationTrafficCountRaw Message

Upon receipt of a Traffic Count Message (AIG510) from STARS, STDDS **SHALL** send a TerminalAutomationTrafficCountRaw message.

STDDS **SHALL** discard received AIG510 messages if the input STARS system is reported to be in test mode.

STDDS **SHALL** include the data elements in Table 5-41 in each TerminalAutomationTrafficCountRaw message.

STDDS **SHALL** include the base64 encoded contents of each Traffic Count Message (AIG510) message in each TerminalAutomationTrafficCountRaw message payload.

Table 5-41 TerminalAutomationTrafficCountRaw Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: "CR".
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Source TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the data source.
Source Interface Version	Y	Version number of input AIG message.
Send To	Y	Authorization flag. Permissible value: "authorized".

5.2.4.4.7 TerminalAutomationPerformanceMonitoringRaw Message

Upon receipt of a STARS Performance Monitoring Message (AIG700) from STARS, STDDS **SHALL** send a TerminalAutomationPerformanceMonitoringRaw message.

STDDS **SHALL** discard received AIG700 messages if the input STARS system is reported to be in test mode.

STDDS **SHALL** include the data elements in Table 5-42 in each TerminalAutomationPerformanceMonitoringRaw message.

STDDS **SHALL** include the base64 encoded contents of each STARS Performance Monitoring Message (AIG700) message in each TerminalAutomationPerformanceMonitoringRaw message payload.

Table 5-42 TerminalAutomationPerformanceMonitoringRaw Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: "PR".

Data Element	Required	Description
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Source TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the data source.
Source Interface Version	Y	Version number of input AIG message.
Send To	Y	Authorization flag. Permissible value: “authorized”.

5.2.4.4.8 TerminalAutomationInformationServiceStatus Message

STDDS **SHALL** send a TerminalAutomationInformationServiceStatus message every 60 seconds.

The TerminalAutomationInformationServiceStatus message **SHALL**, contain the data elements in Table 5-43, Table 5-44, Table 5-45, and Table 5-46.

Table 5-43 TerminalAutomationInformationServiceStatus Header Data Elements

Data Element	Required	Description
Message Type	Y	Defines the type of message. Permissible value: “IS”.
Version	Y	Version number of STDDS schema.
Timestamp	Y	UTC date and time of STDDS message generation.
TRACON ID	Y	FAA Location Identifier (three alphanumeric characters) of the STDDS producer.
Send To	Y	Authorization flag. Permissible value: “all”.

Table 5-44 TerminalAutomationInformationServiceStatus Message Payload Data Elements

Data Element	Required	Description
Service Status	Y	Status of the service. Permissible values: “Available”, “Degraded”, or “Unavailable”.
STARS Link Data	Y	List of external links configured to provide STARS updates. See Table 5-45 below for details.

Table 5-45 STARS Link Data Elements

Data Element	Required	Description
Link Name	Y	Name of the external link.
Link Status	Y	Status of the link. Permissible values: "Normal", "Degraded", "Failed", "Unknown". A link status of "Degraded" indicates that one of the connections is Failed.
Connection Data	N	List of connections associated with the link. See Table 5-46 below for details.

Table 5-46 STARS Connection Data Elements

Data Element	Required	Description
Connection Name	Y	Name of the external link connection.
Connection Status	Y	Status of the connection. Permissible values: "Normal", "Failed", "Unknown".

6 NON-FUNCTIONAL REQUIREMENTS

6.1 Quality of Service Requirements

A two-way TLS connection **SHALL** be established between a NEMS node and STDDS for message delivery via JMS.

When the two-way TLS connection is lost, STDDS **SHALL** attempt to reconnect to a NEMS node.

The following table lists the STDDS Quality of Service parameters.

Table 6-1 STDDS QoS Parameters

QoS Parameter	Value	Definition	Method
Availability	0.999	The probability that a system or constituent piece may be operational during any randomly selected instant of time. (Definition from NAS-SR-1000)	MTBF/(MTBF + MDT)
Data Latency	1 sec	Time interval from the time an input message is received and a corresponding message is put on the output JMS queue.	Continuous measurement
Reconstitute Response Time	2 min	Time interval from the time a reconstitution request message is received and when a reconstitution	Continuous measurement

QoS Parameter	Value	Definition	Method
		complete message is sent	
MTBF	499.5 hours	System reliability metric.	The sum of the individual times between noncritical failures divided by the number of noncritical failures.
MTTR	0.5 hours	System maintainability metric for unscheduled outages.	The sum of the individual times to repair divided by the number of repairs

6.2 Security Requirements

STDDS **SHALL** connect to NEMS using a plain text user name and password.

7 IMPLEMENTATION REQUIREMENTS

STDDS services **SHALL** comply with applicable SWIM protocols and format standards of XML version 1.0.

STDDS services **SHALL** be implemented in accordance with the System Wide Information Management (SWIM) Core Architecture Description.

The STDDS system **SHALL** implement addressing for the STDDS service interface as specified in NAS 1370-500.5

STDDS services **SHALL** be implemented in accordance with the seven-layer OSI reference model using the TCP/IP family of protocols as specified in the table below.

Table 7-1 Communication Layers

Layer	Request/Response Protocol	Publish/Subscribe Protocol
Application	XML/JMS	XML/JMS
Presentation	N/A	N/A
Session	N/A	N/A
Transport	TCP	TCP
Network	IP	IP
Link	802.3	802.3
Physical	Ethernet	Ethernet

Routers deployed at the TRACON will route IP packets between STDDS and NEMS using standard link and physical protocols established for the SWIM WAN.

7.1 Binding Requirements

STDDS services **SHALL** be implemented using the JMS transport protocol.

Messages sent by STDDS services **SHALL** conform to the XML protocol.

7.2 Processing Requirements

The STDDS services send terminal event data to both NAS and non-NAS end-users via NEMS. These end-users have different levels of authorizations to receive sensitive aircraft information, so STDDS processes each input message to ensure that it is properly tagged for routing by NEMS. Sensitive data includes military flights, flights operated on behalf of foreign dignitaries,

state governors, law enforcement agencies, and private citizens who have requested the FAA to consider their flight to be sensitive.

STDDS **SHALL** send ASDEXPositionReport andSurfaceMovementEventMessage containing sensitive data to NEMS with instructions to route the message to authorized end-users only (i.e. message header value sendTo = “authorized”).

STDDS **SHALL** create a copy of each ASDEXPositionReport and SurfaceMovementEventMessage messages containing sensitive data, obscure any flightID/callsign or beacon code data elements with the string “ANON” and send to NEMS with message header value sendTo = “filtered”.

STDDS **SHALL** send ASDEXPositionReport and SurfaceMovementEventMessage messages that do not contain sensitive data to NEMS with instructions to route to all end-users (i.e. message header value sendTo = “all”).

STDDS **SHALL** send TerminalAutomationTrackAndFlightPlanData messages containing sensitive data to NEMS with instructions to route the message to authorized end-users only (i.e. message header value sendTo = “authorized”).

STDDS **SHALL** create a copy of each TerminalAutomationTrackAndFlightPlanData messages containing sensitive data, obscure any flightID/callsign or beacon code data elements with the string “ANON” and send to NEMS with message header value sendTo = “filtered”.

STDDS **SHALL** send TerminalAutomationTrackAndFlightPlanData messages that do not contain sensitive data to NEMS with instructions to route to all end-users (i.e. message header value sendTo = “all”).

7.3 Operational Environment Requirements

The STDDS system **SHALL** support Ethernet 802.3 protocol and electronic connectivity via RJ45 connector for connection to the FTI WAN.

8 QUALITY ASSURANCE PROVISIONS

The following sections describe the quality assurance provisions for the interface.

8.1 Responsibility for Verification

The FAA is responsible for developing and implementing the verification of requirements for each project. The FAA may delegate verification activities to other organizations, independent contractors, and/or the prime contractor. The Test and Evaluation process guidelines within the Acquisition Management System (AMS) **SHALL** be used and **SHALL** be tailored as necessary for the levels and methods of verification in the Verification Requirements Traceability Matrix (VRTM).

8.2 Special Verification Requirements

The special verification requirements **SHALL** include, but not be limited to those defined in the following paragraphs.

8.2.1 International Standards Organization (ISO) Conformance

Any protocols used in this WSRD **SHALL** demonstrate ISO conformance using a test method or certification that is approved by the FAA.

8.2.2 ISO Interoperability

Any protocols used in this WSRD **SHALL** demonstrate ISO interoperability using a test method or certification that is approved by the FAA.

8.2.3 Non-ISO Interoperability

Prior to the start of integration level verification, functional interoperability **SHALL** be demonstrated at the William J. Hughes Technical Center (WJHTC) System Support Computer Complex, or other appropriate demonstration site.

8.3 Verification Requirements Traceability Matrix

Verification **SHALL** be in accordance with Table 8-1. Verification levels and methods implemented in the VRTM are defined in the following paragraphs.

Table 8-1 Verification Requirements Traceability Matrix

	D=Demonstration A=Analysis I=Inspection T=Test X=Not Applicable		
Section Number	**Requirements Title**	**Verification Level**	
		Subsystem	**Integration**
5.2	STDDS services **SHALL** be built using SWIM compliant infrastructure and interface standards.	I	I
5.2	STDDS services **SHALL** send terminal data to NEMS via JMS using the message broker Apache ActiveMQ.	I	I

	D=Demonstration A=Analysis I=Inspection T=Test X=Not Applicable		
Section Number	**Requirements Title**	**Verification Level**	
		Subsystem	**Integration**
5.2	STDDS **SHALL** provide routing information in each output message header for NEMS to determine the authorized recipient of the data.	I	I
5.2.1	The TDES, APDS, TAIS and SMES **SHALL** be of type Plain Old XML (POX) over JMS.	I	I
5.2.2	Message accuracy **SHALL** be ensured via checksum at the network layer or below.	D	X
5.2.2	STDDS services **SHALL** send to NEMS and receive from NEMS the messages described in the following table.	X	D
5.2.4.1	STDDS **SHALL** send past TowerDepartureEvent messages for events that occurred within the past 30 minutes for currently active flights at an airport.	T	X
5.2.4.1.1	STDDS **SHALL** send a TowerDepartureEvent message each time a departure event is detected.	T	X
5.2.4.1.1	STDDS **SHALL** include in each TowerDepartureEvent message at least the required data elements in Table 5-2 and Table 5-3.	D	X
5.2.4.1.1	On start-up STDDS **SHALL** set the Message Sequence ID field of the TowerDepartureEvent message to 0.	T	X
5.2.4.1.1	When the Message Sequence ID field of the TowerDepartureEvent message reaches the maximum value (Long.MAX_VALUE), the system **SHALL** set it back to 1.	T	X
5.2.4.1.1	STDDS **SHALL** increment the Message Sequence ID field of the TowerDepartureEvent message upon the generation of every new output message.	T	X
5.2.4.1.1	STDDS **SHALL** set the Recon Message Sequence ID field of reconstituted TowerDepartureEvent messages to 1 upon the start of TDES message reconstitution.	T	X
5.2.4.1.1	When the value of the Recon Message Sequence ID field of reconstituted TowerDepartureEvent messages reaches Long.MAX_VALUE, STDDS **SHALL** set the value of the field to 1.	T	X
5.2.4.1.1	STDDS **SHALL** increment the Recon Message Sequence ID field of reconstituted TowerDepartureEvent messages upon the generation of every new reconstituted output message.	T	X
5.2.4.1.2	STDDS **SHALL** send a TowerDepartureEventServiceStatus message every 60 seconds.	T	X
5.2.4.1.2	STDDS **SHALL** include the data elements in Table 5-4, Table 5-5 and Table 5-6 in each TowerDepartureEventServiceStatus message.	D	X

	D=Demonstration A=Analysis I=Inspection T=Test X=Not Applicable		
Section Number	**Requirements Title**	**Verification Level**	
		Subsystem	**Integration**
5.2.4.1.3	NEMS **SHALL** publish a ReconstituteSubscriptionToDepartureData message containing the data items listed in Table 5-7 and Table 5-8 to the reconstitution request topic.	X	D
5.2.4.1.3	STDDS, at each TRACON, **SHALL** subscribe to the reconstitution request topic.	X	D
5.2.4.1.4	Upon receipt of a ReconstituteSubscriptionToDepartureData message which contains an adapted Airport ID, STDDS **SHALL** send a ReconstitutionRequestStatus message.	X	T
5.2.4.1.4	STDDS **SHALL** include the data elements listed in Table 5-9 and Table 5-10 in each ReconstitutionRequestStatus message.	X	D
5.2.4.1.5	Upon the start of reconstitution, STDDS **SHALL** send a TowerDepartureEventReconstitutionStart message.	T	X
5.2.4.1.5	STDDS **SHALL** include the data elements listed in Table 5-11 and Table 5-12 in each TowerDepartureEventReconstitutionStart message.	D	X
5.2.4.1.5	STDDS **SHALL** send reconstituted TowerDepartureEvent messages interleaved in the steady state publication stream of TowerDepartureEvent messages.	D	D
5.2.4.1.6	Upon completion of a reconstitution, STDDS **SHALL** send a TowerDepartureEventReconstitutionComplete message.	T	X
5.2.4.1.6	STDDS **SHALL** include the data elements listed in Table 5-13 and Table 5-14 in each TowerDepartureEventReconstitutionComplete message.	D	X
5.2.4.2	The STDDS Airport Data Service **SHALL** provide RVR data from all available runway sensors at an airport.	T	T
5.2.4.2.1	Upon receipt of an Application Data Unit message from RVR (nominally every 2 seconds), STDDS **SHALL** send an RVRDataUpdate message to NEMS.	T	T
5.2.4.2.1	STDDS **SHALL** include the header data elements described in Table 5-15 in each RVRDataUpdate message.	D	X
5.2.4.2.1	STDDS **SHALL** include the payload data elements described in Table 5-16 and Table 5-17 for each runway at an airport in each RVRDataUpdate message.	D	X
5.2.4.2.2	STDDS **SHALL** send the AirportDataServiceStatus message every 60 seconds.	T	X

	D=Demonstration A=Analysis I=Inspection T=Test X=Not Applicable		
Section Number	**Requirements Title**	**Verification Level**	
		Subsystem	**Integration**
5.2.4.2.2	STDDS **SHALL** include the data elements in Table 5-18, Table 5-18Table 5-19, Table 5-20 and Table 5-21 in each AirportDataServiceStatus message.	D	X
5.2.4.3	STDDS **SHALL** discard received ASDE-X data if the input ASDE-X system is reported to be in maintenance mode.	X	T
5.2.4.3	STDDS **SHALL** discard received ASSC data if the input ASSC system is reported to be in maintenance mode.	X	T
5.2.4.3.1	Upon receipt of a System Track Report from ASDE-X and detection that an aircraft surface movement event has occurred, STDDS **SHALL** send a SurfaceMovementEvent message.	X	T
5.2.4.3.1	Upon receipt of a System Track Report from ASSC and detection that an aircraft surface movement event has occurred, STDDS **SHALL** send a SurfaceMovementEvent message.	X	T
5.2.4.3.1	Each SurfaceMovementEvent message **SHALL** contain the data elements in Table 5-22 and Table 5-23.	D	X
5.2.4.3.2	Upon receipt of a System Track Report from ASDE-X, STDDS **SHALL** send an ASDEXPositionReport message.	X	T
5.2.4.3.2	Upon receipt of a System Track Report from ASSC, STDDS **SHALL** send an ASDEXPositionReport message.	X	T
5.2.4.3.2	STDDS **SHALL** include the data elements in Table 5-24 in each ASDEXPositionReport message.	D	X
5.2.4.3.2	STDDS **SHALL** include one or more position reports consisting of the data elements in Table 5-25 in each ASDEXPositionReport message.	D	X
5.2.4.3.2	STDDS **SHALL** include the data elements in Table 5-24 in each ASDEXPositionReport message.	D	X
5.2.4.3.2	STDDS **SHALL** send all data elements listed in Table 5-23 and Table 5-24 to NEMS every *N* seconds (*N* is nominally 60 seconds).	X	D
5.2.4.3.2	If a System Track Report for a particular flight/track number is received and less than *N* seconds (*N* is nominally 60 seconds) have elapsed since the last full ASDEXPositionReport message was sent, STDDS **SHALL** send an ASDEXPositionReport message including the elements that have changed or have been deleted since the last update.	T	X
5.2.4.3.2	STDDS **SHALL** batch ASDEXPositionReport messages by originating airport and authorization.	T	X
5.2.4.3.3	STDDS **SHALL** send an ASDEXSystemStatus message every *N* seconds (*N* is nominally 60 seconds) and upon change of any published fields in the ASDE-X System Status message.	X	T
5.2.4.3.3	STDDS **SHALL** send an ASDEXSystemStatus message every *N* seconds (*N* is nominally 30 seconds) and upon change of the input ASSC link status.	X	T

	D=Demonstration A=Analysis I=Inspection T=Test X=Not Applicable		
Section Number	**Requirements Title**	**Verification Level**	
		Subsystem	**Integration**
5.2.4.3.3	STDDS **SHALL** include the data elements listed in Table 5-26 and Table 5-27 in each ASDEXSystemStatus message.	D	X
5.2.4.3.3	STDDS **SHALL** send ASDEXSystemStatus messages during operational and maintenance modes of the input ASDE-X system.	X	T
5.2.4.3.3	STDDS **SHALL** send ASDEXSystemStatus messages during operational and maintenance modes of the input ASSC system.	X	T
5.2.4.3.4	STDDS **SHALL** send a SurfaceMovementEventServiceStatus message every 60 seconds.	T	X
5.2.4.3.4	The SurfaceMovementEventServiceStatus message **SHALL**, contain the data elements in Table 5-28, Table 5-29, Table 5-30 ASDE-X/ASSC Link Data ElementsTable 5-30 and Table 5-31.	D	X
5.2.4.4.1	Upon receipt of a STARS Status (AIG100) message from STARS, STDDS **SHALL** send a TerminalAutomationStatus message.	X	T
5.2.4.4.1	STDDS **SHALL** send TerminalAutomationStatus messages during normal and test modes of the input STARS system.	X	T
5.2.4.4.1	STDDS **SHALL** include the data elements in Table 5-342 and Table 5-33 in each TerminalAutomationStatus message.	D	X
5.2.4.4.2	Upon receipt of a Track and Flight Plan Data Message (AIG200) from STARS, STDDS **SHALL** send a TerminalAutomationTrackAndFlightPlanData message.	X	T
5.2.4.4.2	STDDS **SHALL** discard received AIG200 messages if the input STARS system is reported to be in test mode.	X	T
5.2.4.4.2	STDDS **SHALL** batch TerminalAutomationTrackAndFlightPlanData messages by authorization.	D	X
5.2.4.4.2	STDDS **SHALL** include the data elements in Table 5-34 in each TerminalAutomationTrackAndFlightPlanData message.	D	X
5.2.4.4.2	STDDS **SHALL** include the payload data elements described in Table 5-35, Table 5-36, and Table 5-37 for each Track and Flight Plan data record in each TerminalAutomationTrackAndFlightPlanData message.	D	X
5.2.4.4.3	Upon receipt of a STARS Alert Data Message (AIG300) from STARS, STDDS **SHALL** send a TerminalAutomationAlertDataRaw message.	X	T
5.2.4.4.3	STDDS **SHALL** discard received AIG300 messages if the input STARS system is reported to be in test mode.	X	T
5.2.4.4.3	STDDS **SHALL** include the data elements in Table 5-38 in each TerminalAutomationAlertDataRaw message.	D	X

	D=Demonstration A=Analysis I=Inspection T=Test X=Not Applicable		
Section Number	**Requirements Title**	**Verification Level**	
		Subsystem	**Integration**
5.2.4.4.3	STDDS **SHALL** include the base64 encoded contents of each STARS Alert Data Message (AIG300) message in each TerminalAutomationAlertDataRaw message payload.	D	X
5.2.4.4.4	Upon receipt of a STARS SISO Event Message (AIG500) from STARS, STDDS **SHALL** send a TerminalAutomationSISOEventRaw message.	X	T
5.2.4.4.4	STDDS **SHALL** discard received AIG500 messages if the input STARS system is reported to be in test mode.	X	T
5.2.4.4.4	STDDS **SHALL** include the data elements in Table 5-39 in each TerminalAutomationSISOEventRaw message.	D	X
5.2.4.4.4	STDDS **SHALL** include the base64 encoded contents of each STARS SISO Event Message (AIG500) message in each TerminalAutomationSISOEventRaw message payload.	D	X
5.2.4.4.5	Upon receipt of an IMC Status Message (AIG502) from STARS, STDDS **SHALL** send a TerminalAutomationIMCStatusRaw message.	X	T
5.2.4.4.5	STDDS **SHALL** discard received AIG502 messages if the input STARS system is reported to be in test mode.	X	T
5.2.4.4.5	STDDS **SHALL** include the data elements in Table 5-40 in each TerminalAutomationIMCStatusRaw message.	D	X
5.2.4.4.5	STDDS **SHALL** include the base64 encoded contents of each STARS IMC Status Message (AIG502) message in each TerminalAutomationIMCStatusRaw message payload.	D	X
5.2.4.4.6	Upon receipt of a Traffic Count Message (AIG510) from STARS, STDDS **SHALL** send a TerminalAutomationTrafficCountRaw message.	X	T
5.2.4.4.6	STDDS **SHALL** discard received AIG510 messages if the input STARS system is reported to be in test mode.	X	T
5.2.4.4.6	STDDS **SHALL** include the data elements in Table 5-41 in each TerminalAutomationTrafficCountRaw message.	D	X
5.2.4.4.6	STDDS **SHALL** include the base64 encoded contents of each Traffic Count Message (AIG510) message in each TerminalAutomationTrafficCountRaw message payload.	D	X
5.2.4.4.7	Upon receipt of a STARS Performance Monitoring Message (AIG700) from STARS, STDDS **SHALL** send a TerminalAutomationPerformanceMonitoringRaw message.	X	T
5.2.4.4.7	STDDS **SHALL** discard received AIG700 messages if the input STARS system is reported to be in test mode.	X	T

	D=Demonstration A=Analysis I=Inspection T=Test X=Not Applicable		
Section Number	**Requirements Title**	**Verification Level**	
		Subsystem	**Integration**
5.2.4.4.7	STDDS **SHALL** include the data elements in Table 5-42 in each TerminalAutomationPerformanceMonitoringRaw message.	D	X
5.2.4.4.7	STDDS **SHALL** include the base64 encoded contents of each STARS Performance Monitoring Message (AIG700) message in each TerminalAutomationPerformanceMonitoringRaw message payload.	D	X
5.2.4.4.8	STDDS **SHALL** send a TerminalAutomationInformationServiceStatus message every 60 seconds.	D	X
5.2.4.4.8	The TerminalAutomationInformationServiceStatus message **SHALL**, contain the data elements in Table 5-43, Table 5-44, Table 5-45, and Table 5-46.	D	X
6.1	A two-way TLS connection **SHALL** be established between a NEMS node and STDDS for message delivery via JMS.	X	D
6.1	When the two-way TLS connection is lost, STDDS **SHALL** attempt to reconnect to a NEMS node.	X	D
6.2	STDDS **SHALL** connect to NEMS using a plain text user name and password.	X	D
7	STDDS services **SHALL** comply with applicable SWIM protocols and format standards of XML version 1.0.	I	I
7	STDDS services **SHALL** be implemented in accordance with the System Wide Information Management (SWIM) Core Architecture Description.	I	I
7	The STDDS system **SHALL** implement addressing for the STDDS service interface as specified in NAS 1370-500.5	X	I
7	STDDS services **SHALL** be implemented in accordance with the seven-layer OSI reference model using the TCP/IP family of protocols as specified in the table below.	X	I
7.1	STDDS services **SHALL** be implemented using the JMS transport protocol.	I	I
7.1	Messages sent by STDDS services **SHALL** conform to the XML protocol.	I	I
7.2	STDDS **SHALL** send ASDEXPositionReport andSurfaceMovementEventMessage containing sensitive data to NEMS with instructions to route the message to authorized end-users only (i.e. message header value sendTo = “authorized”).	D	D
7.2	STDDS **SHALL** create a copy of each ASDEXPositionReport and SurfaceMovementEventMessage messages containing sensitive data, obscure any flightID/callsign or beacon code data elements with the string “ANON” and send to NEMS with message header value sendTo = “filtered”.	D	D

	D=Demonstration A=Analysis I=Inspection T=Test X=Not Applicable		
Section Number	**Requirements Title**	**Verification Level**	
		Subsystem	**Integration**
7.2	STDDS **SHALL** send ASDEXPositionReport and SurfaceMovementEventMessage messages that do not contain sensitive data to NEMS with instructions to route to all end-users (i.e. message header value sendTo = "all").	D	D
7.2	STDDS **SHALL** send TerminalAutomationTrackAndFlightPlanData messages containing sensitive data to NEMS with instructions to route the message to authorized end-users only (i.e. message header value sendTo = "authorized").	D	D
7.2	STDDS **SHALL** create a copy of each TerminalAutomationTrackAndFlightPlanData messages containing sensitive data, obscure any flightID/callsign or beacon code data elements with the string "ANON" and send to NEMS with message header value sendTo = "filtered".	D	D
7.2	STDDS **SHALL** send TerminalAutomationTrackAndFlightPlanData messages that do not contain sensitive data to NEMS with instructions to route to all end-users (i.e. message header value sendTo = "all").	D	D
7.3	The STDDS system **SHALL** support Ethernet 802.3 protocol and electronic connectivity via RJ45 connector for connection to the FTI WAN.	X	I

8.3.1 Verification Levels

The three levels of verification are Subsystem, Integration, and Site. All requirements imposed by this WSRD **SHALL** be verified at one or more of these levels.

Subsystem-level. For subsystems developed under contract, this level of verification is usually accomplished at the contractor's facility and culminates in the formal acceptance of a contractual end-item. For subsystems developed by the Government, this level of verification is usually accomplished at the WJHTC, or at a key site.

Integration-level. This level of verification is conducted at the WJHTC, or at a key site. The verification conducted shall determine if the hardware, software, or subsystem to be deployed for site installation will perform in a NAS environment and in accordance with NAS system-level operational and functional requirements.

Site-level. This level of verification is usually performed at the designated site. The verification portion of the subsystem installation and checkout shall emphasize demonstration of the overall system performance requirements. It includes the demonstration of an end-item, subsystem and/or system, the final acceptance demonstrations, and commissioning activities.

8.3.2 Verification Methods

The four verification methods that can be used at any of the three verification levels are as follows.

Inspection. This method is used to determine compliance without using special laboratory equipment, procedures, or services, and consists of a non-destructive static-state examination of the hardware, software, and/or the technical data and documentation.

Demonstration. This is a method in which qualitative determination of properties is made for a configuration item, including software and/or the use of technical data and documentation. The items being verified are observed, but not quantitatively measured, in a dynamic state.

Analysis. This is a method in which hardware or software designs are compared with known scientific and technical principles, procedures, and practices to estimate the capability of the proposed design to meet the mission and system requirements.

Test. Test is a method in which performance is measured during or after the controlled application of functional and/or environmental stimuli. Quantitative measurements are analyzed to determine the degree of compliance. The process uses standardized laboratory equipment, procedures, and/or service.