# Traffic Flow Management System-to-Aircraft Situation Display to Industry (TFMS-to-ASDI) Interface Control Document (ICD) for the Traffic Flow Management-Modernization (TFM-M) Program


## Final, Release 3, Revision 1

Contract Number: DTFAWA-04-C-00045
CDRL: E05

**March 15, 2010**

Prepared for:
**U.S. Federal Aviation Administration**

Prepared by:
**CSC**
**North American Public Sector – Civil Group**
**15245 Shady Grove Road**
**Rockville, MD 20850**


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CSC/TFMM-08/0473
Release 3 Final Revision 1 March 15, 2010

INTERFACE CONTROL DOCUMENT
APPROVAL SIGNATURE PAGE
TFMS/ASDI

APPROVAL SIGNATURES

| PARTICIPANT | NAME | DATE |
|---|---|---|
| | | |
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# Document History Record

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| Initial Draft | September 21, 2007 | Contractual delivery |
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# 1 Scope

This section identifies the scope, purpose, and organization of this Interface Control Document (ICD) and identifies the subsystem responsibility list.

## 1.1 Scope and Purpose

This ICD provides the design characteristics of the interface between the Traffic Flow Management System (TFMS) and the Aircraft Situation Display to Industry (ASDI). This ICD satisfies the interface design requirements contained in the Traffic Flow Management System Interface Requirements Specification (IRS) for Traffic Flow Management Modernization (TFM-M), Proposed Revision 2.2, August 5, 2008. This is a companion document to the CSC/TFMM-04/0025, Subsystem Specification (SSS) for the Traffic Flow Management–Modernization (TFM-M) Program, Baseline Revision 4.0 August 5, 2008. This ICD was prepared under guidance from FAA-STD-025e, dated August 9, 2002 and the TFMM-ENGR-05(E05), Traffic Flow Management Modernization (TFM-M), Data Item Description (DID) for ICDs.

The purpose of this ICD is to specify:

- Interface connectivity between the TFMS and the ASDI Vendors/Clients
- Format of data transmitted from the ASDI to the TFMS

## 1.2 Subsystem Responsibility List

The following list provides the TFMS external system interface and identifies the responsible Federal Aviation Administration (FAA) organizations:

- TFMS - FAA-ATO
- ASDI - FAA-ATO-R

## 1.3 Document Organization

This ICD is organized in six sections and appendix:

Section 1, **Scope**, describes the purpose and scope of this ICD.

Section 2, **Applicable Documents**, provides a listing of referenced government and non-government documents, and document sources researched and used by this ICD.

Section 3, **Interface Characteristics**, identifies and describes the general, functional design, and physical design characteristics for this ICD.

Section 4, **Verification Provisions**, contains verification provisions for this ICD.

Section 5, **Preparation for Delivery**, contains any specific preparations required by this ICD.

Section 6, **Notes**, provides a list of definitions, abbreviations, and acronyms used in this ICD.

Appendix A, **XML Schemas**, describes the files which are provided as separate XSD files.

# 2 Applicable Documents

The following documents form part of this ICD to the extent specified herein.

## 2.1 Government Documents

FAA Standards:

| | |
|---|---|
| FAA-STD-025e | Preparation of Interface Documentation, August 9, 2002 |
| FAA-STD-039b | Open Systems Architecture and Protocols, May 1, 1996 |
| FAA-STD-043b | Open System Interconnect Priority, 1996 |
| FAA-STD-045 | OSI Security Architecture, Protocol and Mechanisms, 1994 |

FAA Orders:

| | |
|---|---|
| FAA Order 1370.82A | Information Systems Security Program September 11, 2006 |

National Airspace System (NAS) Documents:

| | |
|---|---|
| NAS-IR-24032410 | Enhanced Traffic Management System (ETMS) Interface Requirements Document (IRD) for Traffic Flow Management Infrastructure (TFMI), Revision A, September 16, 2005 |
| NAS-IR-241400001 | Traffic Flow Management System (TFMS) Interface Requirements Document (IRD) for Traffic Flow Management Modernization (TFM-M) Version 1.0, August 14, 2006 |
| NAS-MD-315 | National Airspace System En Route Configuration Management Document, Computer Program Functional Specifications: Remote Outputs, Model A5f1.5, October 4, 2004, |

Request For Comments (RFC) Documents:

| | |
|---|---|
| RFC 791 | Internet Protocol, Sep 1981 |
| RFC 793 | Transmission Control Protocol, Sep 1983 |
| RFC 3076 | Canonical XML Version 1.0, Mar 2001 |

Other Government Documents:

| | |
|---|---|
| ASDI-FD-001 | Aircraft Situation Display to Industry: Functional Description (FD) and Interface Control Document, Version 5.4, November 15, 2005 |
| ASDI ICD | Aircraft Situation Display to Industry: Functional Description and Interface Control Document for the XML Version, Version 1.5, July 29, 2008. |
| ATO-W | Federal Telecommunications Infrastructure (FTI) Operational Internet Protocol (IP) User's Guide, Version 3.1, Final Draft, March 2007 |
| CSC/TFMM-04/0025 | Subsystem Specification (SSS) for the Traffic Flow Management–Modernization (TFM-M) Program, Release3, Revision 5.0, May 19, 2009 |
| CSC/TFMM-04/0048 | Information Systems Security Plan (ISSP), Revision 2.2 for Traffic Flow Management–Modernization (TFM-M), June 2, 2009 |
| CSC/TFMM-05/0121 | Interface Requirements Specification (IRS) for the Traffic Flow Management – Modernization (TFM-M) Release 3, Revision 2.3, May 19, 2009 |
| CSC/TFMM-08/0473 | Traffic Flow Management System-to-Airline Operation Center Network (TFMS-to-AOCNET) Interface Control Document (ICD), Release 3, Final, August 24, 2009 |
| CSC/TFMM-08/0473 | Traffic Flow Management System-to-Traffic Flow Management Data to Government (TFMS-to-TFMDG) Interface Control Document (ICD), Release 3 Final, August 24, 2009 |
| TFMM-ENGR-05(E05) | Traffic Flow Management Modernization (TFM-M), Data Item Description (DID), undated |

## 2.2 Non-Government Documents

International Organization for Standardization (ISO):

| | |
|---|---|
| ISO/IEC 7498-1 | Information Processing Systems – Open Systems Interconnect – Basic Reference Model, 1993 |

Institute of Electrical and Electronics Engineers (IEEE):

| | |
|---|---|
| IEEE 802.3 | IEEE Standard for Information Technology — Telecommunications and Information Exchange Between Systems, 2000 |

American National Standards Institute (ANSI):

| | |
|---|---|
| ANSI X3.4 | American National Standard Code for Information Interchange (ASCII), REV. 1992 |

## 2.3 Document Sources

This subsection provides sources for FAA and International Organization for Standardization (ISO) documents.

### 2.3.1 Source of FAA Documents

Copies of FAA specifications, standards, and publications may be obtained from the Contracting Officer, Federal Aviation Administration, 800 Independence Avenue S.W., Washington, DC, 20591. Requests should clearly identify the desired material by number and date and state the intended use of the material.

### 2.3.2 Request for Comment (RFC) Documents

RFC documents are available from the reference area electronically at the following Web address:

http://www.faqs.org/rfcs/

### 2.3.3 ISO, IEEE, and ANSI Documents

Copies of ISO, IEEE, and ANSI standards may be obtained from the American National Standards Institute, 11 West 42nd Street, New York, NY, 10036.

### 2.3.4 ASDI Documents

The following web site contains current information about the ASDI feed. It also includes the eXtensible Marhup Language (XML) schema definition files (XSD) and sample ASDI XML data packages.

http://www.fly.faa.gov/ASDI/asdi.html

# 3 Interface Characteristics

This section provides the general, functional, and physical interface characteristics for the TFMS interface with ASDI Clients and Vendors.

## 3.1 General Characteristics

TFMS provides near real-time air traffic data to Vendors who are authorized by the FAA to resell the data to downstream clients, and Clients who are direct users of the ASDI data.

The heart of the ASDI feed is located at the Traffic Flow Management System Production Center (TPC), located at the William J. Hughes Technical Center in Atlantic City (WJHTC), New Jersey. This is the end system on the TFMS side. On the ASDI side, the end systems are the various Vendor/Clients that interface with TFMS for ASDI data.

Figure 3-1, TFMS-to-ASDI Interface Block Diagrams, illustrates the TFMS-to-ASDI interfaces and the demarcation points. These are indicated as "Vendor/Clients' in the diagram below (and throughout the document) in the two interface diagrams (FAA FTI ED-8 Gateway system and the AOCNET Wide Area Network (WAN)). Note, there may be many clients of either type interfacing with the TFMS system.

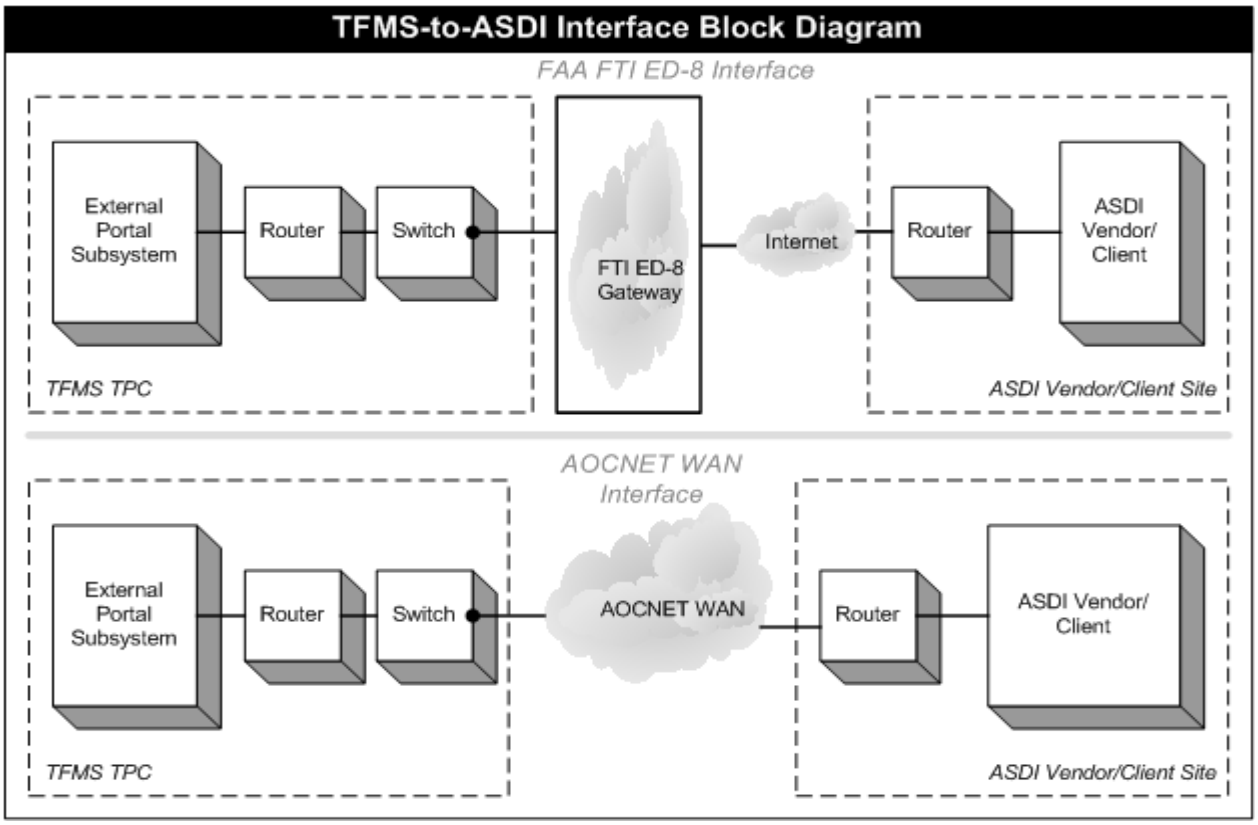


**Figure 3-1. TFMS-to-ASDI Interface Block Diagram**

The Commercial Vendors/Clients communicate with the TFMS External Portal Subsystem through either:

- AOCNet/CDM Wide Area Network (WAN) (for more details, refer to CSC/TFMM-08/0473, Traffic Flow Management System-to-Airline Operation Center Network (TFMS-to-AOCNET) Interface Control Document (ICD)).

- FAA's FTI ED-8 gateway system. ED-8 provides a path for 'untrusted' and 'partially trusted' systems to have an interface to receive data. (Complete information on the FTI ED-8 can be found in the FTI Operational IP User's Guide)

The demarcation points for these two interface types are switches contained within the TFMS TPC. (Refer to Section 3.3 for full physical details)

The TFMS-to-ASDI interface has three different feeds of commercial Vendor/Clients connected, as well as government feeds (designated Traffic Flow Management to Government (TFMDG) and Federal BZ feeds) which are covered in a separate ICD.

## 3.2 Functional Design Characteristics

This subsection describes the functional design characteristics of the TFMS and ASDI.

### 3.2.1 Application Processes (APs)

This subsection identifies each application process and the applicable services, including performance characteristics (information units, quality of service, error handling, and responses).

#### 3.2.1.1 Identification of Application Processes

The TFMS uses an AP called the External Portal Message Interface Server AP contained within the External Portal Subsystem to receive and send data packets.

The corresponding ASDI AP is the ASDI Client AP, provided by the ASDI Vendor/Clients.

#### 3.2.1.2 Category of Services Required by the AP

The TFMS-to-ASDI interface is used to transfer flight data packets to authorized ASDI clients via the following feeds:

- ASDI – Class One London – This is a Filtered near-real time ASDI feed including London data. (Commercial feed)
- ASDI – Class One noLondon – This is a Filtered near-real time ASDI feed without London data. (Commercial feed)
- ASDI – Class Two noLondon Delayed – This is a Filtered delayed ASDI feed without London data. (Commercial feed)

Filtering protocols are discussed in Section 3.2.2.1.2. The data transferred across the TFMS-to-ASDI interface is detailed in Table 3-I below.

The following Message Types are transferred by the TFMS-to-ASDI interface:

- Flow Control Amendment Information (AF) Message
- Flow Control Arrival Information (AZ) Message
- Departure (DZ) Message
- Flight Plan Information (FZ) Message
- Flight Management Information (RT) Message
- Flow Control Cancellation (RZ) Message
- Oceanic Report (TO) Message
- Flow Control Track/Flight Data Block (TZ) Message
- Flow Control Update (UZ) Message
- Heartbeat Message

Loss of the TFMS-to-ASDI interface will impair full TFMS operation, but will not degrade TFMS operations to the point of inoperability. Loss of the interface will cause a significant impact to the ASDI Vendor/Clients utilizing the interface. This interface is designated "essential" IAW NAS-SR-1000.

### 3.2.1.3 Information Units

This subsection describes the formats of the data files transferred from TFMS to ASDI.

#### 3.2.1.3.1 Information Code

All TFMS-to-ASDI interface data packets are encoded in eXtensible Markup Language (XML). American Standard Code for Information Interchange (ASCII) alphanumeric data format is used by XML in accordance with ANSI X3.4, American National Standard Code for Information Interchange (ASCII).

The XML developed for the ASDI data feed is defined by XML Schema Definition (XSD) files. These XSD files are used to describe and validate the elements used in the XML documents sent over the ASDI data feed. The following schema definition files are needed to validate, parse and process ASDI XML documents:

- **TFMS_XIS.xsd** – The root schema, including all external interface schemas using the same name space.
- **ASDI.xsd** – The schema definition representing all data transmitted over the ASDI interface.
- **MessageMetaData.xsd** – The schema definition representing common header type information for external interfaces.

- **NasXCommonMessages.xsd** – The schema definition describing common data sent and received over multiple TFMS interfaces (including ASDI.
- **NasXCoreElements.xsd** – This schema definition describes all common element types used by NasXCommonMessages.xsd.

These XSD files were developed as part of the TFM-M program and as such contain additional element/attribute definitions supporting multiple TFM-M data interfaces and in some cases data is represented that will be available in future TFMM releases.

These XSD files will be attached to this interface control document.

There are a number of set procedures and data files for the XML format to provide uniformity and coherence to all clients. The following are the basic rules:

- The files contain only printable ASCII characters.
- The file format follows standard XML structural conventions.
- In XML terminology, the files are guaranteed to be:
  - Valid – The XML file content matches the proper schema and documentation.
  - "Well-Formed." - This means that every opening tag (i.e. - <TAG>) has a corresponding closing tag (i.e. - </TAG>), opening and closing tag pairs are correctly matched and nested, and consistent capitalization is used. Note - The first line of every file is the standard "**<?XML ...>**" entry, identifying the XML version number. This is the only tag which has no corresponding close tag.
  - Structured – The XML file consists of *data element* consisting of a pair of matching start and end tags, together with the data between them. Elements can contain other elements, and are referred to as a *container*. The container element is considered to be the '*parent*' to the elements contained within. Elements contained within the 'parent' container are considered '*child'* elements. Example:

```
<CTR_ROUTE>
      <CTR_SEG>...</CTR_SEG>
</CTR_ROUTE>
```

All data is between matching start and end tags:

```
<TAG>data</TAG>
```

A pair of matching start and end tags, together with the data between them, is known as a data element or an element.

Characters that are not between matching start and end tags are ignored, . They are and may be used occasionally for comments or enhancements of clarity. Example:

```
<TAG1>
   <TAG2>This is data </TAG2>
```

```
        This is a comment.
        <TAG2>This is data</TAG2>
    </TAG1>
```

Data elements can be in any order within their container element's tag pair (if element is a child of a parent element) or within the file (if an element not acting as a container).

New-line characters between matching start and end tags are part of the element's data.

### 3.2.1.3.2 Information Structure

The following subsections provide the detailed record layout of the products sent by the ASDI. Table 3-I, TFMS-to-ASDI Interface Data Packets Table, presents the TFMS-to-ASDI Interface Data Packets, including the subsection reference and mnemonic.

**Table 3-I. TFMS-to-ASDI Interface Data Packets Table**

| Product Name | Product Mnemonic | ICD Subsection |
|---|---|---|
| XML Data Packet Header | N/A | 3.2.1.3.2.1 |
| XML Data Packet Payload | N/A | 3.2.1.3.2.2 |
| ASDI Registration Message | N/A | 3.2.2.1.1 |

The ASDI message consists of two distinct items:

- The XML Data Packet Header – the uncompressed fixed length (32 byte) header in binary and standard ASCII format. (Refer to Section 3.2.1.3.2.1)
- The XML Data Packet Payload – Variable length compressed data ‘payload’, consisting of multiple messages in a single XML formatted payload. (Refer to Section 3.2.1.3.2.2)

#### 3.2.1.3.2.1 XML Data Packet Header

The ASDI Data Packet Header consists of five fixed length fields:

- Timestamp – 16 bytes, standard ASCII data
- Data Type – 4 bytes, binary integer value
- Sequence Number – 4 bytes, binary integer value
- Compressed Size – 4 bytes, binary integer value
- Decompressed Size – 4 bytes, binary integer value

All Clients must set their software to read these first 32 bytes. The data structure, written in C, describes the components of this Header:

**ASDI Data Packet Message Header Example**

```
struct typedef xml_header_t
{
  char timestamp[16];
  int data_type;
  int sequence_number;
  int compressed_size;
  int decompressed_size;
} xml_header_t;
```

The five fields of the Header are described below

- Timestamp - The Timestamp indicates when the ASDI packet was transmitted. It is in the format *YYYYMMDDhhmmss[null][null]*:
  - *Y* – Year (4 digits – Characters 1-4)
  - *M* – Month (2 digits – Characters 5-6)
  - *D* – Day (2 digits – Characters 7-8)
  - *h* – Hour (2 digits – Characters 9-10)
  - *m* – Minute (2 digits – Characters 11-12)
  - *s* – Second (2 digits – Characters 13-14)

  The time and date occupy the first fourteen places of the Timestamp. These are followed by:
  - Null character (1 byte – Character 15)
  - Null character (1 byte – Character 16)

  These characters are used to ensure proper alignment among the header characters.
- Data Type – There are two different types of ASDI Data Packets sent:
  - Flight Data Payload – This is the flight data messages in XML format. The Data Type field would read: `#define XMLDataType 2`
  - Heartbeat Payload – This indicates that the Client that the ASDI feed is functioning even though no flight data is coming through. The Data Type field would read: `#define HeartBeatDataType 1`
- Sequence Number – Each ASDI data packet is given a sequential number, to allow Clients to keep track of packet reception. The range of possible numbers is 0 through 100,000 (inclusive), but 0 is only used at initial program start. (If the 100000 mark is reached, the sequence rolls over to the number 1, not 0)
- Compressed Size – This tells the Client the size of the compressed data, allowing them to determine the capacity of the data buffer required to read the payload. The files are compressed using the standard ‘gzip’ or similar compression tools.
- Decompressed Size – This tells the Client the size of the data after decompression, allowing them to determine the capacity of the data buffer

required to read the payload. The decompression returns the data payload to XML format. The message must be decompressed prior to processing.

#### 3.2.1.3.2.2 XML Data Packet Payload

Once decompressed, the ASDI XML payload is comprised of:

- The Document Preamble – This starts off the message. It is comprised of:
  - The Opening tag. Each ASDI XML data packet has an opening ("parent" level) XML tag of <*asdiOutput*> for each collection of container ('child' level) records, each noted with the tag <*asdiMessage*>. The maximum number of messages following the preamble is determined by values established prior to activating the ASDI feed. Refer to the attached XSD files for full ASDI XML structure.
  - XSD Tags – This is a series of XML tags, indicating what XSD files were used to construct the message. This allows the Client to use the correct files when processing ASDI XML messages.

    These files can be found in attachments to this document.
- The Data Payload – Each payload is comprised of some number of ASDI messages. Each message begins and ends with the ASDI XML Tag:

  `<asdiMessage>` *ASDI XML message data* `</asdiMessage>`

  There may be multiple messages individually set out by ASDI Message container tags, of any of the formats specified in the subsections below. Not all Message types will be contained in every ASDI Data Packet.

The following subsections provide bulleted lists of the elements contained within each message type. Refer to the attached ASDI XML and XSD files for a complete detailing of these XML elements.

##### 3.2.1.3.2.2.1 Flow Control Amendment Information (AF) Message

The Flow Control Amendment Information (AF) message provides revised flight plan data whenever a flight plan is amended. It contains the following elements:

- Aircraft Identification (ID)
- Amendment Data
- Departure Point
- Destination
- Field Reference

#### 3.2.1.3.2.2.2 Flow Control Arrival Information (AZ) Message

The Flow Control Arrival Information (AZ) message is used to provide arrival date and time information for all eligible arriving flights. It consists of the following elements:

- Aircraft ID
- Arrival Time
- Departure Point
- Destination

#### 3.2.1.3.2.2.3 Departure (DZ) Message

The Departure (DZ) message is transmitted for all eligible initially activated flight plans when the activation is not from an adjacent NAS. It consists of the following elements:

- Departure Time (Actual or Estimated)
- Aircraft ID
- Aircraft Data
- Departure Point
- Destination
- Estimated Time of Arrival (optional)

#### 3.2.1.3.2.2.4 Flight Plan Information (FZ) Message

The Flight Plan Information (FZ) message is used to provide flight plan data for all eligible flight plans. It consists of the following elements:

- Aircraft ID
- Aircraft Data
- Assigned Altitude (Active) or Requested Altitude (Proposed)
- Coordination Fix
- Coordination Time
- Route
- Speed

#### 3.2.1.3.2.2.5 Flight Management Information (RT) Message

The purpose of the Flight Management Information (RT) message is to provide data from TFMS that is not otherwise available in other message. For example, this message may contain the current prediction of wheels-up and wheels-down time for a flight, where these predictions are based on all information available to TFMS. It consists of the following elements:

- Aircraft Category
- Aircraft ID
- Airways List
- Arrival Fix Time (optional)
- Center List
- Controlled Arrival Time (optional)
- Controlled Departure Time (optional)
- Current Route
- Departure Center
- Destination
- Estimated Time of Arrival (optional)
- Estimated Time of Departure
- Fix List
- Flight Origin
- Flight Status
- Generated By Message Type
- Original Gate Departure Time (optional)
- Original Gate Arrival Time (optional)
- Sector List
- User Category
- Waypoint List

#### 3.2.1.3.2.2.6 Flow Control Cancellation (RZ) Message

The Flow Control Cancellation (RZ) Messages are used to provide cancellation data for all eligible flight plans. It consists of the following elements:

- Aircraft ID
- Departure Point
- Destination

#### 3.2.1.3.2.2.7 Oceanic Report (TO) Message

A TO message is generated by TFMS when an oceanic position report is received through NADIN. All transoceanic flights that are inbound from oceanic routes provide these position reports each time they cross ten degrees of longitude. It consists of the following elements:

- Aircraft ID
- Arrival Airport (optional)
- Calculated Speed
- Departure Airport (optional)
- Planned Position Report 1 (optional)
- Planned Position Report 2 (optional)
- Reported Position Report

#### 3.2.1.3.2.2.8 Flow Control Track/Flight Data Block (TZ) Message

Flow Control Track/Flight Data Block Information (TZ) message are used to provide a position update along with other information used in a data block. TZ messages are transmitted to TFMS on a cyclic basis on all flat-tracked and non-tentative free-tracked eligible flight plans. It consists of the following elements:

- Aircraft ID
- Altitude
- Ground Speed
- Track Position Coordinates

#### 3.2.1.3.2.2.9 Flow Control Update (UZ) Message

Flow Control Update Information (UZ) message are used to provide current flight plan information on active eligible flights that enter an Air Route Traffic Control Center (ARTCC). Generally speaking, a UZ payload is an ARTCC boundary crossing message. The UZ payload is
transmitted by the receiving NAS En Route Center when the flight plan is eligible for TFMS message transmission. It consists of the following elements:

- Aircraft ID
- Aircraft Data
- Altitude
- Boundary Crossing Point Inbound
- Calculated Inbound Boundary Crossing Time
- Route
- Speed

#### 3.2.1.3.2.2.10 Heartbeat Message (HB)

The ASDI Heartbeat message is sent from TFMS to the ASDI Vendors/Clients and indicates the interface connection is still active even if no data is being sent. This message is never combined with other ASDI XML message. It is always sent alone.

In the XML feed, the Heartbeat information is transmitted as a header only. It shows a Data type of '1', a Compressed Size of '0', and a Decompressed Size of 0''with a unique data type indicating that it is an Heartbeat rather than XML data packet.

### 3.2.1.3.3 Information Unit Segmentation

Not applicable.

### 3.2.1.3.4 Direction of Information Flow

The information flow between the ASDI Client and TFMS is bi-directional. The ASDI registration message flows from the ASDI client to TFMS to initiate traffic flow. The XML Flight Data and Heartbeat data packets flow from TFMS to the ASDI client.

### 3.2.1.3.5 Frequency of Transmission

The ASDI Registration message is transmitted only for initial connection. The Heartbeat data packet is sent every 10 seconds. The other data packets frequencies are transmitted as described in Section 3.2.2.2.1, according to the message compression frequency described below.

When TFMS receives a message, it will hold it until either a defined number of messages have arrived (*m*, which is currently set at 32 messages for optimum compression and transmission size, but is a configurable parameter) or a defined number of ¼ seconds (also designated 'ticks') have elapsed (*s* which is currently determined as two ticks (½ second), but is a configurable parameter), whichever occurs first. It then sends the accumulated messages as a data packet.

### 3.2.1.3.6 Responses

The ASDI Vendor/Client sends a registration message to begin data flow. There is no response message; acceptance is indicated by the onset of the data flow.

## 3.2.1.4 Quality of Service

Not applicable.

## 3.2.1.5 AP Error Handling

For errors in registration, no data is sent until TFMS receives a valid registration message. If TFMS has not received a legal registration message within 60 seconds after the socket connection is made, it will close this socket. The Vendor/Client must then resubmit a new ASDI Registration message to connect to the interface.

TFMS uses non-blocking write operations to the ASDI Clients, sending all data packets in sequence. The standard interpretation of any missing data packets is that they resulted from a buffer overflow forced by (1) the client's not reading the data packets fast enough or (2) the client's communication link not being able to accept the ASDI data feed fast enough.

Any write to a client that results in an error condition will cause ASDI to terminate the connection. If the connection is terminated, the client must re-establish a connection if it is to receive data. No data will be buffered for a disconnected client. A 'port filled' or 'no room in port' condition is not considered to be an error. If either of these conditions is returned when ASDI attempts to write to a socket, this data is buffered, and a later attempt is made to re-transmit.

### 3.2.1.6 Interface Summary Table

An interface summary table (see Table 3-II below) shows the association between the data packets that flow across the interface and the APs of the interfacing subsystems. The left side of the interface summary table column lists the TFMS APs. The center column contains the names of the data packets transferred, the reference for each data packet, and the data flow direction. The right hand column lists the ASDI APs.

**Table 3-II. TFMS-to-ASDI Interface Summary Table**

| Subsystem A TFMS AP | Data Packet | Data Flow | Reference | Subsystem B ASDI AP |
|---|---|---|---|---|
| External Portal Message Interface Server | ASDI Registration Message | A←B | ASDI FD/ICD Ver 1.5, Section 6 | ASDI Client AP |
| External Portal Message Interface Server | ASDI Data Packets | A→B | ASDI FD/ICD Ver 1.5, Section 6 | ASDI Client AP |
| External Portal Message Interface Server | ASDI Heartbeat Message | A→B | ASDI FD/ICD Ver 1.5, Section 6 | ASDI Client AP |

## 3.2.2 Protocol Implementation

The TFMS to ASDI interface communications functions are implemented according to OSI reference model as defined in FAA-STD-039b, Open Systems Architecture and Protocols, and FAA-STD-043b, Open System Interconnect Priority. Subsection 3.2.2 documents the OSI protocols implemented for each layer of the interface. For the layers not used, this following text will be used "This layer is not implemented within the TFMS-to-ASDI interface".

a. Application Layer (Layer 7) - This layer is not implemented within the TFMS-to-ASDI interface.

b. Presentation Layer (Layer 6) – This layer is not implemented within the TFMS-to-ASDI interface.

c. Session Layer (Layer 5) - This layer is not implemented within the TFMS-to-ASDI interface.

d. Transport Layer (Layer 4) - The TFMS-to-ASDI interface uses the TCP as its Transport layer protocol.

e. Network Layer (Layer 3) - The TFMS-to-ASDI interface uses the standard IP as its Network layer protocol.

f. Data-Link Layer (Layer 2) - The TFMS-to-ASDI uses the 100-baseT Ethernet standard in accordance with IEEE 802.3, IEEE Standard for Information Technology — Telecommunications and Information Exchange Between Systems, 2000 as the Data Link Layer

g. Physical Layer (Layer 1) - The TFMS-to-ASDI interface uses a standard Category 5 (Cat-5) Ethernet cable as its Physical layer protocol.

Figure 3-2, OSI Layer Functional Interface Connectivity Diagram for TFMS-to-ASDI, gives a visual representation of the OSI layers and their structure.

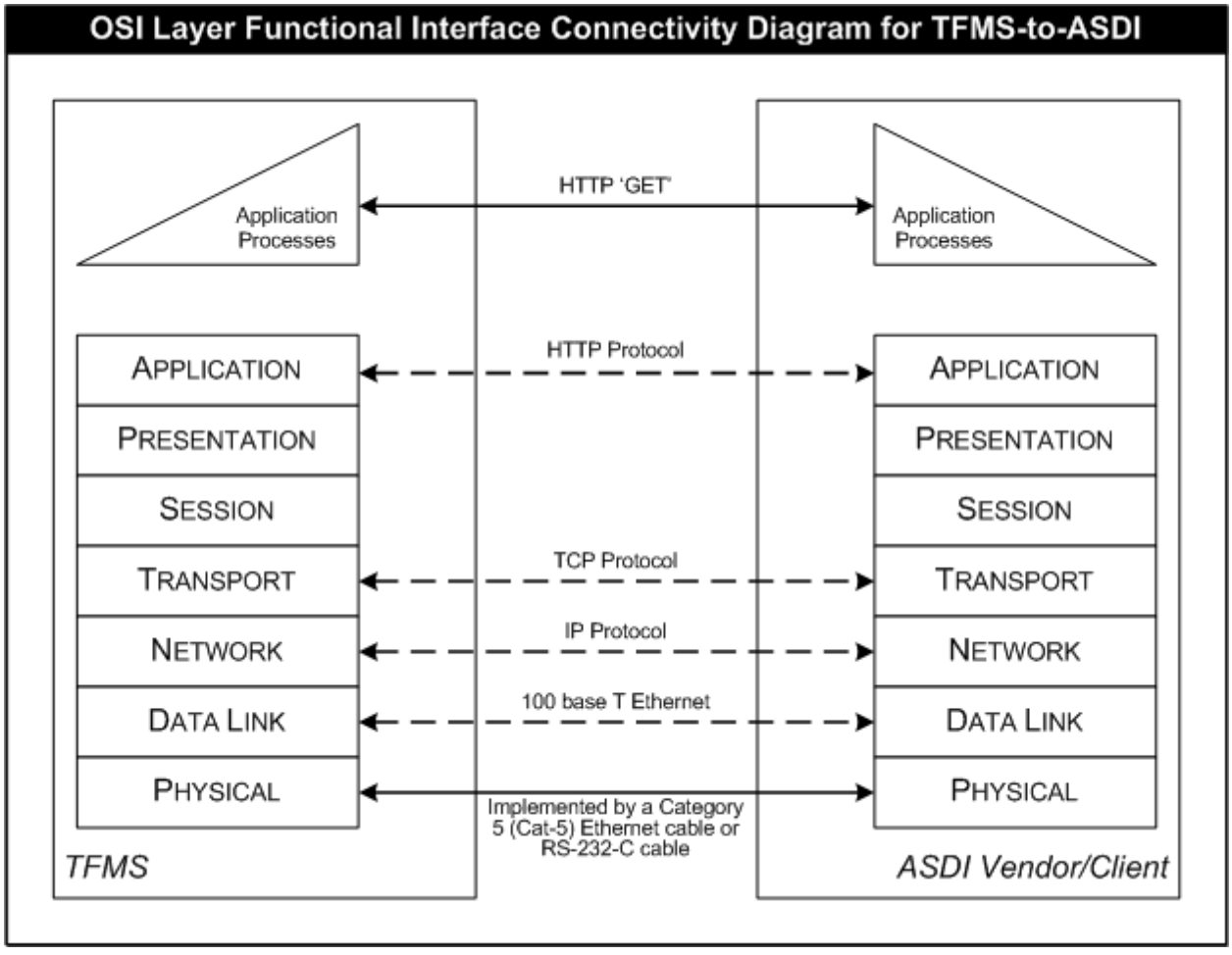


**Figure 3-2. OSI Layer Functional Interface Connectivity Diagram for TFMS-to-ASDI**

### 3.2.2.1 Application Services

The interface between TFMS and the ASDI Vendor/Client's software running on the Vendor/Client's premises is a standard TCP/IP socket. The redundant ASDI feeds each listen separately on assigned IP addresses and port numbers for clients that request to be registered to receive the data. The Vendor/Client is given these IP addresses and port numbers (after it signs the ASDI memorandum of agreement with the FAA) enabling the Vendor/Client to connect to one of the ASDI feeds.

TFMS sends identical ASDI data to all connected Vendor/Clients according to the feed (Class One London, Class Two noLondon Delayed, etc). If necessary, TFMS buffers packets for each connected Vendor/Client. This might happen in a case where a Client is debugging their application or are doing some processing that causes them to process the data stream slower than it is being written by the ASDI Server. This buffer holds a configurable number of packets per Vendor/Client (currently this is 32 packets, but this could change in the future).

#### 3.2.2.1.1 ASDI Registration Message

All ASDI Vendors/Clients are required to register to receive data, using an ASDI Registration Message. After a Vendor/Client opens a socket, it is given 60 seconds to send an ASDI Registration to TFMS, containing the Vendor/Client name and password. Once TFMS has received a valid registration message, the Vendor/Client is said to be registered.

Table 3-III below specifies the format of the registration message, which contains a Vendor/Client name and password. Each element of this message may be delimited by one or more spaces. Spaces directly after an "**=**" sign are discarded and are not considered part of the Client name or password. Registration message must be terminated by a special character. The password and the termination character are provided to the clients by TFMS Help Desk via secure out-of-band communication methods before interface initiation. An **out-of-band communication agreement** is an agreement or understanding that governs the semantics of the request/response interface but which is not part of the formal description of the interface specification itself. As an example, the password and the termination character to be used at the end of the registration message will be conveyed to the clients via telephone conversation.

**Table 3-III. ASDI Registration Message Format**

| Field | Function | Unit/Format | Description | Bytes |
|---|---|---|---|---|
| Keyword | ID Field | **ID** | Keyword specifying id field. Static entry **ID** | 2 |
| = | Field assignment character | = | Used to designate the data following as the correct entry for the ID field. Static entry **=** | 1 |
| Name | <client name | a [a][a] … [a] | A 1 to 80 character | 1-80 |

| Field | Function | Unit/Format | Description | Bytes |
|---|---|---|---|---|
| | string> | | alphanumeric string, chosen by the Vendor/Client. It may include embedded spaces. | |
| , | Separator | . | Field separator character. Static entry (single period) | 1 |
| Keyword | PASSWORD | **PASSWORD** | Keyword specifying password field. Static Entry **PASSWORD** | 8 |
| = | Field assignment character | = | Used to designate the data following as the correct entry for the Password field. Static entry = | 1 |
| Password | <client password string> | a [a][a][a][a][a][a][a][a][a][a] | 1 – 12 character alphanumeric string. | 1-12 |

TFMS sends identical data packet batches to all connected Clients. It buffers packets for each connected Client, and will discard data if the Client's buffer overflows. (Currently, the buffer size is set at 32 packets, but is configurable.) TFMS uses the following sequence to transmit messages to the registered Clients:

- TFMS filters out any messages that are not allowed into the feed. (See Section 3.2.2.1.2 below)
- TFMS removes any fields that are not allowed into the feed. (See Section 3.2.2.1.2 below)
- TFMS adds a header to the data packet payload (See Section 3.2.1.3.2.1 above)

TFMS sends the filtered data packet batch to every client that is registered

### 3.2.2.1.2 Filtering Protocols

In all variants of the ASDI feed, some level of filtering is performed, to justify inclusion or exclusion in one of the designated ASDI feeds. radiotelephony.dat

- FilterCallSign.dat
- IncludeInASDI.dat
- FEDERAL_IncludeInASDI.dat
- FEDERAL_FilterCallSign.dat
- Radiotelephony.dat

For the filtered data, the following steps are performed to filter the data:

1. Check to see if the message is an allowed type. If not, e.g., the message is a BZ message, then the message is discarded; it does not go out in the ASDI feed. If it is valid, continue to the next step.

2. Look at the code in the message that shows the facility that generated the message. If the code is not in the configuration file that specifies legal facilities, then discard this message; it does not go out in the ASDI feed. If the code is in this file, then continue to the next step. (Note: There are two feeds--one that contains London data and one that does not. This configuration file controls for each feed whether London data is included.)

3. Look at the aircraft call sign. If it is in the file FilterCallSign.dat, then discard this message; it does not go out in the feed. If the call sign is not in this file, then continue to the next step.

4. Look at the aircraft call sign. If it is in the file IncludeInASDI.Dat, then it goes out in the ASDI feed. If it is not in the file, then continue to the next step.

5. Checks to see if the aircraft call sign is already in dynamic list of excluded military flights. If so, it is removed from the feed.

6. Check to see if the call sign starts with 'N' followed by a digit followed by a digit or letter. That is, check to see if the first three characters of the call sign have the format 'Ndd' or ‘Ndl', where 'd' stands for digit and 'l' for letter. If so, this is considered to be a General Aviation (GA) flight; it goes out in the ASDI feed. If not, then continue to the next step.

7. Check to see if the call sign starts with 'LN' followed by a digit followed by a digit or letter. That is, check to see if the first four characters of the call sign have the format 'LNdd' or ‘LNdl', where 'd' stands for digit and 'l' for letter. If so, this is considered to be a lifeguard flight; it goes out in the ASDI feed. If not, then continue to the next step.

8. Check to see if the call sign starts with 'TN' followed by a digit followed by a digit or letter. That is, check to see if the first four characters of the call sign have the format 'TNdd' or ‘TNdl', where 'd' stands for digit and 'l' for letter. If so, this is considered to be an air taxi flight; it goes out in the ASDI feed. If not, then continue to the next step.

9. Check to see if the call sign is three letters followed by a digit. If not, the flight is considered to be military and is discarded; it does not go out in the ASDI feed. If so, this is considered to be a commercial flight; continue to the next step.

10. Check the first three letters of the call sign to see if they represent an airline for which messages are to be sent in the feed. (The Radiotelephony file,

which is maintained by the Air Traffic Control System Command Center, specifies the airlines whose messages are to be included in the feed.) If not, discard this message; it does not go out in the ASDI feed. If so, then this message is included in the ASDI feed.

11. Check to see if the message is for a flight with a military aircraft type. (only FZ, DZ, UZ and some AF messages contain the aircraft type information). If so, then the message is discarded; it does not go out in the ASDI feed and the aircraft call sign is added to the dynamic list of excluded military flights. Some message types, e.g., a TZ, do not have the aircraft type. The ASDI Server handles this by remembering from previous messages that do have the aircraft type, e.g., FZ, which call signs are associated with military aircraft. The ASDI Server uses the aircraft_categories.map file to determine which aircraft types are military.)

Filtering using these files provides the following feeds:

- ASDI – Class One London – Commercial filtered near-real time ASDI feed including London data. This is provided to designated commercial clients. (See Section 3.2.2.1.4 for how London data is defined)
- ASDI – Class One noLondon – Commercial filtered near-real time ASDI feed without London data.
- ASDI – Class Two noLondon Delayed– Commercial filtered delayed ASDI feed without London data
- ASDI – Federal BZ – Government filtered delayed feed (Refer to TFMS-to-TFMDG ICD as listed in Section 2)
- TFMDG – Government unfiltered undelayed feed (Refer to TFMS-to-TFMDG ICD as listed in Section 2)

TFMS provides the unfiltered base ASDI feed consisting of the following data packets:

- All of the NAS messages received by TFMS
- All of the TZ messages from the Surface Movement Advisor (SMA) sites (TRACONS) received by TFMS
- All of the TO messages generated by TFMS
- All of the RT messages generated by TFMS
- All Heartbeat messages

The filtered data runs through the steps above, filtering out specific kinds of data (Note – The rules for filtering out sensitive flights are set conservatively, in the sense that some flights that are not truly sensitive are filtered out. For example, most messages on GA flights registered in countries other than the U.S. and Canada are filtered out.):

- The only message types currently allowed into the filtered ASDI data stream are AF, AZ, DZ, FZ, RZ, TZ, UZ, RT, TO, and HB messages.
- Messages on sensitive flights (such as military flights) are filtered out.
- Messages from certain facilities or regions are filtered out. Currently messages are included from facilities in the United States, Canada, and the United Kingdom.

All Vendor/Clients who connect to TFMS for the same variant of the feed receive exactly the same data, for the feed they have selected. For example, all ASDI Class One London clients will receive the same unfiltered, undelayed data, including London data, while all Class Two noLondon Delayed data would receive filtered data with no London data at a specified delay rate.

#### 3.2.2.1.3 Data Clients

When the ASDI feed was first established, data was sent out to all Vendor/Clients in near real-time, i.e., with a delay that in practice was a few seconds. For security reasons, it was determined that this near real-time feed was unnecessary for all Vendor/Clients. It was then split into two Classes of commercial feed with one Class of government Clients (This was later again divided into Federal BZ and TFMDG Clients)

**Commercial Class One Clients:**

It was determined that undelayed ASDI data for commercial Vendor/Clients should only go to those organizations with an established flight dispatch or planning function that requires near real-time data. Some examples of Class One Vendor/Clients are:

- Air carriers
- Regional air carriers
- Air taxis
- Organizations providing dispatch or tracking functions for aircraft owners
- Flight operation centers
- Professional flight planning service organizations.

There are two commercial varieties of the Class One data feed: London and noLondon. See Section 3.2.2.1.4 for how London Vendor/Clients are authorized.

A Vendor that has both Class One and Class Two users will be allowed to get both feeds. These Vendors are then obligated by the Memorandum of Agreement (MOA) signed with the FAA to provide the undelayed feed only to Class One downstream users. The FAA requires that a Vendor that receives an undelayed feed be audited annually at the Vendor's expense to verify that they are providing undelayed data only to Class One downstream users. (Procedures for a Vendor/Client to gain permission to receive Class One data can be found in Aircraft Situation Display to

Industry: Functional Description and Interface Control Document for the XML Version, Version 1.5, Section 4.6.1.1)

**Commercial Class Two Clients:**

Any other commercial agency not requiring this near-real time data is designated a "Class Two" Vendor/Client. Class Two Vendors receive the feed with a delay. Examples of Class Two Vendor/Clients would be:

- Most general aviation
- Non-aviation related industries

A Vendor who has Class Two users will only be allowed to get a delayed ASDI feed. The FAA retains the option of changing the amount of delay, which is currently set at 5 minutes.

#### 3.2.2.1.4 London Data

The British authorities have placed a requirement on the FAA to restrict distribution of the data provided to TFMS for the ASDI feeds. Therefore, TFMS applies filtering to remove this data, restricting the distribution to only the designated Class One London Vendor/Clients.

It is required that a Vendor/Client only receives the London data if it satisfies one or both of the following conditions:

- It is an air carrier, including cargo carriers.
- It owns and operates aircraft in Europe, and, therefore, pays landing fees and air traffic control fees in Europe.

If a Vendor/Client satisfies at least one of these conditions, it is designated an approved recipient of the London data. If a user does not fulfill at least one of these two conditions, then that user is not allowed to receive any of the London data, and must then receive one of the other data feeds. (Procedures for a Vendor/Client to gain permission to receive London data can be found in Aircraft Situation Display to Industry: Functional Description and Interface Control Document for the XML Version, Version 1.5, Section 4.5.1.1 and 4.5.1.2)

London data is identifiable in the data packets transferred to Vendor/Clients. Each data packet on the ASDI feed has four characters that indicate the facility that generated the message (designated by the *sourceFacility* attribute of the *asdiMessage* element). If this XML tag contains the coding '*LLON*', then this packet is from London and must be filtered from all noLondon feeds. If these four characters are anything else, then this packet is not from London and can be included in all feeds.

### 3.2.2.2 Network Services

The TFMS-to-ASDI interface uses the established standards of Transmission Control Protocol (TCP) in accordance with RFC 793, Transmission Control Protocol, and Internet Protocol (IP) in accordance with RFC 791, Internet Protocol.

#### 3.2.2.2.1 Data Compression

Aside from using XML instead of ASCII, there is one other significant change in the XML version of the ASDI feed: compression. The reason for using compression is that, while XML is easy to read by human and machine interpreters, it achieves this by using tags that significantly increase the amount of transmitted data. If compression were not used, the bandwidth required to carry the ASDI feed would at least triple, which is not desirable.

Compression follows the following process.

- When it is time to send the accumulated messages' data packet, TFMS will convert them to XML format and compress the converted data using gzip, creating a data payload.
- TFMS will prefix a header of fixed size to the zipped payload to provide the information needed to read and unzip it. (See the next section for discussion of this header.)
- TFMS will transmit the header and payload.
- The Vendor/Client will read the fixed header and determine the size of the payload of data packets.
- The Vendor/Client will then read the entire zipped packet and unzip it.
- The Vendor/Client processes these unzipped XML data.

### 3.2.2.3 Naming and Addressing

This interface supports the transfer of the ASDI data headers data packet payload listed above in accordance with the Aircraft Situation Display to Industry: Functional Description and Interface Control Document for the XML. Details on how headers are addressed are contained in Section 3.2.1.3.2.1.

## 3.2.3 Security

TFMS implements FAA information security guidelines in accordance with Information Systems Security Plan (ISSP) for Traffic Flow Management–Modernization (TFM-M), the FAA Information Systems Security Program, FAA Order 1370.82A, and FAA-STD-045, OSI Security Architecture, Protocols and Mechanisms. It will enact security strategies and measures on all incoming information into TFMS.

## 3.2.4 Interface Design Characteristics Table

Subsection 3.2.4 summarizes the interface functional design characteristics in an interface design characteristics table or matrix in addition to the text. Table 3-IV, the

Interface Design Characteristics Table of the TFMS-to-ASDI Interface serves as a "quick-look" reference.

**Table 3-IV. Interface Design Characteristics of the TFMS-to-ASDI Interface**

| Message Name | Format | Size Max/Min (Bytes) | Time Constraints | Frequency |
|---|---|---|---|---|
| Source: Aircraft Situation Display to Industry: Functional Description and Interface Control Document for the XML Version (Refer to Section 2 for full document detail) | | | | |
| ASDI Registration Message | ASCII | 15/105 | Must be sent within 60 seconds of opening socket | Upon registration |
| ASDI Data Packet Header | ASCII/ Binary | 32 | | With each data payload packet |
| ASDI Data Packet | XML/ ASCII | * | | At least every ½ second |
| Heartbeat Data Packet Header | ASCII/ Binary | 32 | | Every 10 seconds |
| *Note – The maximum size of the data packet is variable. If necessary, the system will buffer a maximum 32 data packets. | | | | |

## 3.3 Physical Design Characteristics

For Commercial Vendor/Clients, there are two ways to interface with the TFMS system to receive ASDI data (depending on the AOCNET Participant):

- ASDI Vendor/Clients using the AOCNET WAN interface with the Dataprobe WAN Fallback Switch (designated AB-TAPS) for the physical interface. The data flows through the Cisco 7206 Router/Switch (designated EXTRTR) which acts as a gateway to the subsystems of the TFMS. The data is passed through the Firewall into the External Portal Message Interface Server, an HP PorLiant DL380 (designated PRSR_3). The physical demarcation point is the AB-TAPS switch
- ASDI Vendor/Clients not using the AOCNET WAN system interface via the FAA FTI ED-8 Gateway system. This is an ‘untrusted’ system (Vendor/Clients are considered ‘outside’ the FAA security area). The ASDI Vendor/Client connects to ports on the two Cisco Catalyst 3560G switches (designated SWPT_4) on the TPC side of the interface. The data flows through the Cisco 7206 Router/Switch (designated EXTRTR) and follows the same path into the TFMS subsystems as the as in the previous bullet. The physical Demarcation is at the SWPT_4 switch.

Note – the Demarcations for all forms of the interface are designated by encircled dots on their line ends.

See Figure 3-3 below for the Physical diagram of the TFMS-to-ASDI interface.

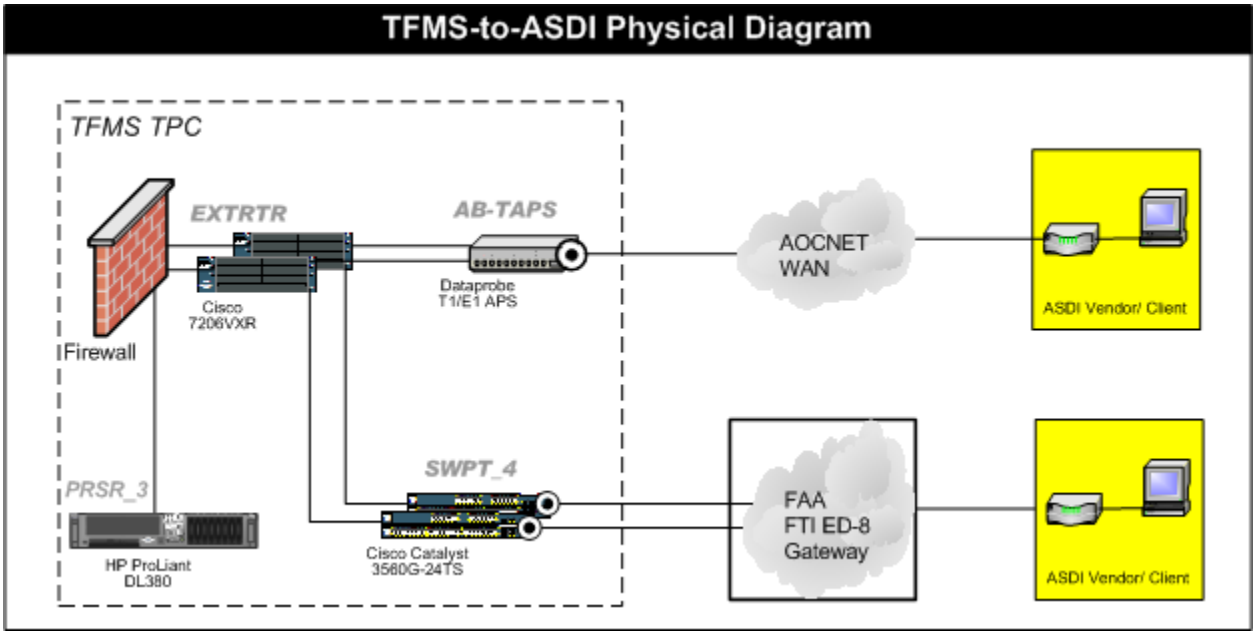


**Figure 3-3. TFMS-to-ASDI Interface Physical Diagram**

### 3.3.1 Electrical Power and Electronic Characteristics

Not applicable.

#### 3.3.1.1 Connectors

The TFMS-to-ASDI interface using the AOCNET WAN employs a standard RS-232 connector as the interface connection. Standard RS-232 pin assignments are used in this case.

The TFMS-to-ASDI interface using the FTI ED-8 Gateway uses a standard RJ-45 Ethernet connection connector as the interface connection in all instances. Standard RJ-45 pin assignments are used in this case.

#### 3.3.1.2 Wire/Cable

Standard RS-232 communication cable is used for the TFMS-to-ASDI interface instances using the AOCNET WAN.

Standard Cat-5 Ethernet cabling with R-J45 connectors are is used in all instances of for the TFMS-to-ASDI interface instances using the FTI ED-8 Gateway.

#### 3.3.1.3 Electrical Power/Grounding

Not applicable

#### 3.3.1.4 Fasteners

Not applicable

#### 3.3.1.5 Electromagnetic Compatibility

Not applicable

# 4 Verification Provisions

## 4.1 Responsibility for Verification

Following are verification provisions for the TFMS-to-ASDI interface:

1. Each project is required to perform conformance testing.
2. Each project is required to perform interoperability testing at an FAA-approved test facility.
3. Noninterference testing will be conducted on the TFMS-to-ASDI interface.

## 4.2 Special Verification Requirements

Not applicable

## 4.3 Verification Requirements Traceability Matrix (VRTM)

Not applicable

# 5 Preparation for Delivery

Not applicable.

# 6 Notes

## 6.1 Definitions

### 6.1.1 Facility Identifiers

Table 6-I provides the facility identifiers used to label the origin (source facility) of NAS messages. Note that the identifiers representing the departure facility and centers in the Flight Management Information (RT) message use 3 character codes that are described in Table 6-II. Table 6-I is broken out as follows:

- The first column shows the four character identifier used in the ASDI feed. The ASDI feed represents each facility with a four character identifier, which is right justified and filled with leading blanks if necessary. These IDs, especially the TRACON and foreign IDs, are tentative. In some cases, facilities that provide multiple data sources will have the same facility identifier (i.e., ZAN EARTS and ZAN OCS).
- Following the identifier is a brief description of the facility that generated the message.

Note - ODAPS stands for the Oceanic Display and Planning System, which provides NAS messages other than TZs on oceanic flights; position updates on oceanic flights are in the TO message.

**Table 6-I. Facility Identifiers**

| ASDI ID | Facility Name |
|---|---|
| KZAB | Albuquerque Center |
| KZBW | Boston Center |
| KZOB | Cleveland Center |
| KZDV | Denver Center |
| PZAN | Anchorage Center |
| PZAN | Anchorage Center |
| KZFW | Fort Worth Center |
| KZAU | Chicago Center |
| KZHU | Houston Center |
| KZID | Indianapolis Center |
| KZJX | Jacksonville Center |
| KZKC | Kansas City Center |
| KZLA | Los Angeles Center |
| KZME | Memphis Center |
| KZNY | New York Center |

| ASDI ID | Facility Name |
|---|---|
| KZOA | Oakland Center |
| KZMP | Minneapolis Center |
| PZHN | Honolulu, Hawaii (NAS TZ only) |
| KZMA | Miami Center |
| KZSE | Seattle Center |
| KZTL | Atlanta Center |
| KZLC | Salt Lake Center |
| PZLB | American Samoa (No data) |
| KZDC | Washington (D.C.) Center |
| ETMS | RT message generated by ETMS |
| TZSU | San Juan, Puerto Rico |
| KF90 | Boston TRACON (TZ only) |
| KCVG | Cincinnati TRACON (TZ only) |
| KDEN | Denver TRACON (NAS TZ only) |
| PZAN | Anchorage AK (ODAPS) |
| KDFW | Dallas/Fort Worth TRACON (NAS TZ only) |
| KC93 | Chicago TRACON (TZ only) |
| KIND | Indianapolis TRACON (TZ only) |
| KSDF | Louisville TRACON (TZ only) |
| KMCO | Orlando TRACON (TZ only) |
| KGTW | Gateway (St. Louis) TRACON (NAS TZ only) |
| KPHX | Phoenix TRACON (TZ only) |
| KMES | Memphis Tracon (SMA TZ only) |
| KN90 | New York TRACON (NAS TZ only) |
| KOOA | ODAPS Oakland (AF, AZ, DZ, FZ, RZ, UZ only) |
| KPHL | Philadelphia TRACON (TZ only) |
| PZUA | Guam |
| KTPA | Tampa |
| KA80 | Atlanta TRACON (NAS TZ only) |
| KNCT | Northern Cal TRACON (NAS TZ only) |
| KONY | ODAPS New York (AF, AZ, DZ, FZ, RZ, UZ only) |
| KPCT | Potomac TRACON (NAS TZ only) (No data) |
| ETMS | TO message generated by ETMS |
| KMSP | Minneapolis TRACON (NAS TZ only) |
| KSCT | Southern California TRACON (NAS TZ only) |
| YOWT | CANADA OTHER |

| ASDI ID | Facility Name |
|---|---|
| CCZX | GANDER |
| CCZM | MONCTON |
| CCZU | MONTREAL |
| CCZY | TORONTO |
| CCZW | WINNIPEG |
| CCZE | EDMONTON |
| CCZV | VANCOUVER |
| LLON | LONDON |
| KA8S | Atlanta TRACON (SMA TZ only) |
| KF9S | Boston TRACON (SMA TZ only) |
| KC9S | Chicago TRACON (SMA TZ only) |
| KCLS | Charlotte TRACON (SMA TZ only) |
| KDFS | Dallas-Ft. Worth TRACON (SMA TZ only) |
| KDTS | Detroit TRACON (SMA TZ only) |
| KSDS | Louisville TRACON (SMA TZ only) |
| KMSS | Minneapolis TRACON (SMA TZ only) |
| KN9S | New York TRACON (SMA TZ only) |
| KPHS | Philadelphia TRACON (SMA TZ only) |
| KPIS | Pittsburgh TRACON (SMA TZ only) |
| KGTS | St. Louis TRACON (SMA TZ only) |

### 6.1.2 ARTCC Identifiers

The Facility Identifiers listed above in Table 6-I correspond to the logical locations which send NAS messages. The ARTCC codes listed in this section correspond to actual physical areas containing airports and airspaces, and are associated with the departure center, as well as the centers the flight traverses. Many of the one character codes in the two tables are the same, but there are some in each table which are not in the other.

Note that for international flights, the foreign centers may be artificially generated as one of the listed codes for London/Europe, South America, Pacific/Australia, etc. since the actual foreign centers may not be known or recognized.

The table is broken out as follows:

- The first column contains the three character code used in ASDI XML feed.
- The second column is a brief description of the ARTCC center corresponding to the code.

**Table 6-II. ARTCC Identifiers**

| ASDI ID | Facility Name |
|---|---|
| CZE | Edmonton, Alberta |
| CZM | Moncton, New Brunswick |
| CZU | Montreal, Quebec |
| CZV | Vancouver, British Columbia |
| CZW | Winnipeg, Manitoba |
| CZQ | Gander Domestic, Newfoundland |
| CZY | Toronto, Ontario |
| CZX | Gander Oceanic, Newfoundland |
| ZAB | Albuquerque, New Mexico |
| ZAN | Anchorage, Alaska |
| ZAU | Aurora, Illinois (Chicago) |
| ZBW | Boston, Massachusetts |
| ZDC | Washington, District of Columbia |
| ZDV | Denver, Colorado |
| ZEU | London (and Europe and India) |
| ZFW | Dallas/Fort Worth, Texas |
| ZHN | Honolulu, Hawaii |
| ZHU | Houston, Texas |
| ZID | Indianapolis, Indiana |
| ZJX | Jacksonville, Florida |
| ZKC | Kansas City, Missouri |
| ZLA | Los Angeles, California |
| ZLB | American Samoa |
| ZLC | Salt Lake City, Utah |
| ZMA | Miami, Florida |
| ZME | Memphis, Tennessee |
| ZMP | Minneapolis, Minnesota |
| ZMX | Mexico |
| ZNY | New York, New York (Inland Section) |
| ZOA | Oakland, California |
| ZOB | Oberlin, Ohio (Cleveland) |
| ZPA | Pacific and Australia |
| ZSA | South America |
| ZSE | Seattle, Washington |
| ZSU | San Juan, Puerto Rico |

| ASDI ID | Facility Name |
|---|---|
| ZTL | Atlanta, Georgia |
| ZUA | GUAM |
| ZCA | Central America |
| ZCX | Chile |
| ZCO | Colombia |

## 6.2 Abbreviations and Acronyms

This section provides a definition of acronyms contained within this ICD.

| | |
|---|---|
| ANSI | American National Standards Institute |
| AOCNET | Airline Operations Center Network |
| AP | Application Process |
| ARTCC | Air Route Traffic Control Center |
| ASCII | American Standard Code for Information Interchange |
| ASDI | Aircraft Situation Display to Industry |
| DID | Data Item Description |
| ETA | Estimated Time of Arrival |
| ETMS | Enhanced Traffic Management System |
| FAA | Federal Aviation Administration |
| FD | Functional Description |
| FTI | Federal Telecommunications Infrastructure |
| GA | General Aviation |
| HB | Heartbeat |
| ICD | Interface Control Document |
| ID | Identification |
| IEC | International Electro-technical Commission |
| IEEE | Institute of Electrical and Electronics Engineers |
| IP | Internet Protocol |
| IRD | Interface Requirement Document |
| IRS | Interface Requirement Specification |
| ISO | International Organization for Standardization |
| ISSP | Information Systems Security Plan |
| LLON | Identifier for the London Data |
| MD | Management Document |
| MOA | Memorandum of Agreement |

| | |
|---|---|
| NADIN | National Airspace Data Interchange Network |
| NAS | National Airspace System |
| ODAPS | Oceanic Display and Planning System |
| OSI | Open Systems Interconnect |
| REV | Revision |
| RFC | Request For Comments |
| SMA | Surface Movement Advisor |
| SSS | System/Subsystem Specification |
| STD | Standard |
| TCP | Transmission Control Protocol |
| TFM | Traffic Flow Management |
| TFMDG | Traffic Flow Management Data to Government |
| TFMI | Traffic Flow Management Infrastructure |
| TFM-M | Traffic Flow Management - Modernization |
| TFMS | Traffic Flow Management System |
| TPC | Traffic Flow Management System Production Center |
| TRACON | Terminal Radar Approach Control Center |
| VRTM | Verification Requirements Traceability Matrix |
| WAN | Wide Area Netork |
| WJHTC | William J Hughes Technical Center |
| XML | eXtensible Markup Language |
| XSD | XML Schema Definition |

# Appendix A XML Schemas

The following XML schema files are provided as separate XSD files. They are:

1. ASDI.xsd
2. MessageMetaData.xsd
3. NasXCommonMessages.xsd
4. NasXCoreElements.xsd
5. TFMS_XIS.xsd

These files are also available on the Internet at the following FAA site:

http://www.fly.faa.gov/ASDI/asdi.html