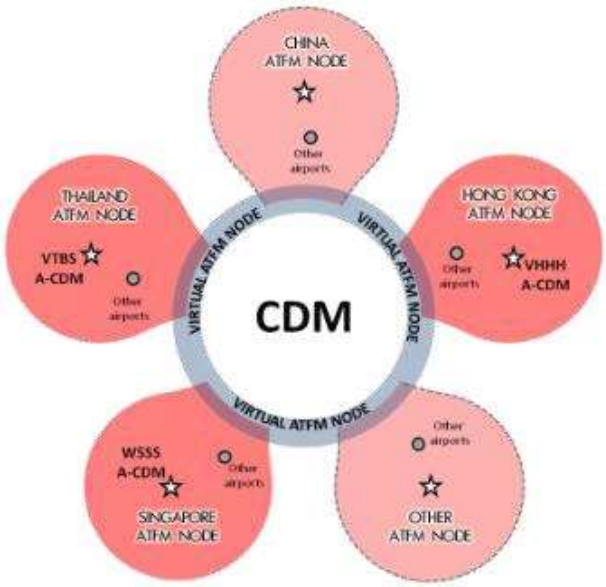

Distributed Multi-Nodal Air Traffic Flow Management

AFTN/AMHS Based Interface Control Document

08 February 2019

Version: 0.1

Revision Record

Revision	Description	Date	Authored By	Approved By
Original	Initial version for discussion			

Table of Contents

List of Figures

List of Tables

List of Acronyms

ACID .....Aircraft Identifier

ACType .....Aircraft Type

ADEP .....Departure Airport

ADES .....Arrival Airport

ADEXP .....ATS Data Exchange Presentation

ADF.....Application Data Field

ADS.....Automatic Dependent Surveillance

ADS-C.....Automatic Dependent Surveillance - Contract

AFIL .....Filed in Air

AFIX .....Arrival Fix

AFTN .....Aeronautical Fixed Telecommunications Network

AIDC .....ATS Interfacility Data Communications

aka .....Also Known As

ALTN .....Alternate Destination

AMHS .....ATS Message Handling System

ANSP .....Air Navigation Service Provider

ARCID .....Aircraft Identification

ARR .....Arrival message

ASCII .....American Standard Code for Information Interchange

ATC.....Air Traffic Control

ATFCM .....Air Traffic Flow and Capacity Management

ATFM .....Air Traffic Flow Management

ATS .....Air Traffic Services

ATSU .....Air Traffic Services Unit

CCITT .....ITU-T Telecommunication Standardization Sector of the International Telecommunications Union (formerly known as Consultative Committee for International Telephony and Telegraphy)"

CDM .....Collaborative Decision Making

CFL .....Cleared Flight Level

CHG .....Change message

CNL.....Cancellation message

CPDLC .....Controller-Pilot Data Link Communications

CSF .....Communication Status Field

CTOT .....Calculated Take-Off Time

DCT.....Direct Routing
DEP .....Departure message
DEP .....Departure Airport
DEST.....Destination Airport
DFIX .....Departure Fix
DLA .....Delay message
DOF.....Date of Flight Departure
EET .....Estimated Elapsed Time
EOBD .....Estimated Off-Block Date
EOBT .....Estimated Off-Block Time
ETFMS .....Enhanced Tactical Flow Management System
FAN.....FANS Application Notification
FANS .....Future Air Navigation System

FMH .....Facilities Notification Message Header
FMP.....Flow Management Position
FPL .....Flight Plan message
FPO .....Facilities Notification Current Position
HDG .....Heading
IA5 .....International Alphabet Number 5
IATA .....International Air Transport Association
IBT .....In-Block Time
ICAO .....International Civil Aviation Organization
ICD .....Interface Control Document
IFPLD .....Individual Flight Plan
IFPLID .....Individual Flight Plan Identifier
IFPS.....Integrated Initial Flight Plan Processing System
IOBD .....Initial Off-Block Date
IOBT .....Initial Off-Block Time
IP .....Internet Protocol
K .....Kilometer
LDT .....Landing/Touch Down Time
M .....Mach
N .....Knot
NM .....Network Manager

OAC .....Oceanic Area Control Centre

OBT.....Off Block Time

ODF.....Optional heading information Data Field

OTD .....Off Track Deviation

OTIS .....Operational Terminal Information Service

PRL .....Pilot Request Level

REG.....Aircraft Registration

RFL .....Requested Flight Level

RIF .....Route details to the revised destination airport

RVR .....Runway Visual Range

SAM .....Slot Allocation Message

SLC .....Slot Cancellation Message

SMI .....Standard Message Identifier

SRM .....Slot Revision Message

SSR .....Secondary Surveillance Radar

TDF .....Track Data Field

TOT .....Take Off Time

TRU.....Track Update

TYP .....Aircraft Type

UTC.....Coordinated Universal Time (aka Greenwich Mean Time)

1 ICD Scope

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

1.1 Introduction

Distributed Multi-Nodal Air Traffic Flow Management (ATFM) Network concept is based on a network of Air Navigation Service Providers (ANSPs) leading independent ATFM operation within their area of responsibility and connecting to each other through information sharing framework.

Unlike regional-centralized ATFM where there is an overarching authority responsible for ATFM operation for the entire region, each ANSP together with associated Airspace Users (AUs) and Airport Operators (AOs) within their *area of jurisdiction comprising one or more FIRs* ~~respective FIR~~ (Flight Information Region), ~~participating~~ *participates* in cross-border ATFM following this Distributed Multi-Nodal ATFM Network concept, ~~form~~ *forms an* ATFM Node where *the* ANSP as *a* Node Leader is responsible for ~~engagement~~ *engaging* with various Node stakeholders and ensuring that the Node as a whole is ready and able to participate in the regional cross-border ATFM process.

By establishing common ATFM operating procedures and utilizing fully-interconnected information sharing mechanism among ATFM Nodes, ATFM programs based on Collaborative Decision Making (CDM) process, involving both domestic and intra-regional international flights can be effectively implemented in the region.

To achieve the efficient information dissemination required for such ATFM operation, the baseline standard for information exchange among related stakeholders is needed. This Interface Control Document (ICD) specifies the interface requirements which ATFM support system of each Node Leader must meet in order to be able to communicate with systems of other ATFM Nodes participating in the cross-border ATFM and to ensure the compatibility between them.

1.2 Scope

This ICD details the interface between nodes of the distributed Multi-Nodal ATFM.

This ICD:

- Establishes data exchange, functional, and performance requirements
- Assigns responsibilities for interface implementation and maintenance

1.3 Subsystem Responsibility List

The *leader of each node* ~~node leader of each FIR~~ develops and maintains ~~their~~ *its* own ATFM software in accordance to this ICD.

1.4 Operational Requirement

Distributed Multi-Nodal ATFM Network comprises ATFM Nodes, each of which is led by *an* ANSP responsible for ATFM operation within their *area of jurisdiction* ~~respective FIR~~. With various ATFM support systems ~~which have been developed or procured independently~~ *developed independently or procured* by different ANSPs and lack of information linkage ~~between~~ *among* them, ~~a major~~ *an airline operating flights across such areas falling under jurisdiction of different ANSPs* ~~with a number of flights originating from many places~~ is required to access different

systems to obtain ATFM information on ~~all~~ their flights, ~~consequently creating a possible roadblock to scaling the ATFM Network due to the high workload in accessing their related information~~. *The requirement of accessing multiple and varying ATFM support systems increases workload on part of an airliner and so creates a possible roadblock to expanding ATFM Network to areas falling under jurisdiction of different ANSPs.* This calls for the need of a so-called single-point information access able to be achieved by establishing the interconnection between ATFM support systems aiming at enabling the seamless information sharing among stakeholders. However, to maintain the flexibility to accommodate new users and additional customized functions of ATFM support systems developed or procured separately as previously mentioned and to minimize the impact of changes ~~between~~ *among* them, loose system coupling is still required. Furthermore, to attain cost-effective communication among stakeholders and to gain the network-wide scalability, common standards for information exchange are needed to be considered. On the other hand, with the nature of decentralized ATFM operational approach where ATFM support system of each ATFM Node locating geographically dispersed, security across systems is of paramount importance. Technical requirements to address the operational need for information sharing between ATFM support systems stated above can be summarized as follows.

1) Loose system coupling
2) Common standards for information exchange
3) System-wide security

To facilitate the aforementioned requirements, this document describes an interface connection that is designed using the currently deployed AFTN networking (or AMHS).

In particular, considering variation in interactions ~~between~~ *among* stakeholders required at different phases of ATFM operation and keeping in mind the objective of having systems loosely coupled, a data exchange architecture based on existing messaging *is chosen* to exchange ATFM information. This solution is intended to eventually be deprecated and replaced by a SWIM based solution that uses FIXM data models. However, considering the timeline for deployment of all nodes of the multi-nodal network, it is considered a necessary first step to initially deploy ATFM using data exchange with AFTN/AMHS.

2 Applicable Documents

List of all applicable documents:

ICAO DOC 4444

ICAO DOC 9971

FIXM 4.1.0 core

FIXM XXX APAC extension for MN

SWIM Version of the Multi-Nodal ICD

MN COP

3 Interface Characteristics

This section provides the general, functional, and physical characteristics for each AFTN node and the AFTN/AMHS interface.

3.1 General Characteristics

This section identifies the interfacing subsystem(s); the point(s) of interface including associated cable terminations, functions, and services provided by the interface; and each layer implemented within the interfacing subsystem(s) necessary to achieve connectivity.

Figure 1 identifies the interface described within this ICD and depicts how the systems fit into the logical architecture context of the implementation.

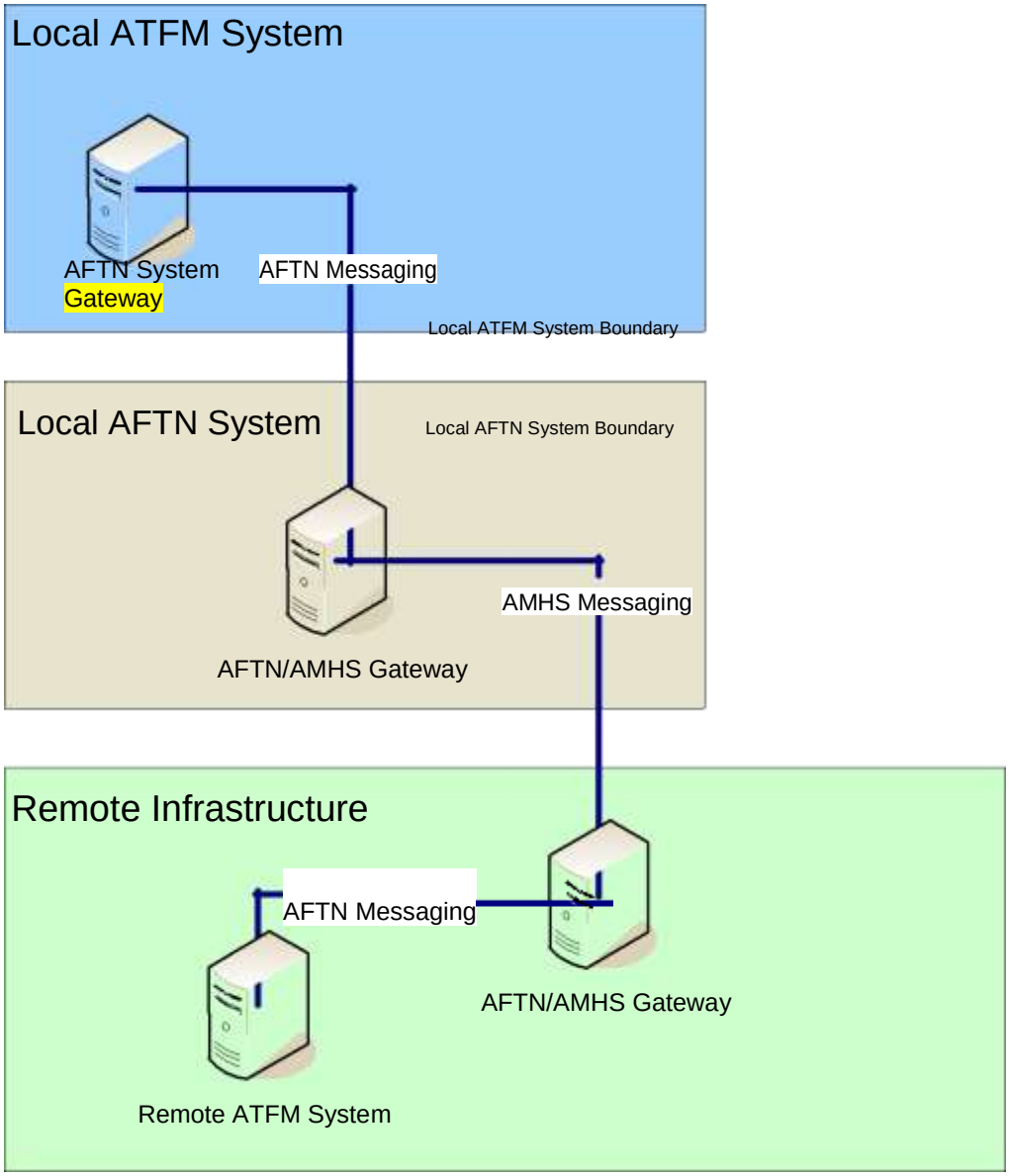

Figure 1. Logical Architecture Showing Interface Demarcation between the Local ATFM system and AFTN/AMHS

3.1.1 Data Format

In general, data that is sent to the local ATFM System across the interface will use text-based messages, as defined by the *ICAO Doc 4444* standard for exchange of flight information messages. Specifically, the communication described in this ICD is based on the message transfer requirements necessary to exchange character-based International Alphabet Number 5 (IA-5) AFTN message data[1] between two ATM systems. IA-5 is a modified subset of American

[1] This ICD includes a collection of information from several standards that are applicable to the interface. This is because the Multi-Nodal concept only needs a subset of all of the messages available from the relevant standards. Universally, when discussing the general characteristics of the data format of the messages: the message

Standard Code for Information Interchange (ASCII) characters that can only be supported by AFTN and AFTN/AMHS Gateway. The information in this document pertaining to the message transmission is based on the CCITT 1984 X.25 standard[2].

There are messages not defined by *ICAO Doc 4444*. These are defined by AIDC and ADEXP. For simplicity, aside from some helpful contrasting information between ICAO Doc 4444 and AIDC messaging, only messages related to multi-nodal operations are included in this ICD.

3.1.2 Messages defined by ADEXP

For the Slot Allocation Message (SAM) and the Slot Revision Message (SRM), the Slot Cancellation Message (SLC), the standard that is applied is referenced using the EUROCONTROL document: *ATFCM User's Manual Edition 21*, dated 03 May 2018. The SAM, SRM, and SLC follow the same form as required by *ICAO Doc 4444* and as reiterated in this ICD (see section 3.1.4).

3.1.3 Message Construction

Each AFTN message, regardless of the data format, contains a specific structure that is compliant with IA-5 and defined in *ICAO Annex 10*. This structure is summarized in Table 1.

Table 1. Summary of IA-5 Fields used in messages sent via AFTN/AMHS

Field #	Description	Format	Example
1	Start of Message/ Start of heading	4 letters	ZCZC
2	Transmission Identification	3 letters + 3 numbers	HAR001
3	Additional Service Indication	Optional <11 characters	123456
4	Priority Indicator	2 letters	FF
5	Addressee of the message	8 letters	EGLLZRZX
6	Day / time of the message	DDHHMM (UTC)	041345
7	Originator of the message	8 letters	OPSTZQZX
8	Optional Heading Information	ODF – See AIDC	See AIDC
9	ATS Message Payload	…	…
10	End of Message	4 letters	NNNN

composition is defined as IA-5 as described in *ICAO Annex 10, Volume I*, paragraph 4.11.1; message format is as specified in *Volume II*, section 4.4.16; and message text shall be as specified in *Volume II*, section 4.4.16.3.

Generally, ICAO, ADEXP, and AIDC use the IA-5 format to send messages over AFTN/AMHS. However, there are key differences in how ICAO and ADEXP use the fields. These differences are explained in the following sections and follow the format illustrated in Figure 2 and Figure 3.

FAB3887 251146
FF WSJCZQZX
251146 WMFDYFYX
(DEP-MAS2530/A2165-WMKK1146-WBGG-
DOF/150125)

Figure 2. IA-5 Illustration of ICAO Message

WSB0903 250145
FF YMMLJSTX
250145 VTBBFDMC
—TITLE SAM
—ARCID SAA123
—ADEP FAJS
—ADES FADN
—EOBD 100303
—EOBT 1020
—CTOT 1035

Figure 3. IA-5 Illustration of ADEXP Message

3.1.3.1 IA-5 Message Field 1: Start of Message

The Start of Message / Start of heading is handled outside the scope of this ICD, but it is included for completeness.

3.1.3.2 IA-5 Message Field 2: Transmission Identification

The transmission identification field includes a prescribed sequence of characters intended to convey a specific keyboard (terminal) and a channel on which the terminal will communicate:

a) Transmitting-terminal letter
b) Receiving-terminal letter
c) Channel-identification letter
d) Channel-sequence number

For the purposes of this ICD, the transmission Identification for the local ATFM system will be XXXXX

3.1.3.3 IA-5 Message Field 3: Additional Service Indication

For the purposes of this ICD, the additional service indication field is the time of the transmission.

3.1.3.4 IA-5 Message Field 4: Priority Indicator

The priority indicator is a two (2)-letter identifier that provides context for the associated message. The following priority indicators are possible:

- FF – Standard Air Traffic Service (ATS) Message
- SS – Distress message

- DD – Urgent message
- GG – One of the following: ○
  Meteorological message
  - Flight Regularity Message
  - Aeronautical Information Services message
- KK – Aeronautical Administrative message.

For the purposes of this ICD, the ATFM messaging will only send FF messages.

3.1.3.5 IA-5 Message Field 5: Addressee of the Message

The addressee of the message is an eight-character code that is interpreted by the network to determine the routing location that the message will be sent.

When the number of addressees required is more than the operational system parameters allow, two or more transmissions of the message must be made. The eight (8)-letter combination addressee indicators are composed as follows:

- The four (4)-letter ICAO location indicator, as defined by *ICAO DOC 7910* (*Location Indicators*).
- A three (3)-letter designator for the facility type/office, or if no designator has been assigned, ZZZX for aircraft in flight, or YYYX for all other cases. The source of the facility designator is *ICAO DOC 8585, Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*.
- The eighth character of the address indicates the end system application and is determined by the Air Traffic Services Unit (ATSU).

3.1.3.6 IA-5 Message Field 6: Day / Time of the Message

The day/time field is the time the message is sent by a local ATFM System or filed for sending (for incoming messages). The field is a six (6)-digit date/time group that follows the format, DDHHMM in Coordinated Universal Time (UTC).

3.1.3.7 IA-5 Message Field 7: Originator of the Message

The originator of the message is an eight-character code of the ANSP, organization, and application which is sending the message. Similar to IA-5 Message Field 5, the originator address is constructed in three parts:

- The four (4)-letter ICAO location indicator, as defined by *ICAO DOC 7910* (*Location Indicators*).
- A three (3)-letter designator for the facility type/office, as defined by *ICAO DOC 8585, Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*.
- The eighth character of the address indicates the end system application and is determined by the ATSU.

3.1.3.8 IA-5 Message Field 8: Optional Heading Information

The optional heading information field is used for AIDC messages. It is rarely used for ICAO or ADEXP messages; therefore, it is not included in this ICD.

3.1.3.9 IA-5 Message Field 9: ATS Message Payload

See section 3.1.4 and section 3.2.

3.1.3.10 IA-5 Message Field 10: End of Message

The end of message field is a specific character sequence that is indicative of the end of the AFTN message. Similar to IA-5 message field 1, this is handled by the AFTN/AMHS gateway; therefore, it is not within the scope of this ICD.

3.1.4 Message Body (ATS Message Payload)

The message body—message type and data—follows the message header. The message body contains the message type and information used to identify the flight attributes as well as maintain an updated flight state. The message body may be different depending on whether it is defined by ICAO or ADEXP. The context of this ICD Is focused on multi-nodal operations, and therefore only ADEXP related messaging is included.

3.1.4.1 Messages defined by ADEXP

In contrast with messages defined by AIDC and ICAO, the message body for ADEXP messages does not begin with an open parenthesis. Instead, they begin with the hyphen "—", followed by a keyword (TITLE), and then the three (3)-letter indicator of the message type. Although there are several complexities related to simple and compound fields in ADEXP messages, for this ICD, the focus is limited to only simple fields.

Each field is delimited a by hyphen "–", and the data elements within each field are separated by '/' or spaces. The example shown in Figure 4 has been presented in a manner which makes it easy to read. This has been achieved through the use of carriage returns, line feeds, indents, etc. Such a layout does not form part of the ADEXP format rules; therefore, presentation of a message is at the discretion of the receiving system.

…

Figure 4. Overall structure of AFTN (ADEXP) message

Figure 5 is an example of a SAM message that follows the ADEXP structure:

—TITLE SAM
—ARCID SAA123
—ADEP FAJS
—ADES FADN
—EOBD 100303
—EOBT 1020
—CTOT 1035
—REGUL FAJS
—TAXITIME 0015
—REGCAUSE WA 84

Figure 5. SAM message using ADEXP structure

3.2 Functional Design Characteristics

This subsection describes the functional design characteristics of this interface and focuses on the AFTN messages that contain the information necessary to manage flight data for multi-nodal operations, or are related to the communication between a local ATFM system and AFTN. These messages are independent of the messaging system—AFTN or AMHS.

Every ATFN message contains a combination of identifying fields for uniqueness and specific flight data attributes for the flight. Table 2 shows the information contained in each field and which fields are sent with each message type from *ICAO Doc 4444 ATM/501* and includes all AFTN messages. Table 3 shows a similar table for those messages defined in ADEXP[3].

3 Table 3 indicates the messages, as defined by the ADEXP; however, the source of the table is actually the Air Traffic Flow & Capacity Management Operations *ATFCM Users Manual, edition 22.1*, dated 14 November 2018.

Table 2. Fields and corresponding flight information contained in each ICAO 4444 message type

DESIGNATOR / MESSAGE TYPE		1 Not currently used	2 Not currently used	3 Message type, number and reference data	4 Not currently used	5 Description of emergency	6 Not currently used	7 Aircraft identification and SSR mode and code	8 Flight rules and type of flight	9 Number and type of aircraft and wake turbulence category	10 Equipment	11 Not currently used	12 Not currently used	13 Departure aerodrome and time	14 Estimate data	15 Route	16 Destination aerodrome and total estimated elapsed time, alternate aerodrome(s)	17 Arrival aerodrome and time	18 Other information	19 Supplementary information	20 Alerting search and rescue information	21 Radio failure information	22 Amendment	FIELD TYPE NUMBERS
Alerting	ALR			3		5		(7)	8	(9)	10			(13)		(15)	(16)		(18)	(19)	(20)			Emergency messages
Radiocommunication failure	RCF			3				7														(21)		
Filed flight plan	FPL			3				7	8	(9)	10			(13)		(15)	(16)		(18)					Field flight plan messages and associated update messages
Delay	DLA			3				7						13			16		18					
Modification	CHG			3				7						13			16		18				(22)	
Flight plan cancellation	CNL			3				7						13			16		18					
Departure	DEP			3				7						13			16		18					
Arrival	ARR			3				7						13			16	17						
Current flight plan	CPL			3				7	8	(9)	10			(13)	14	(15)	(16)		(18)					Coordination messages
Estimate	EST			3				7						13	14		16							
Coordination	CDN			3				7						13			16						(22)	
Acceptance	ACP			3				7						13			16							
Logical acknowledgement	LAM			3																				

Table 3. Fields and corresponding flight information contained in each ADEXP message type

PRIMARY FIELD COMPOSITION OF TACTICAL ATFCM MESSAGES EXCHANGE (1)														
Message Field	SAM	SRM	SLC	SIP	FLS	DES	RRP	RRN	ERR	SMM	SPA	SRJ	FCM	RJT
-TITLE	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-IFPLID	1	1	1	1	1	1	1	1	(1)	(1)	(1)	(1)	(1)	(1)
-ADDR	(1)	(1)	(1)	(1)	(1)	(1)								
-ARCID	1	1	1	1	1	1	1	1	(1)	1	1	1	1	1
-ADEP	1	1	1	1	1	1	1	1	(1)	1	1	1	1	1
-EOBD	1	1	1	1	1	1	1	1	(1)	(1)	(1)	(1)	(1)	(1)
-EOBT	1	1	1	1	1	1	1	1	(1)	1	1	1	1	1
-IOBD	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
-IOBT	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
-CTOT	1			1			(1)	(1)		1				
-NEWCTOT		1		1			(1)	(1)			1			
-NEWPTOT							(1)	(1)						
-REJCTOT												1		
-REASON	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)					
-ADES	1	1	1	1	1	1	1	1	(1)	1	1	1	1	1
-REQUL	1<	1<		1<	0<								0<	
-ORGRTE							1	1						
-PTOT					(1)		(1)	(1)						
-NEWRTE							1	1						
-RRTEREF							(1)	1						(1)
-RVR	(1)	(1)			(1)								(1)	
-RESPBY				1	(1)		1	1						
-ORGMSG									(1)					
-FLTIM									1					
-ERRFIELD														
-MINLINEUP														
-COMMENT	0<	0<	0<	0<	0<	0<	0<	0<	0<					
-TAXITIME	1	1	1	1	1	1	1	1	(1)					
-REGCAUSE	1	1			(1)									
-OBTLIMIT - VALPERIOD							1	1						
-TTO	1	1												

'1' means: exactly one field of the specified type is required
'(1)' means: a single optional field of the specified type is allowed
a 'blank cell' means: this field is not in a message
'n<' means: n or more occurrences of this field can appear in a message

The messages needed to perform the slot management functionality are the SAM, SRM and SLC. Each message sent by the Local ATFM system to AFTN/AMHS or received by the local ATFM System from AFTN/AMHS is compliant with *ADEXP*. The table 3 above is for reference only, please refer to the table 4 below for the exact ADEXP fields to be sent in the respective SAM, SRM and SLC messages.

3.2.1 ADEXP ATS Message Payload –Message Fields

Table 4 provides an overview of the data that is contained in each field for the ADEXP messages defined in this document. The complete structure and the format of the information in each field can be found in the *EUROCONTROL Specification for ATS Data Exchange Presentation (ADEXP), version 3.2*.

Each ATFM message comprises a number of fields, some of which are mandatory and some of which are optional. This may vary from message to message. Specific requirements are given in this document according to the principles of the ADEXP Standard document already mentioned. All ATFM messages shall begin with the TITLE field. The order of other fields is optional.

The field IFPLID, the unique identifier assigned to a flight by EUROCONTROL's Integrated Initial Flight Plan Processing System (IFPS) (two (2) alphabetic characters followed by eight (8) digits, e.g. —IFPLID AA12345678), will be in all ADEXP messages issued by the Network Manager (NM). EUROCONTROL's Enhanced Tactical Flow Management System (ETFMS) will accept the IFPLID when provided in an incoming message in ADEXP format. Therefore, messages sent to NM may include the Individual Flight Plan (IFPLD). The field is optional and it is not used in any other system worldwide so the value can be anything such as AA00000000.

The M and O designation in Table 4 indicates mandatory or optional fields for the specific message; if the field is blank it is not used for the specific message.

Table 4. Flight data attributes associated with ADEXP message fields

ADEXP Field Name	Message & Example	SAM	SRM	SLC
TITLE	-TITLE SAM	M	M	M
ADDR	-BEGIN ADDR -FAC LLEVZPZX -FAC LFFFZQZX -END ADDR	O	O	O
ARCID	-ARCID AMC101	M	M	M
IFPLID	-IFPLID AA12345678	O	O	O
ADEP	-ADEP EGLL	M	M	M
ADES	-ADES LMML	M	M	M
EOBD	-EOBD 160224	M	M	M
EOBT	-EOBT 0950	M	M	M
IOBD	-IOBD 160224	O	O	O
IOBT	-IOBT 0950	O	O	O
CTOT	-CTOT 1030	M		
NEWCTOT	-NEWCTOT		M	
REGUL	-REGUL RMZ24M	O	O	O
TAXITIME	-TAXITIME 0020	M	M	M
REGCAUSE	-REGCAUSE CE 81	M	M	
REASON	-REASON	O	O	O
RVR	-RVR	O	O	O
COMMENT	-COMMENT	O	O	O

3.2.1.1 TITLE Field

The TITLE field is a three (3)-letter identifier of the message. The TITLE field always is first in the payload. The syntax required for this field is:

'-' "TITLE" titleid

3.2.1.2 ADDR Field

List field that requires BEGIN and END (i.e., -BEGIN ADDR and –END ADDR) as brackets around a listing of eight character addresses with subfields (e.g., -FAC CFMUTACT). The eight-character identifiers are the same as that which is identified for location identifiers in section 3.1.3.5. The syntax required for this field is:

'- "BEGIN" "ADDR" 1 { fac } '-' "END" "ADDR"

3.2.1.3 ARCID Field

The ARCID field is the registration marking of the aircraft, or the ICAO designator of the aircraft operator followed by the flight identifier. The syntax required for this field is:

'-' "ARCID" aircraftid

3.2.1.4 IFPLID Field

IFPS Identification. This is the unique flight plan identification which is issued by EUROCONTROL's Flight Planning System (IFPS). It is only available in flight plans that have been distributed in ADEXP format. The IFPLID is two (2) alphabetic characters followed eight (8) digits, e.g. —IFPLID AA12345678), and will be in all ADEXP messages issued by the NM. EUROCONTROL's ETFMS will accept the IFPLID when provided in an incoming message in ADEXP format. Therefore, messages sent to NM may include the IFPLD. The field is optional and it is not used in any other system worldwide, so for sending the message to any other ATFM system, the value can be anything such as AA00000000.

The Syntax required is:

'-' "IFPLID" 2{ALPHA}2 ! 8{ DIGIT }8

3.2.1.5 ADEP Field

ICAO indicator for Aerodrome of Departure. The syntax required is:

'-' "ADEP" (icaoaerodrome | 'AFIL' | 'ZZZZ')

3.2.1.6 ADES Field

ICAO indicator for Aerodrome of Destination. The syntax required is:

'-' "ADES" (icaoaerodrome | 'ZZZZ')

3.2.1.7 EOBD Field

Estimated Date of Flight. The format is YYMMDD (i.e., no century). The syntax required is:

'-' "EOBD" YYMMDD

3.2.1.8 EOBT Field

Estimated Off-Block Time. The syntax required is:

'-' "EOBT" hhmm

3.2.1.9 IOBD Field

Initial Off-Block Date. The format is YYMMDD (i.e., no century). The syntax required is:

'-' "IOBD" YYMMDD

3.2.1.10 IOBT Field

Initial Off-Block Time. The syntax required is:

'-' "IOBT" hhmm

3.2.1.11 CTOT Field

Calculated Take-Off Time. Importantly, the send or receipt of an SAM message (with a CTOT) is only done at approximately two hours before EOBT. This relative delivery time will allow the ATFM systems to determine whether the CTOT is intended for the current day or next day. Specifically, if the CTOT will be late enough in the day relative to current time that it actually is for the next day, the ATFM systems can assume it is the next day and use the EOBD to determine the correct day of flight. The syntax required is:

'-' "CTOT" hhmm

3.2.1.12 NEWCTOT Field

A new Calculated Take-Off Time, as updated by an ATFM system. Importantly, the send or receipt of an SRM message (with a NEWCTOT) is only done at approximately two hours before EOBT. This relative delivery time will allow the ATFM systems to determine whether the NEWCTOT is intended for the current day or the next day. Specifically, if the NEWCTOT will be late enough in the day relative to current time that it actually is for the next day, the ATFM systems can assume it is the next day and use the EOBD to determine the correct day of flight. The syntax required is:

'-' "NEWCTOT" hhmm

3.2.1.13 REGUL Field

The —REGUL field indicates the name of the ATFM Measure affecting the flight. Several — REGUL fields may be present, the first one being the ATFM Measures field that controls the flight. The syntax required is:

'-' "REGUL" regulid

3.2.1.14 TAXITIME Field

The difference in time between the 'off blocks time' and the 'take-off time'. The times referred to could be actual or estimated depending upon the context. The syntax required is:

'-' "TAXITIME" hhmm

3.2.1.15 REGCAUSE Field

In order to provide more specific nomenclature for delay causes and, at the same time, to assist the post-flight analysis, the ADEXP field —REGCAUSE comprises:

a) ATFM Measure cause code (one (1)-letter code corresponding to the cause assigned by the Flow Management Position [FMP] upon the implementation of the ATFM measure).
b) ATFM Measure Location code—one (1)-letter code: D, E or A, describing the phase of the flight (Departure, Enroute, and Arrival) of the constraint that triggered the ATFM Measure.
c) A space.
d) The IATA Delay Code in numeric (e.g., 81, 82, 83, 89) or 00 when no IATA Code available.
    - The following codes comprise the list of Air Traffic Control (ATC) delay codes. There are other codes related to airline operations that are not applicable to this ICD and are therefore omitted. The codes are as follows:
        i. 81 (AT) ATFM due to ATC EN-ROUTE DEMAND/CAPACITY, standard demand/capacity problems
        ii. 82 (AX) ATFM due to ATC STAFF/EQUIPMENT EN-ROUTE, reduced capacity caused by industrial action or staff shortage, equipment failure, military exercise, or extraordinary demand due to capacity reduction in neighboring area
        iii. 83 (AE) ATFM due to RESTRICTION AT DESTINATION AIRPORT, airport and/or runway closed due to obstruction, industrial action, staff shortage, political unrest, noise abatement, night curfew, special flights
        iv. 84 (AW) ATFM due to WEATHER AT DESTINATION
        v. 85 (AS): Mandatory security
        vi. 86 (AG): Immigration, Customs, Health
        vii. 87 (AF): Airport Facilities, parking stands, ramp congestion, buildings, gate limitations
        viii. 88 (AD): Restrictions at airport of destination, airport/runway closed due obstruction, industrial action, staff shortage, political unrest, noise abatement, night curfew, special flights
        ix. 89 (AM): Restrictions at airport of departure, airport/runway closed due obstruction, industrial action, staff shortage, political unrest, noise abatement, night curfew, special flights, start-up and pushback, ...

The —REGCAUSE appears in the SAM and SRM messages, and is associated only with the controlling ATFM Measure. The code appearing in the message is the code valid at the time the delay was given to the flight.

The syntax required is:

'-' "REGCAUSE" regulationreasoncode locationccode ” “ IATAdelaycode

3.2.1.16 REASON Field

Reason to explain an action by the FMP (e.g. rejection, cancellation, etc.). The syntax required is:

'-' "REASON" 4{ALPHA}12

3.2.1.17 RVR Field

Runway Visual Range. The syntax required is:

'-' "RVR" 1{ DIGIT }3

3.2.1.18 COMMENT Field

This field provides additional information. The syntax required is:

'-' "COMMENT" 1 { LIM_CHAR }

3.2.1.19 REFDATA field

This is reference data for the message being transmitted that collectively defines the unique message number. This field has three subfields, namely the sender subfield, the receiver (recvr) subfield, and the sequence number (seqnum) subfield. The sender subfield indicates the eight (8)-letter facility address of the sending facility; the receiver subfield indicates the eight (8)-letter facility address to which the message is being sent; and the sequence number subfield indicates the three (3)-digit serial number of the message being sent.

The message sequence number progresses sequentially from 001 to 000 (representing 1000), thence repeats from 001, for all messages sent to the same addressee, regardless of the type of message.

The three (3)-digit sequence number, the sender and receiver address, creates a unique combination used as the reference data. This is the equivalent of Field type 3, element (b) called ‘message number’ in *ICAO Doc 4444*.

The syntax required is:

'-' "REFDATA"

'-' "SENDER" '-' "FAC" 1{ LIM_CHAR }30

'-' "RECVR" '-' "FAC" 1{ LIM_CHAR }30

'-' "SEQNUM" 3{DIGIT}3

3.2.1.20 MSGREF field

Reference data for associated, previously transmitted messages. This field has three subfields, namely the sender subfield, the receiver (recvr) subfield and the sequence number (seqnum) subfield. Together the MSGREF field is intended to provide the necessary reference context

for a message being sent. The sender subfield indicates the eight (8)-letter facility address that sent the original message; the receiver subfield indicates the eight (8)-letter facility address to which the original message was sent; and the sequence number subfield indicates the three (3)-digit serial number of the original message sent.

This is the equivalent of Field type 3, element (c) called 'reference data' in *ICAO Doc 4444.*

The values of Sub-fields "sender", "recvr", and "seqnum", within Primary field "msgref", shall be those of the same Sub-fields within Primary field "refdata" of the OLDI message referred to

'-' "MSGREF"

'-' "SENDER" '-' "FAC" 1{ LIM_CHAR }30

'-' "RECVR" '-' "FAC" 1{ LIM_CHAR }30

'-' "SEQNUM" 3{DIGIT}3

3.2.2 ADEXP ATS Message Payload Types

3.2.2.1 SAM Message Composition

An SAM is sent by the local ATFM System any time a flight is assigned a CTOT. The SAM is used to inform of the Calculated Take-Off Time (CTOT) for each individual flight. The SAM is to be sent approximately 2 hours before EOBT. The construct shown is inclusive of only the mandatory messages.

TITLE	**SAM**
ARCID	**Aircraft ID**
IFPLID	**TBD value**
ADEP	**Departure Airport**
ADES	**Arrival Airport**
EOBD	**Estimated Off Block Day**
EOBT	**Estimated Off Block Time**
CTOT	**Calculated Take-Off Time**
TAXITIME	**Estimated Taxi Time**
REGCAUSE	**ATFM Measure Cause Code**

3.2.2.2 SRM Message Composition

An SRM is sent by an ATFM system any time a flight that has already received an SAM message, is assigned a revised CTOT. The SRM is used to inform of the new Calculated Take-Off Time (CTOT) for each individual flight. Since the goal is to send the original CTOT (via SAM) approximately 2 hours before EOBT, the SRM should not be sent until after the SAM has been acknowledged, + a short interval of time (e.g., 5 minutes). That way, the SAM will always be the first message sent with a CTOT, and SRM messages are suppressed until the CTOT is sent. All revisions to the CTOT should be sent via SRM. The construct shown is inclusive of only the mandatory messages.

TITLE	**SRM**
ARCID	**Aircraft ID**
IFPLID	**TBD value**
ADEP	**Departure Airport**
ADES	**Arrival Airport**
EOBD	**Estimated Off Block Day**
EOBT	**Estimated Off Block Time**
NEWCTOT	**New Calc Take-Off Time**
TAXITIME	**Estimated Taxi Time**
REGCAUSE	**ATFM Measure Cause Code**

3.2.2.3 SLC Message Composition

An SLC is sent by an ATFM system any time a flight is no longer assigned a CTOT. The SLC is used to inform that the previously assigned Calculated Take-Off Time (CTOT) no longer applies for an individual flight. The construct shown is inclusive of only the mandatory messages.

TITLE	**SLC**
ARCID	**Aircraft ID**
IFPLID	**TBD value**
ADEP	**Departure Airport**
ADES	**Arrival Airport**
EOBD	**Estimated Off Block Day**
EOBT	**Estimated Off Block Time**
TAXITIME	**Estimated Taxi Time**

3.2.3 Message Summary Table

Table 5 provides a summary of the message including the ID, message title, whether it is required, and the message flow direction.

Table 5. Message Summary

ID	Message Title	Message Direction
SAM	Slot Allocation Message	Local AFTN System ↔ AFTN
SRM	Slot Revision Message	Local AFTN System ↔ AFTN
SLC	Slot Cancellation Message	Local AFTN System ↔ AFTN

3.2.4 Protocol Implementation

TBD – dependent on specific site implementation

3.2.5 Security

This is a direct connection between AFTN / AMHS and the local ATFM system through a cable connection and after the data is ingested into local ATFM System, the interface is controlled explicitly via firewall rules and precise protocols.

3.3 Physical Design Characteristics

TBD – dependent on specific site implementation

3.3.1 Electrical Power and Electronic Characteristics

3.3.1.1 Connectors

TBD – dependent on specific site implementation

3.3.1.2 Wire/Cable

TBD – dependent on specific site implementation

3.3.1.3 Electrical Power/Grounding

TBD – dependent on specific site implementation

3.3.1.4 Fasteners

TBD – dependent on specific site implementation

3.3.1.5 Electromagnetic Compatibility

Not applicable.