

smartFPL2012 Converter

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Manila, November 2011

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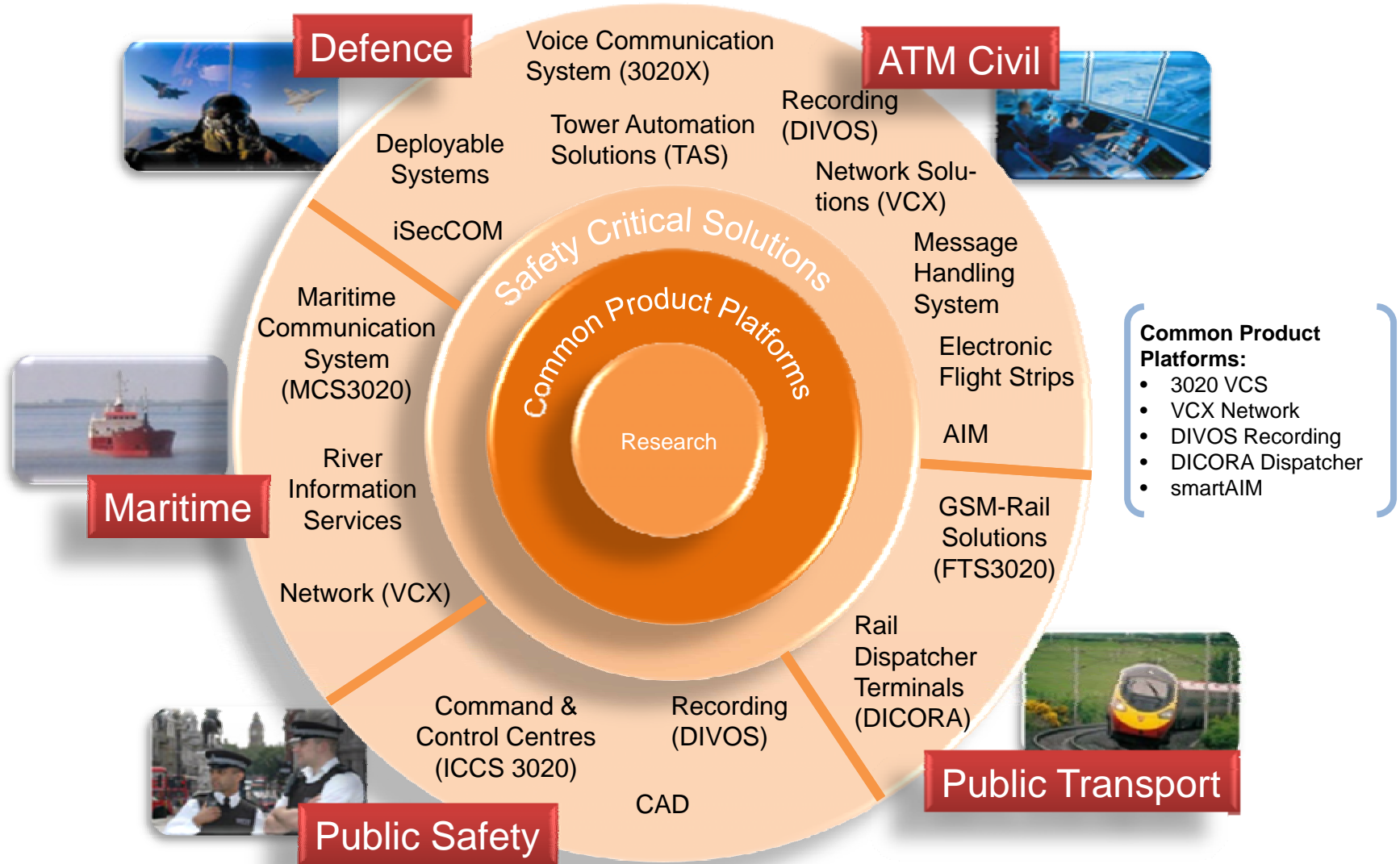
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Background

- ICAO has introduced changes to the format for flight plan and associated ATS messages in Amendment 1 to the Procedures for Air Navigation Services — Air Traffic Management, Fifteenth Edition (PANS-ATM, Doc 4444).
- The changes in this amendment will be effective on November 15, 2012.
- Some ANSPs have ATM Systems (i.e. FDPS) that will not be upgraded on-time to meet the FPL 2012 format (NEW Format)
- These ANSPs will need to implement an FPL2012 Converter

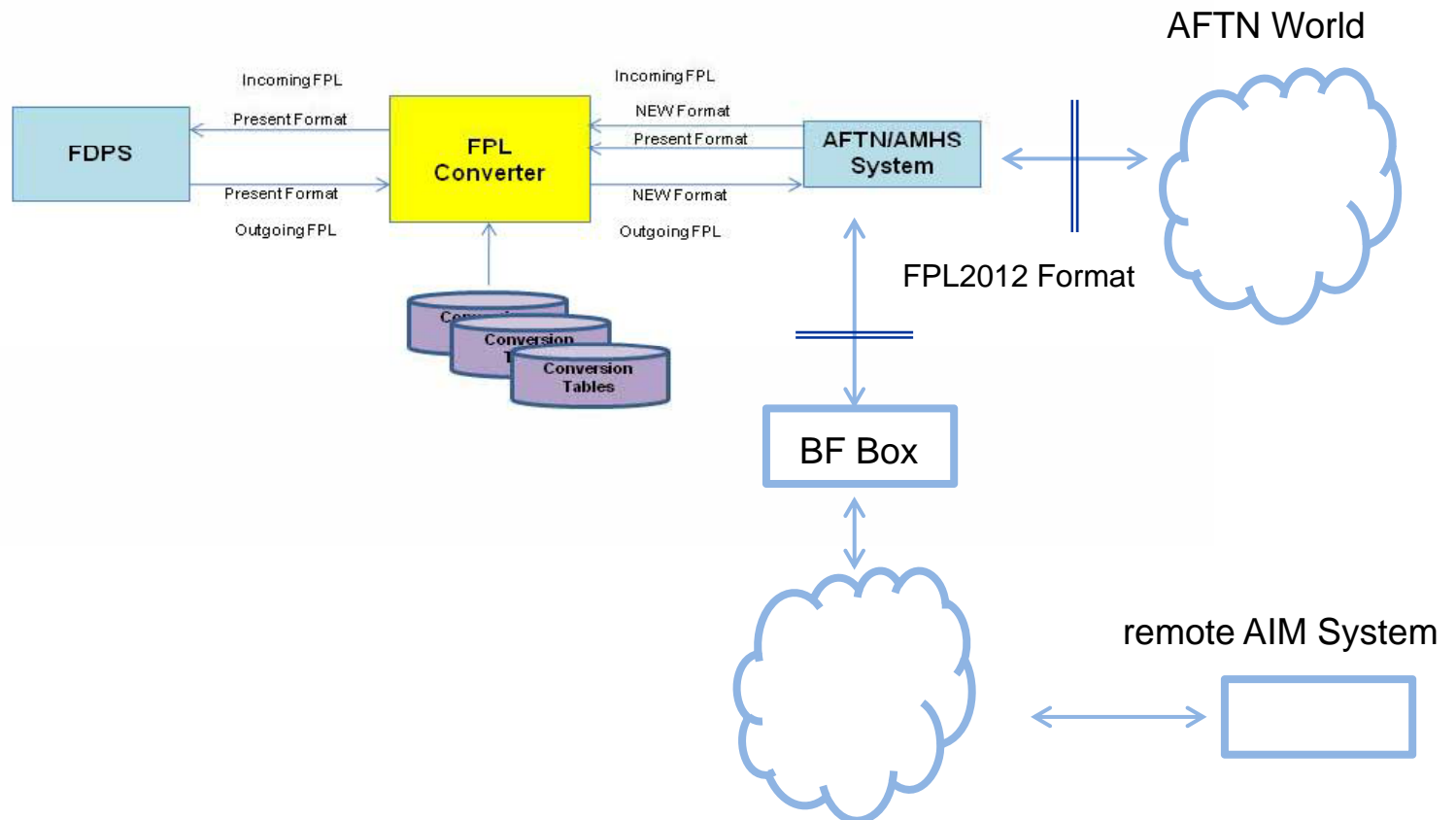


Frequentis Solution: smartFPL2012 Converter

- Provides the ability to allow legacy systems to remain unchanged.
- If there is no functional justification for upgrading legacy systems to the 2012 format, this product provides the ability to convert between the message formats
- Provides bi-directional conversion between the PRESENT and 2012 (NEW) formats.
- Provides the ability to hold messages for distribution 24 hours prior to the Estimated Of Block Time (EOBT) in the flight plan message.
- Installed between an AFTN/AMHS System and ATM System (ie. FDPS)
- Can be hosted on the same computer servers as the AFTN/AMHS system or on separate set of servers (Hot Standby configuration).
- The interface between the converter and the ATM System can be based on the standard AFTN over asynchronous protocol as defined in ICAO Annex 10 or a TCP/IP based connection.



smartFPL2012 Converter





Changes to FPL Format

→ Field 10: Equipment and Capacity

- The equipment field is being changed and it can be significantly longer than it is now.

→ Field 13

- The EOBT has been added to field 13 for ATS messages arrival (ARR), change (CHG) and cancel (CNL).

→ Field 15

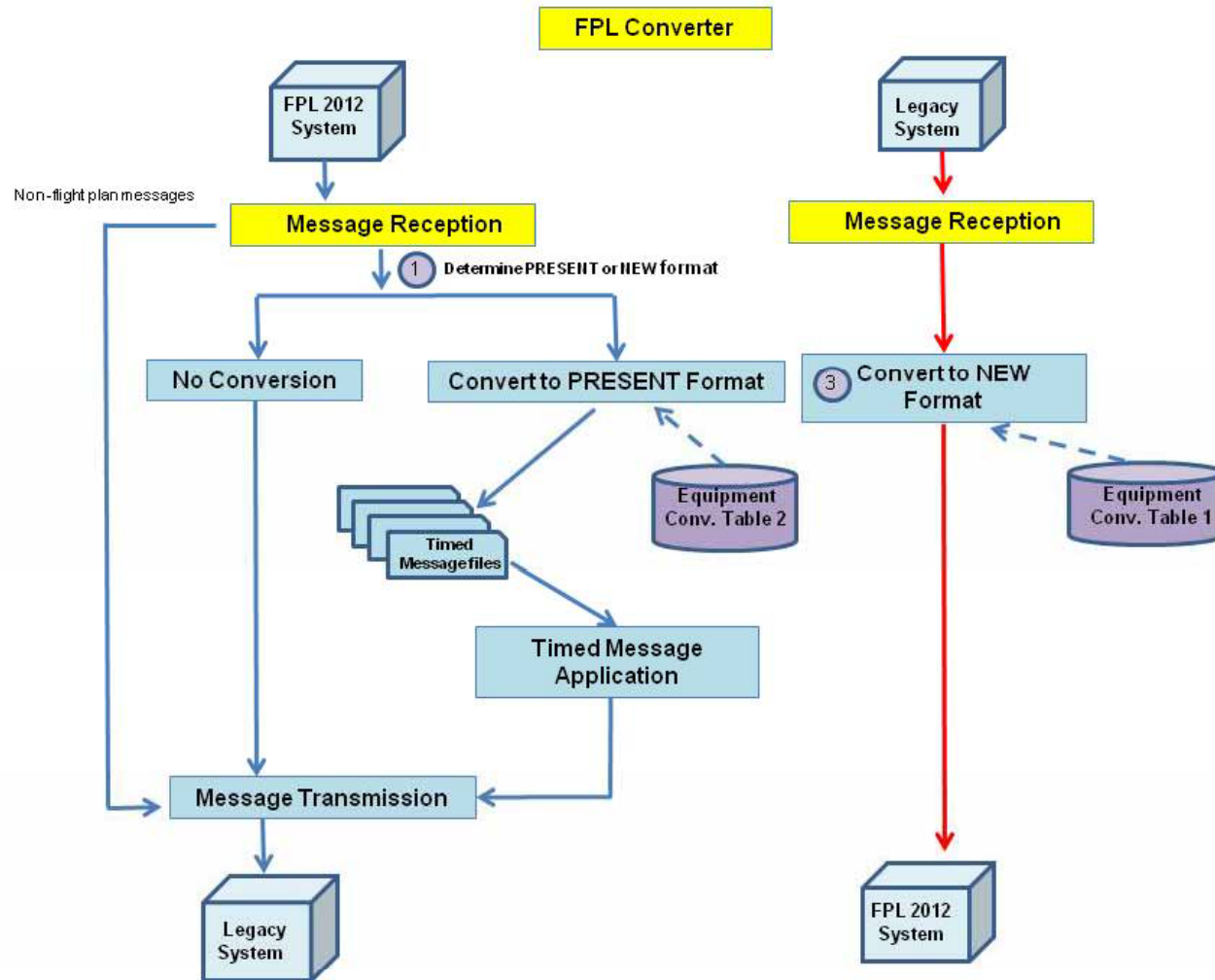
- The bearing and distance from a navaid can now be applied to any significant point, such as a waypoint. This has typically already been in use so no conversion is done for field 15.

→ Field 18

- Field 18 is required in all flight plans and ATS messages (except ARR) whose EOBT is more than 24 hours from the current time.



Functional Description





Message Reception From the AFTN/AMHS

- Upon receipt of a message from the AFTN/AMHS System, the smartFPLConverter checks the type of the message and forwards messages that are not related to flight planning directly to the FDPS.
- Flight Plans and ATS messages (CHG, DLA, CNL, DEP, ARR) that are in the NEW 2012 format are converted to the PRESENT format.
- Messages converted to the PRESENT format are held on the converter until a 24 hours prior to the EOBT on the Date of Flight (DOF). At this time they are transmitted to the FDPS.
- Messages received from the AFTN/AMHS System that are already in the PRESENT format are sent directly to the FDPS.



Conversion from NEW to PRESENT Format

- The NEW format allow messages to be distributed up to 120 hours prior to flight time.
 - Flight plans messages are held on the smartConverter until 24 (configurable) hours prior to the EOBT.
 - ATS messages are also held on the smartConverter until 24 hours (configurable) prior to the EOBT. If EOBT is not present, the messages are held until the start of the Day Of Flight (DOF).

- A table-driven model is used for the conversion. It allows for values to be saved in the RMK/ section of item 18 in order to avoid the loss of any non-convertible data. I.e., the NEW format has many more values that do not have any representation in the PRESENT format. Thus, this feature can be used to ensure that all equipment fields are presented.



Conversion from NEW to PRESENT Format (continued)

- Conversion between NEW and PRESENT equipment codes utilizes a table that provides information about the value to insert into item 10a and the item 18 value to be inserted.
- Example table that follows Asia/Pacific Guidelines:

NEW 10a	NEW 18 indicator	NEW 18 Value	PRESENT 10a	PRESENT 18 Value
*				
R	PBN	B1	R	NAV/RNAV5 B1
R	PBN	B2	R	NAV/RNAV5 B2

- If 10a contains ‘*’, it means that item 18 will have the entire field 10 copied into the RMK portion of item 18. This ensures that all information is passed onwards.
- if 10a contains ‘R’ and item 18 has PBN/B1, PRESENT 10a=‘R’, item 18 has NAV/RNAV5 B1.
- if 10a contains ‘R’ and item 18 has PBN/B2, PRESENT 10a=‘R’, item 18 has NAV/RNAV5 B2.



Conversion from NEW to PRESENT Format (continued)

→ Example table that follows CFMU Guidelines:

NEW 10a	NEW 18 indicator	NEW 18 Value	PRESENT 10a	PRESENT 18 Value
R	PBN	B1	R	NAV/B1 RMK/RNAV5
R	PBN	B2	R	NAV/B2 RMK/RNAV5

- **Item 18 has NAV/B1 RMK/RNAV5**
 - **Item 18 has NAV/B2 RMK/RNAV5**
- The conversion table provides an indicator that allows the entire item 10 to be appended to the RMK/ field of item 18. This assures that there is no loss of equipment information. This feature is configurable, remove the line with the ‘*’ and this only the table translations will be used.
- The Table 10b conversion table holds the translation between field 10b and the first character of 10b. The 2nd character of 10b is set to ‘D’ if the characters E, L, B1, B2, U1, U2, V1, V2, D1, G1 are found in field 10b.
- Item 18 is modified to remove the keyword pairs that are not supported in the PRESENT format. These include: PBN/, SUR/ and DLE/.



Conversion from NEW to PRESENT Format (continued)

→No indicators within item 18 will be repeated. Thus, there is only one occurrence of NAV/ or COM/ or RMK/ etc. within item 18:

–This means that if item 18 already has a NAV/ field, the addition of a second NAV/ field will not add the NAV/ a second time, but will add the data after the NAV/ to the already existing NAV/ field. For instance, item 18 already contains NAV/XXXX. Item 18 contains PBN/B1. The converted item 18 field will have “NAV/XXXX RNAV5 B1” and not “NAV/XXXX NAV/RNAV5 B1”.

→No values within item 18 fields are repeated. Thus, there is only one occurrence of RNAV5 within NAV/.

–If both B1 and B2 are present such that the PBN/ field in item 18 appears as “PBN/B1B2”, item 18 will have “NAV/RNAV5 B1 B2” and not “NAV/RNAV5 B1 RNAV5 B2”.



Message Reception From the FDPS

- All flight plans and ATS messages are converted to the NEW 2012 format and forwarded directly to the AFTN/AMHS System
- A table-driven model is used for the conversion. It allows for values to be saved in the RMK/ section of item 18 in order to avoid the loss of any non-converted data.



Conversion from PRESENT to NEW Format

- The conversion between the equipment code for the PRESENT and the NEW formats utilizes a table that provides information about values to match between item 10a and item 18, as well as values to insert into item 10a and item 18. Both the equipment code and the Name/Value pairs in item 18 must match in order to insert the values specified.

10a	18 indicator	18 Value	New 10a	New 18 Indicator	New 18 Value
Z	NAV	GBAS	A		
G	NAV	*	G	NAV	\$value

- if item 10a contains 'Z' and item 18 contains NAV/GBAS, NEW item 10a receives an 'A' and NAV/GBAS is deleted
- if item 10a contains 'G' and any value after NAV/, item 10 receives a 'G' and item 18 receives NAV/value (whatever the value was).
- No indicators within item 18 are repeated.
- No values within item 18 fields are repeated.



Conversion from PRESENT to NEW Format (continued)

- The conversion table provides an indicator (“*”) that allows the entire item 10 to be appended to the RMK/ field of item 18. This is configurable.
- The FPL Converter will not take any action on the bearing and distance item 15.
- Item 18 must be reorganized into the Keyword order specified by Amendment 1.



System Configuration (GUI)

- Configuration of Connections
- Configuration of Equipment tables

- smartFPL2012 Converter provides a comprehensive administrative GUI



Configuration of Connections

Modify STF connection

Type: TCP_MSG_CNX Name: STF

Description	STF	InterProcess Queue	STF_ipq
Shared Interface	Primary only	No Activity Timeout	0
Binary msg capability	NO	Host name(s) host1: host2	PCLAKE1:PCLAKE2
Input Queue	ROUTE	Output_CID	TSF
Controlling pid	0	Code Format	ISO8859-1
Connection option	MASTER	Service Address	
Port Id	0	EOM	ETX
Heartbeat interval (10's of seconds)	0	Supplemental Info	%D%H%M
Input_CID	STF	Alignment Function fix	INPUT
Message Type	AFTN	MAX WMO output msg size	-1
Service Handle	MANJAL	# Stuck Tape Chars	70
SOM	SOH	Output Text Length	1800
Transmission Line	I/O	Idle Reversals Count	20
Max Sequence	999	Error Correct	YES
Alignment Function fmt	<cr><lf>	Midnight Check	NO
Max Line Length	69	Responsibility Check	OUTPUT
Input Message Length	2100	Com Control Info	
Overlength	OUTPUT	Retry to connect timer	20
QTA Cancel	YES	Monitor Destination	
Channel Check	I/O	Connection ACK Support	NO
Priority Alarm	NO	Template Support	NO
Send Hourly LRLS	NO	Output Sequence	1
Busy Timeout time	20	Automatic re-route	NO
Output Destination Queue	TSF	Test Message File	ICAO.tstm
Connection Mode	FDX	Output suffix	
Connection Retransmit	NO		
Input Sequence	998		
Auto restart time	0		
Only ICAO svc messages	YES		
Output prefix			

OK Cancel



Conclusion

- Frequentis offers an alternative to ANSPs and CAAs allowing them to avoid expensive upgrades of their current ATM systems to support the new FPL 2012 Flight Plan format.
- Interface with any AFTN/AMHS systems available in the market
- Can be configured with Single or dual (redundant) computer servers deployment
- Supports fully automated conversion without need for operator intervention
- Comes with modern Graphical User Interface for system configuration



Summary

- smartFPL2012 Converter will be available for the market from 12/2011

- Price will be given on request

- Product Description available

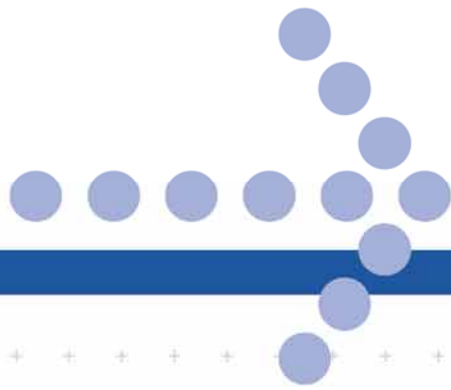
- Each project has a specific design review phase as different ANSPs use different types of AFTN or FDP/AIS systems and the used protocols also range from TCP/IP to X.25

- Implementation for a specific customer takes some weeks



If you are interested

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Thank you for your interest!



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Product Description

smartFPL2012 Converter

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History Chart

Version	Date	Changed Page(s)	Cause of Change	Implemented
1.0	2011-08-30	New Document		Kym Shenton
1.1	2011-10-19	All sections		Kym Shenton

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1. Introduction

1.1. Purpose and Scope

Amendment 1 of ICAO Doc 4444 specifies changes that are required for flight plan and ATS messages by November of 2012. The Frequentis smartFPL2012 Converter provides the ability to allow legacy systems to remain unchanged. If there is no functional justification for upgrading to the 2012 format, this product will provide the ability to both convert between the message formats and to hold messages for distribution within 24 hours prior to the EOBT in the flight plan message.

The purpose of this document is to provide a description of the smartFPL2012 Converter. This document describes only those areas of flight plan management that are relevant to the 2012 changes.

1.2. Reference Documents

This document was produced using the information contained in the following documents:

- AMENDMENT NO. 1 TO THE PROCEDURES FOR AIR NAVIGATION SERVICES (Doc 4444)
- CFMU INTERFACE MANUAL FOR ICAO 2012
- ICAO ANNEX 10

2. Summary of 2012 Changes

The flight plan changes for 2012 are intended to support new technologies in navigation and surveillance as well as providing support for the distribution of flight plans up to 120 hours prior to EOBT. This includes the introduction of the DOF (Date Of Flight) in field 18 for ATS messages.

2.1. Changes to field 10, equipment and capability

The equipment field is being changed and it can be significantly longer than it is now.

Currently, the format of field 10 of the flight plan form is as follows:

- 1) 10a: 1 character text field for the first letter (S, N, or blank)
- 2) 10a: longer text field for the operator to put in equipment information (25 characters).
- 3) a '/' character
- 4) 10b: followed by a single character (N,A,C,X,P,I,S)
- 5) 10b: an optional character D

The 2012 changes are described below:

Field 10A consists of 1 and 2 above. It can now be up to 64 characters in length containing all possible values. There are also 2 character groups rather than just 1 character designators.

Values: "N" or
 1 or more of the character(s):
 ABCD E1 E2 E3 FGHI J1 J2 J3 J4 J5 J6 J7 KL M1 M2 M3 O P1 P2 P3

P4 P5 P6 P7 P8 P9 RSTUWXYZ

10B consists of 4 and 5 above, which is currently 2 characters in length. The 2012 changes allow this field to be up to 20 characters.

Values: "N" or

One or more of the following descriptors, to a maximum of 20 characters:

A, C, E, H, I, L, P, S, X and

one or more of the following groups: B1, B2, U1, U2, V1, V2, D1, G1

2.2. Changes to Field 13

The EOBT has also been added to field 13 for ATS ARR, CHG and CNL messages. This field is already present for DLA and DEP ATS Messages, but it serves a different purpose.

2.3. Changes to Field 15

The bearing and distance from a navaid can now be applied to any significant point, such as a waypoint. Since this is a rare and many Flight Data Processing Systems already handle this, no action will be taken when this field is detected. It could be handled by reconvertng to a waypoint defined as a latitude and longitude. However, this requires a table of all waypoint names and geographical coordinates of each. This is considered out of scope of the 2012 converter.

2.4. Changes to field 18

Field 18 is required in all flight plans and ATS messages (except ARR) whose EOBT is more than 24 hours from the current time. The DOF/ddhhmm specifies the Date Of Flight for any flight plan or ATS message that is more than 24 hours but less than 120 hours. If an ATS messages does not have a DOF, then field 18 will be present but empty, showing only "-0)".

The syntax for Field 18 is:

```
[ "0" ] | [ 1{ "STS/" | "PBN/" | "EUR/" | "NAV/" | "COM/" | "DAT/" | "SUR/" | "DEP/" |
"DEST/" | "DOF/" | "REG/" | "EET/" | "SEL/" | "TYP/" | "CODE/" | "RVR/" | "DLE/" |
"OPR/" | "ORGN/" | "PER/" | "ALTN/" | "RALT/" | "TALT/" | "RIF/" | "RMK/" |
"STAYINFOn/" | "RFP/" } ]
```

The fields are ordered as listed above. Any duplicate entries are grouped under one element name with the values added separated by a space.

3. Flight Plan Converter

The smartFPL2012 Converter is a stand-alone product that would be logically placed between the AFTN/AMHS System and a Flight Data Processing System as shown by the following diagram.

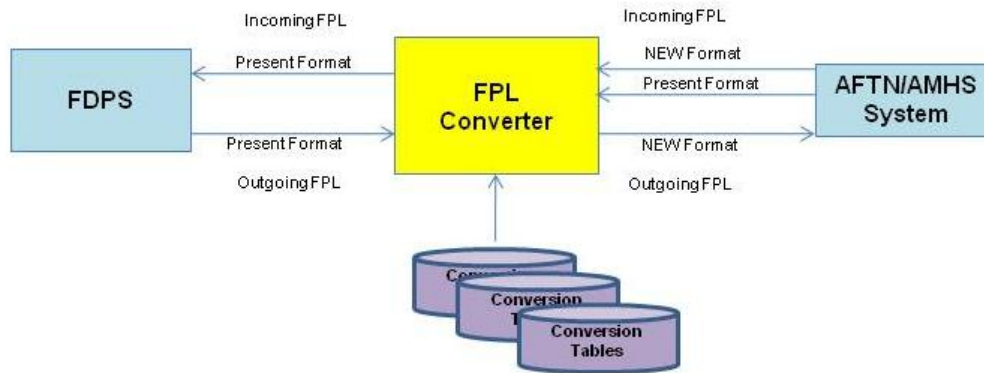


Figure 1 Converter Basic Configuration

In normal operations, the AFTN/AMHS receives all flight plans and ATS messages. These **incoming** FPLs are forwarded to the Flight Data Processing System (FDPS). The FDPS also sends **outgoing** FPLs for active flights to local and international destinations to the AFTN/AMHS. After November 11, 2012, the AFTN/AMHS will receive and forward FPLs that will include the changes defined in Amendment 1, referred to as the “NEW” 2012 Format.

This diagram shows that there can be two types of inputs from the AFTN/AMHS, both 2012 format and the PRESENT format. This is to allow all flight plans, new or PRESENT format, to be sent to the FDPS via the smartFPL2012 Converter. The PRESENT format is simply passed through without conversion.

3.1. Message Reception

The AFTN/AMHS sends all messages intended for the FDPS to the smartFPL2012 Converter. If a message received is not an AFTN message or it is not an FPL or ATS message, it is forwarded directly to the output queue for transfer to the FDPS. Otherwise, the type of the message needs to be determined. If the message is of the PRESENT format, it is forwarded to the FDPS without change. If it is of the NEW format, it is converted to the PRESENT format and held until it is within 24 hours of the EOBT and DOF. At that point, the message is transmitted to the FDPS.

The FDPS sends all flight plans and ATS messages intended for the AFTN/AMHS to the smartFPL2012 Converter to be converted to the NEW format.

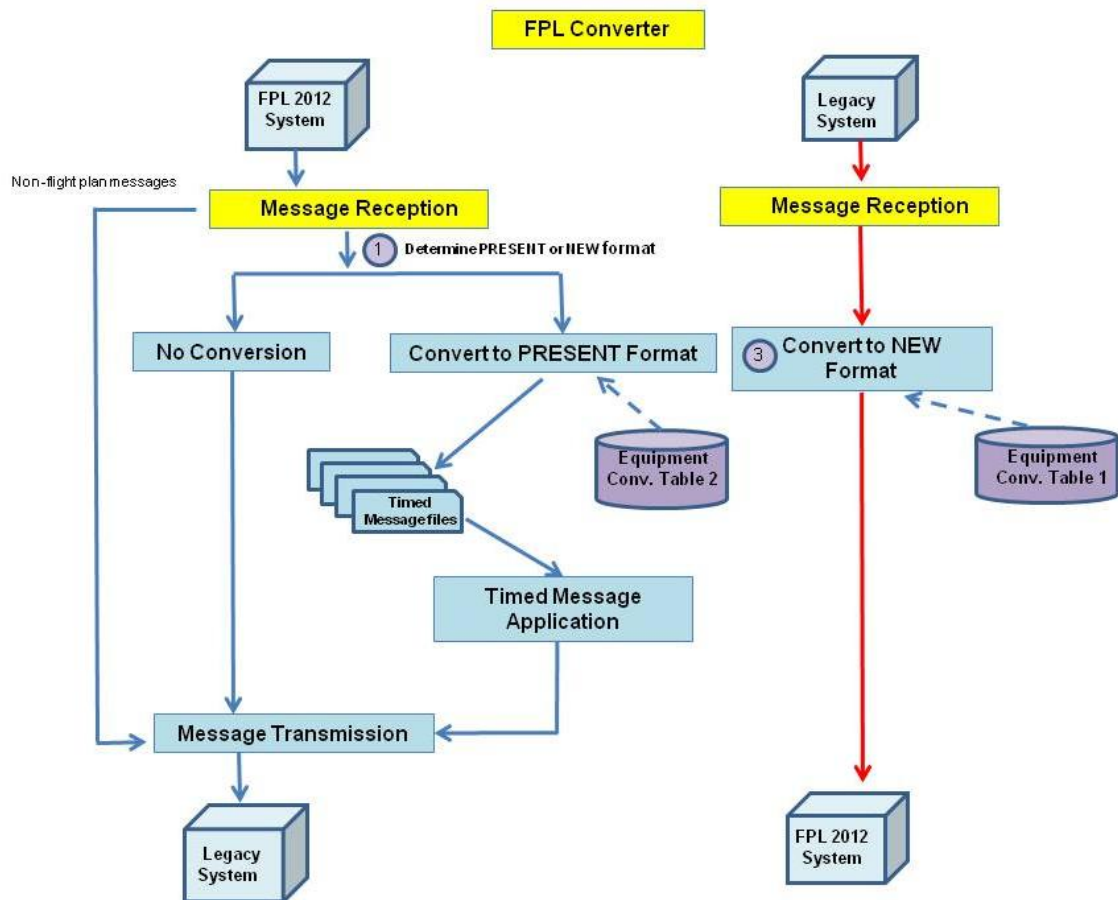


Figure 2 Functional Diagram

3.2. Conversion from 2012 to PRESENT Format

If the message requires conversion from the NEW format to the PRESENT format, the converter processes the message and builds a PRESENT Format message. This message is then held in a file until it is within 24 hours of its EOBT. Since 2012 changes now allow messages to be distributed up to 120 hours prior to flight time, the flight plans need to be held on the Converter until they are within 24 hours of their EOBT. This also applies to the associated ATS (DLA, DEP, CNL, ARR, CHG) messages.

3.2.1. Conversion of Equipment Codes in Field 10

Since there are many more equipment codes available in the 2012 format, the conversion to the PRESENT format is mostly either a replacement of one value for another or the elimination of the code. A table is used to determine the action to take for each code. The table essentially contains the following information:

Equipment Code Conversion to Old Format		
Equipment Code	Changed Value	Add to Field 18 (Keyword/Value)

If required, the original 2012 equipment field can be inserted into field 18 as either a new RMK/ field or appended to an existing RMK/ field.

3.2.2. Conversion of Field 18

Field 18 will be modified to remove the keyword pairs that are not supported in the previous format. These include: PBN/, SUR/ and DLE/.

3.3. Conversion from PRESENT Format to 2012 Format

If the message received by the FPL Conversion module requires conversion from the PRESENT format to the 2012 format, the converter processes the message and builds a 2012 formatted message. This message is then forwarded to the output queue for transmission to the MHS.

3.3.1. Conversion of Equipment Codes in Field 10

The conversion between the equipment code for the old and the new formats utilizes a table that provides information about the value to insert into Field 10. Both the equipment code and the Name/Value pair in Field 18 must match in order to insert the value into Field 10.

Equipment Code Conversion to 2012 Format		
Equipment Code	Field 18 Name/Value	Value to Insert into Field 10

3.3.2. Handling Field 15

As stated in section 2.3, the FPL Converter will not take any action on the bearing and distance field because it is considered to be rare. If required, an error can be optionally set so that the field can be modified by the operator.

3.3.3. Conversion of Field 18

Field 18 must be reorganized into the Keyword order specified by Amendment 1.

This is as follows:

STS/, PBN/, NAV/, COM/, DAT/, SUR/, DEP/, DEST/, DOF/, REG/, EET/, SEL/, TYP/, CODE/, DLE/, OPE/, ORGN/, PER/, ALTN/, RALT/, TALT/, RIF/, RMK/

3.4. No Conversion

On receipt of a flight plan that matches the type requested for conversion, no conversion is done and the message is passed on to the FDPS transmission queue. Also, any message that is not a flight plan or ATS message is passed through to the transmission queue as well. This feature allows the FDPS to receive OPMET data that might be useful to that system.

4. Configuration Options

The smartFPL2012 Converter can be configured as a stand-alone product as described in section 3.

An alternative to a stand-alone configuration is an embedded solution in which the smartFPL2012 runs on the Frequentis smartMessenger AFTN/AMHS system. In this situation, the AFTN Routing service would be provided by smartMessenger. The

performance would improve because there would not be required the transport of data to another machine for processing and the result being routed again to the appropriate destination. All of this processing would be done by smartMessenger.

The smartFPL2012 Converter is available in single or dual (Redundant) computer servers. When configured in dual computer servers, the system is configured in primary-hot standby operation.

5. External Interfaces

The smartFPL2012 Converter supports the connection with the FDPS using the AFTN message format over asynchronous lines as defined in the ICAO Annex 10. Alternatively, the System supports the connection with the FDPS using the AFTN message format over TCP/IP LAN/ WAN in accordance with Frequentis TCP/IP ICD.

6. System Management

The smartFPL2012 Converter comes with a System Management client application including a modern user interface to configure the connections and the conversion tables used by the converter.

The following screen capture shows the window from the System Management application for configuring a connection.

Modify STF connection
✖

Type: TCP_MSG_CNK
Name: STF

<p>Description <input type="text" value="STF"/></p> <p>Shared Interface <input type="text" value="Primary only"/></p> <p>Binary msg capability <input type="text" value="NO"/></p> <p>Input Queue <input type="text" value="ROUTE"/></p> <p>Controlling pid <input type="text" value="0"/></p> <p>Connection option <input type="text" value="MASTER"/></p> <p>Port Id <input type="text" value="0"/></p> <p>Heartbeat interval (10's of seconds) <input type="text" value="0"/></p> <p>Input_CID <input type="text" value="STF"/></p> <p>Message Type <input type="text" value="AFTN"/></p> <p>Service Handle <input type="text" value="MANUAL"/></p> <p>SOM <input type="text" value="SOH"/></p> <p>Transmission Line <input type="text" value="I/O"/></p> <p>Max Sequence <input type="text" value="999"/></p> <p>Alignment Function fmt <input type="text" value="<cr><lf>"/></p> <p>Max Line Length <input type="text" value="69"/></p> <p>Input Message Length <input type="text" value="2100"/></p> <p>Overlength <input type="text" value="OUTPUT"/></p> <p>QTA Cancel <input type="text" value="YES"/></p> <p>Channel Check <input type="text" value="I/O"/></p> <p>Priority Alarm <input type="text" value="NO"/></p> <p>Send Hourly LRLS <input type="text" value="NO"/></p> <p>Busy Timeout time <input type="text" value="20"/></p> <p>Output Destination Queue <input type="text" value="TSF"/></p> <p>Connection Mode <input type="text" value="FDX"/></p> <p>Connection Retransmit <input type="text" value="NO"/></p> <p>Input Sequence <input type="text" value="998"/></p> <p>Auto restart time <input type="text" value="0"/></p> <p>Only ICAO svc messages <input type="text" value="YES"/></p> <p>Output prefix <input type="text"/></p>	<p>InterProcess Queue <input type="text" value="STF_ipq"/></p> <p>No Activity Timeout <input type="text" value="0"/></p> <p>Host name(s) host1:host2 <input type="text" value="PCLAKE1:PCLAKE2"/></p> <p>Output_CID <input type="text" value="TSF"/></p> <p>Code Format <input type="text" value="ISO8859-1"/></p> <p>Service Address <input type="text"/></p> <p>EOM <input type="text" value="ETX"/></p> <p>Supplemental Info <input type="text" value="%D%H%M"/></p> <p>Alignment Function fix <input type="text" value="INPUT"/></p> <p>MAX WMO output msg size <input type="text" value="-1"/></p> <p># Stuck Tape Chars <input type="text" value="70"/></p> <p>Output Text Length <input type="text" value="1800"/></p> <p>Idle Reversals Count <input type="text" value="20"/></p> <p>Error Correct <input type="text" value="YES"/></p> <p>Midnight Check <input type="text" value="NO"/></p> <p>Responsibility Check <input type="text" value="OUTPUT"/></p> <p>Com Control Info <input type="text"/></p> <p>Retry to connect timer <input type="text" value="20"/></p> <p>Monitor Destination <input type="text"/></p> <p>Connection ACK Support <input type="text" value="NO"/></p> <p>Template Support <input type="text" value="NO"/></p> <p>Output Sequence <input type="text" value="1"/></p> <p>Automatic re-route <input type="text" value="NO"/></p> <p>Test Message File <input type="text" value="ICAO.tstm"/></p> <p>Output suffix <input type="text"/></p>
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