Network Manager
nominated by
the European Commission

EUROCONTROL

Centralized Flight Plan Management Service

EU-Latin America and Caribbean Aviation Partnership Project

Network Manager, EUROCONTROL

Juan RODRIGUEZ
Cross Domain Coordinator
Network Operations Division

Overview

1) Objectives

2) Governing Principles

3) Scope of Services

4) Process Overview

5) Services and Components

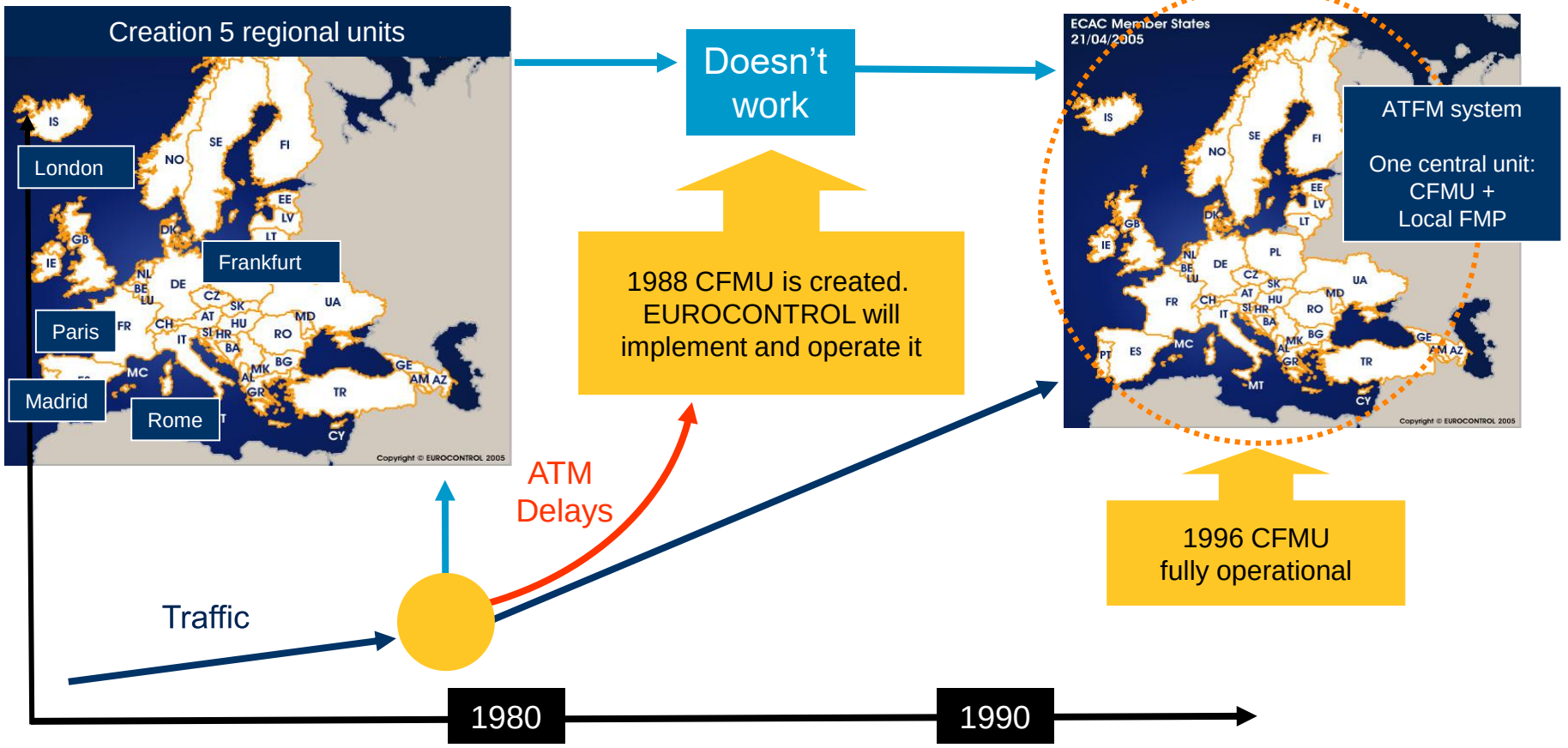
6) Operational Systems

7) Operational Documentation

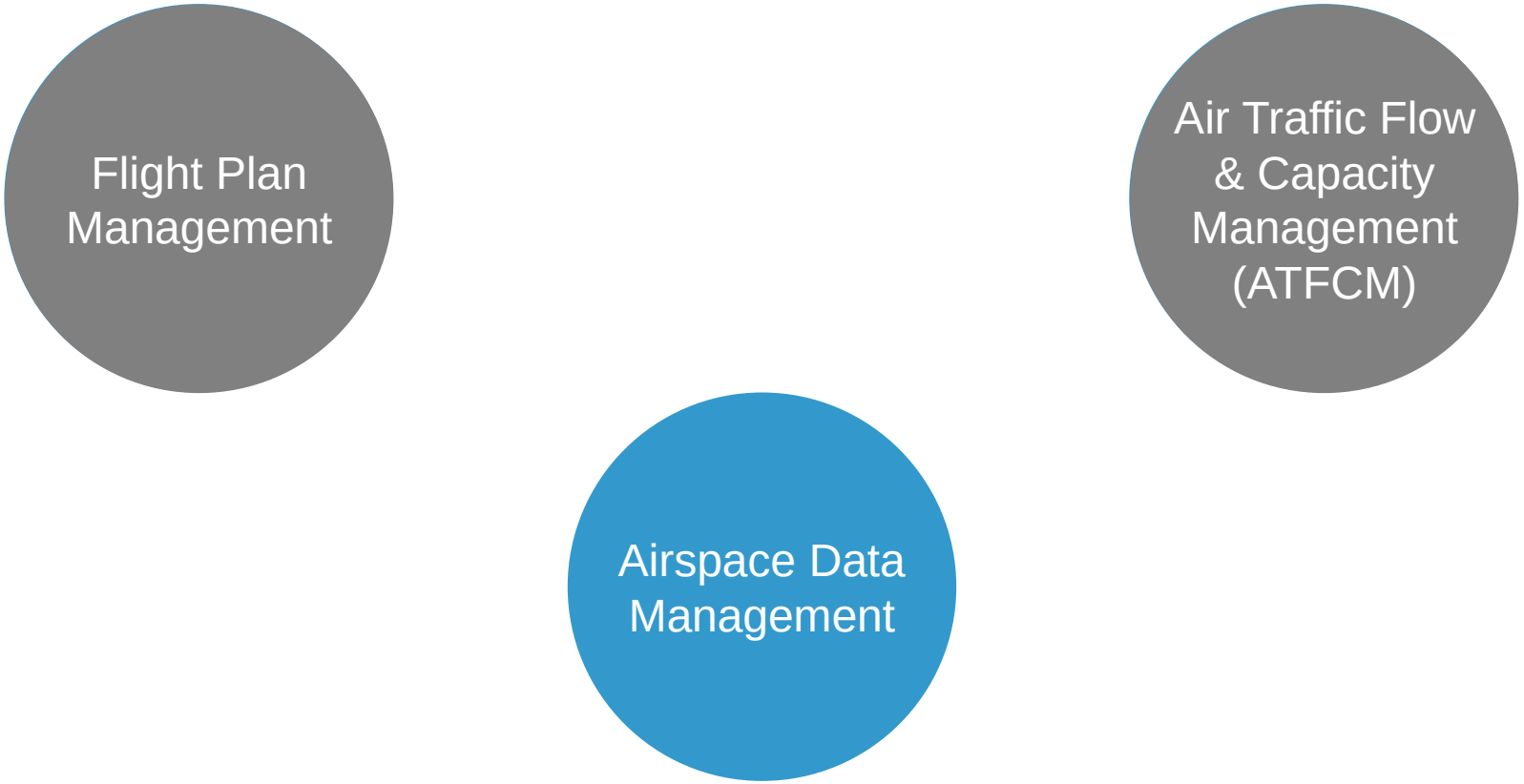
BACKGROUND

Back in the 1980s

Major European ATM crisis → Creation of CFMU



Network Operations Services



AIRSPACE DATA MANAGEMENT

Airspace Data at the Network Manager

- Fundamental enabler to deliver Flight Planning and ATFM Services

Airspace data management

- Maintains routes, points, SID, STAR, RAD, CDRs, Aerodromes, restrictions, sectors, etc., as published and agreed with the states
- Supports states in simulations of major airspace changes and evaluation of network impact
- Airspace design optimization in support of states
- Civil – Military coordination at European level in the use of the airspace, with the aim of improving flight efficiency
- European Airspace Use Plan published at D-1 at 16:00 and subject to updates
- Support in planning of major military exercises

Airspace Data

- Coordinated with NMOC
- Used by NM internal systems
- Published to external users

Airspace Data at the Network Manager

Airspace Data at the Network Manager

Three main pillars of the Airspace Data management

Aeronautical Information Publication

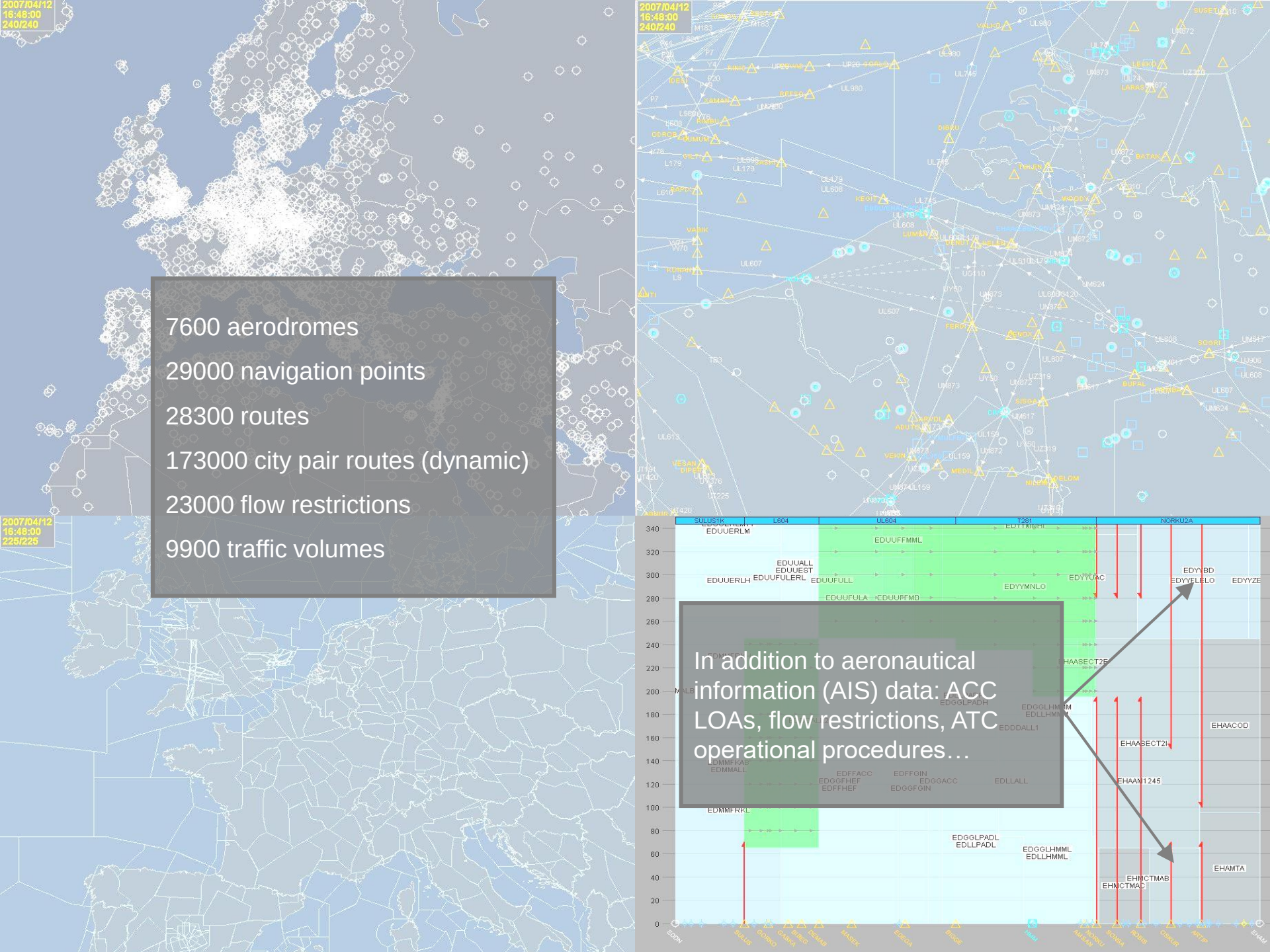
Published by countries in AIP – Aeronautical Information Publication - Standardised content by ICAO

AIRAC

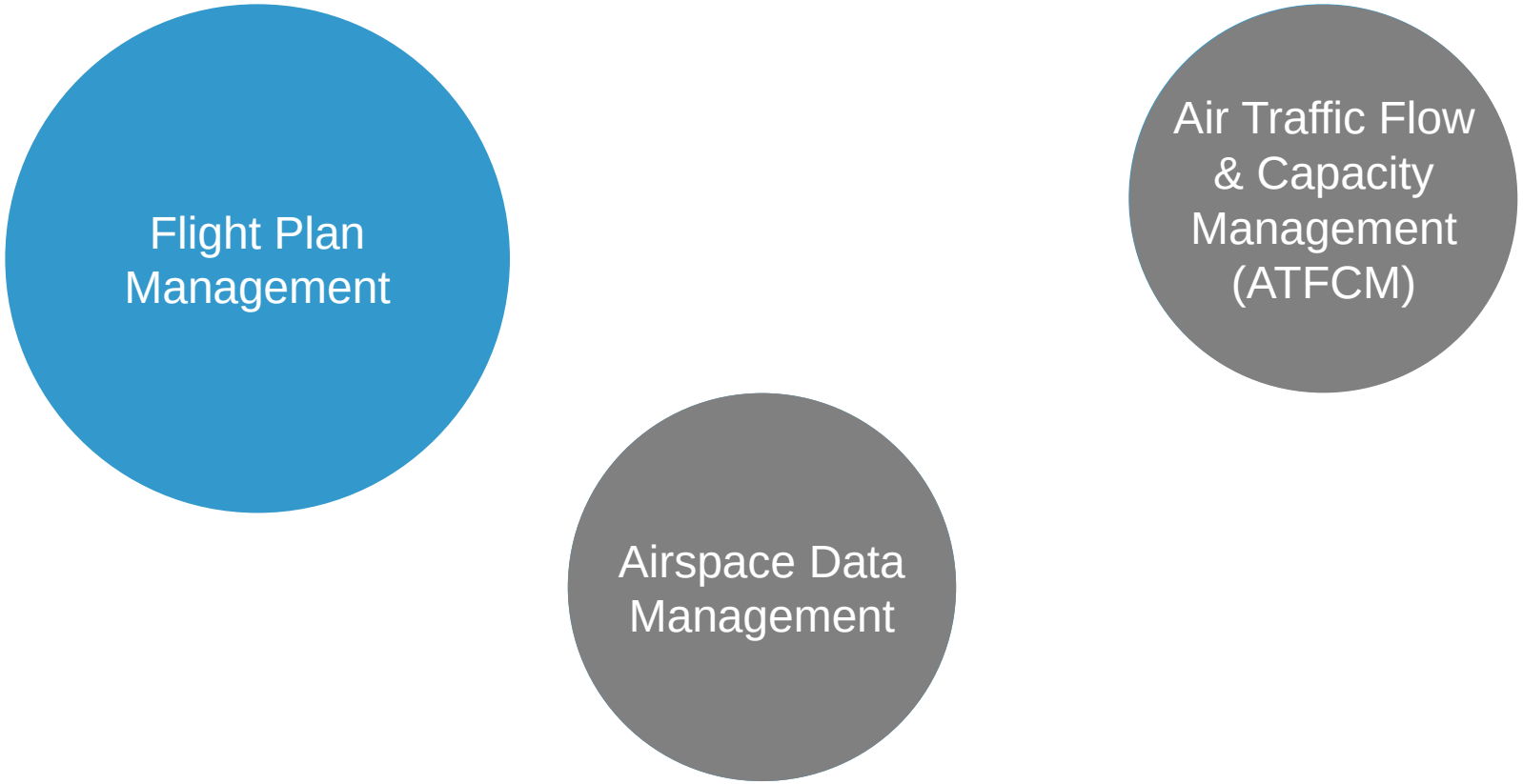
28 days cycle – AIRAC (Aeronautical Information Regulation And Control)

NOTAM

Operational data changes published as NOTAM – Notice to Airman


2007/04/12
16:48:00
240/240
7600 aerodromes
29000 navigation points
28300 routes
173000 city pair routes (dynamic)
23000 flow restrictions
9900 traffic volumes
2007/04/12
16:48:00
225/225
In addition to aeronautical information (AIS) data: ACC LOAs, flow restrictions, ATC operational procedures…

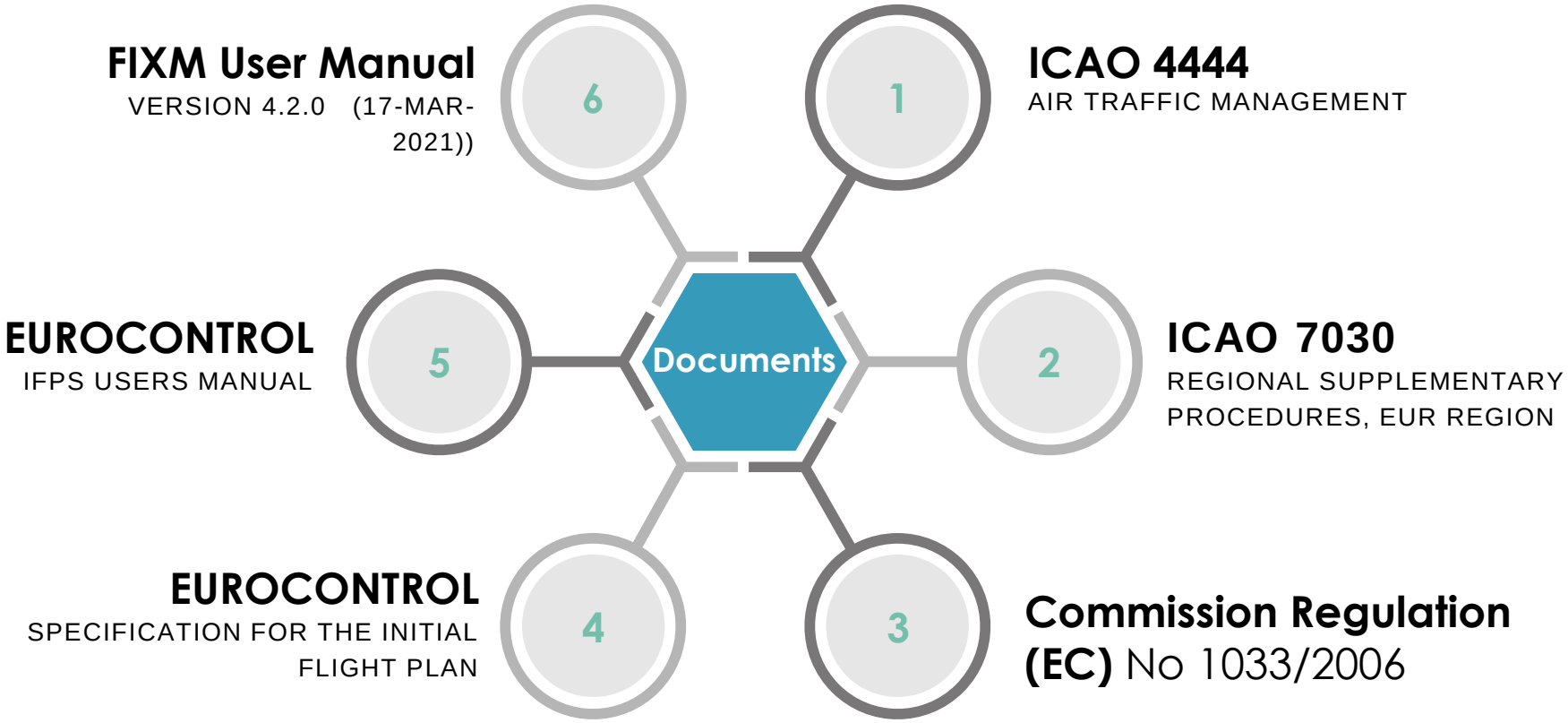
Network Operations Services



GOVERNING PRINCIPLES

Governing Principles

Operations of IFR/GAT flights of parts thereof intending to operate within the IFPZ area shall be aware and comply with the requirements laid down in the following documents:

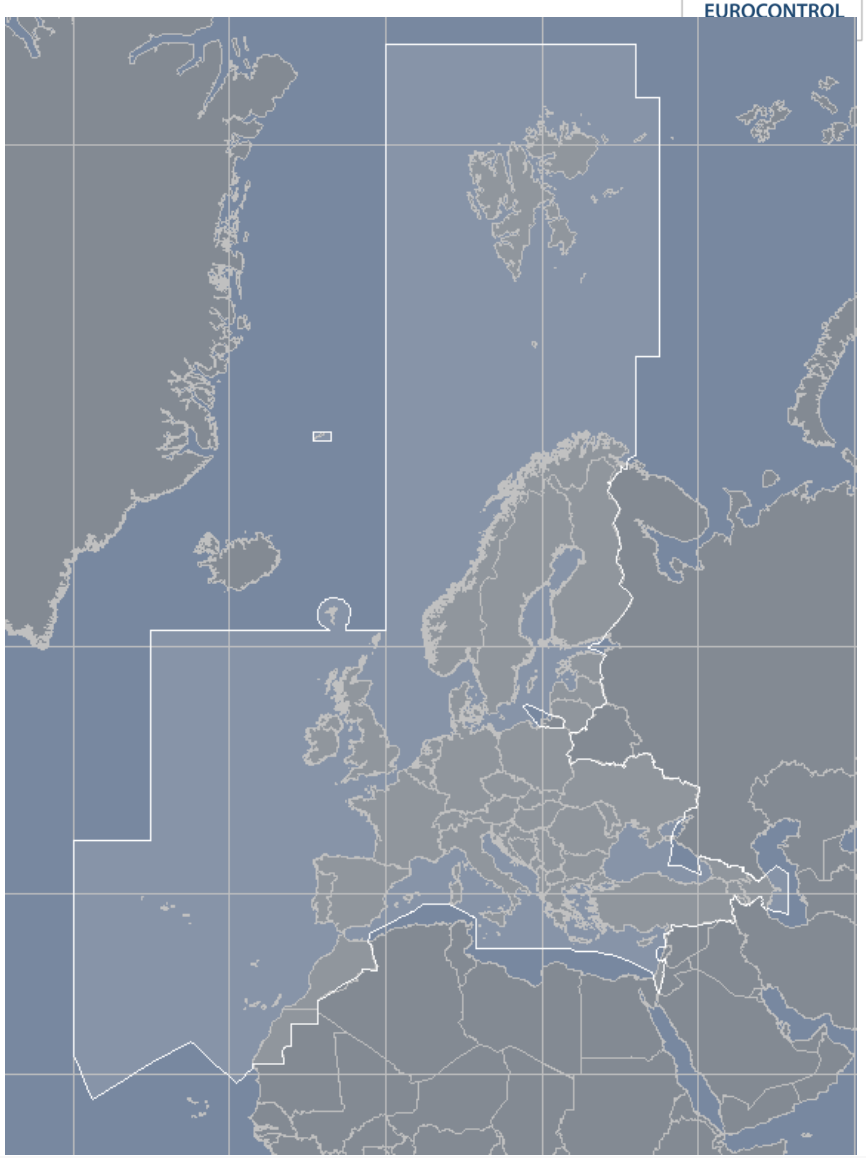


SCOPE

Scope

- A centralized flight plan processing and distribution service exists under the authority of the EUROCONTROL Network Manager (NM).

- The service is provided by the Integrated Initial Flight Plan Processing System (IFPS) and covers that part of the ICAO EUR Region known as the IFPS Zone (IFPZ).



Scope

European Central flight planning management

- All IFR, GAT traffic within, exiting or entering the EUROCONTROL area of responsibility must file a flight plan (FPL) to EUROCONTROL/NM
- NM validates and distributes the FPL to all concerned units
- NM uses flight plan data to assess the demand and perform flow management

Unique in the world

Unique regional model in the world since 1995

Interest from other regions

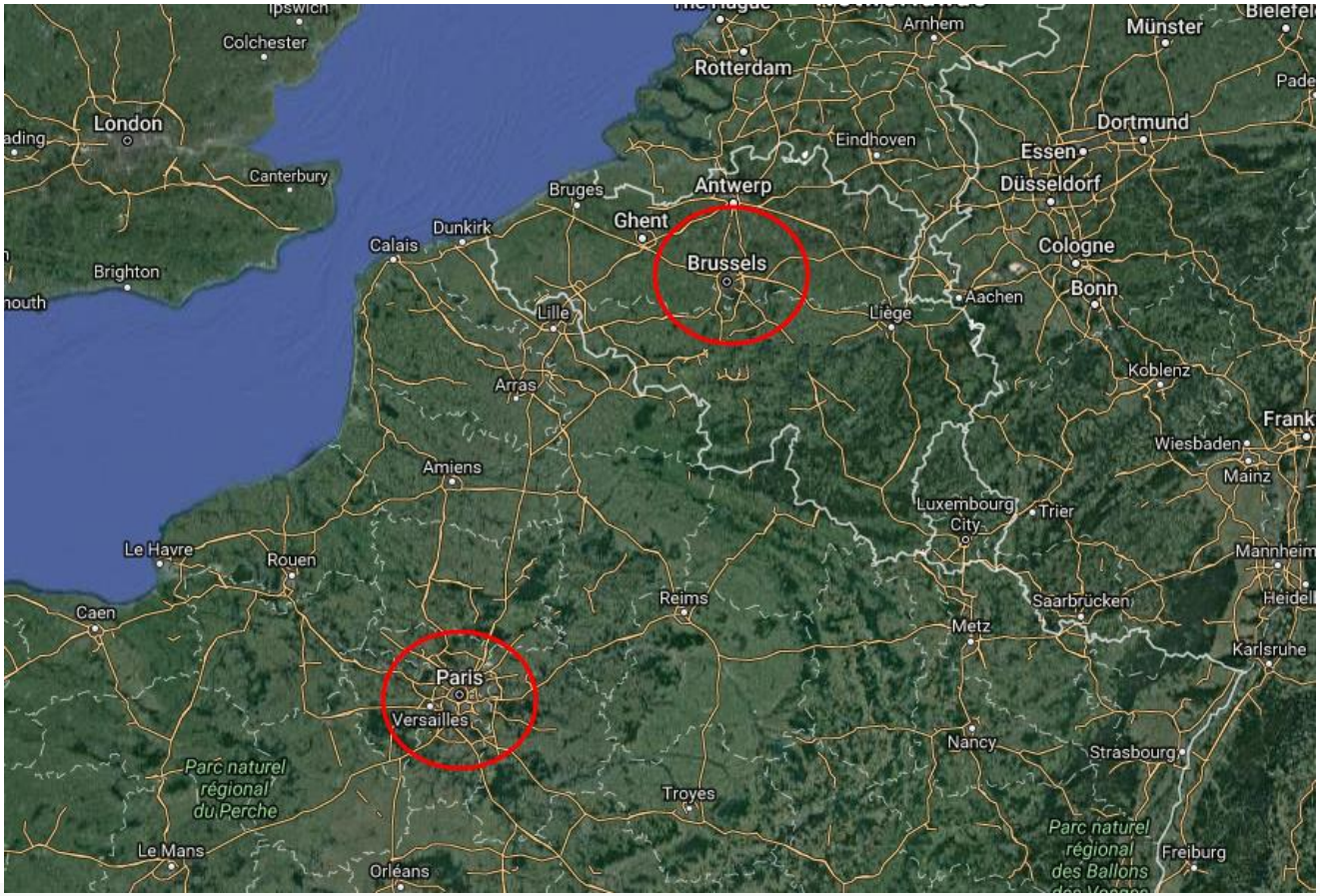
Many other regions expressed the wish to have similar model (Asia, Middle East)

Benefits

- Single access for AOs
- Uniform rules
- Single consistent flight plan for all ATM stakeholders
- No need to validate FPL at each ANSP

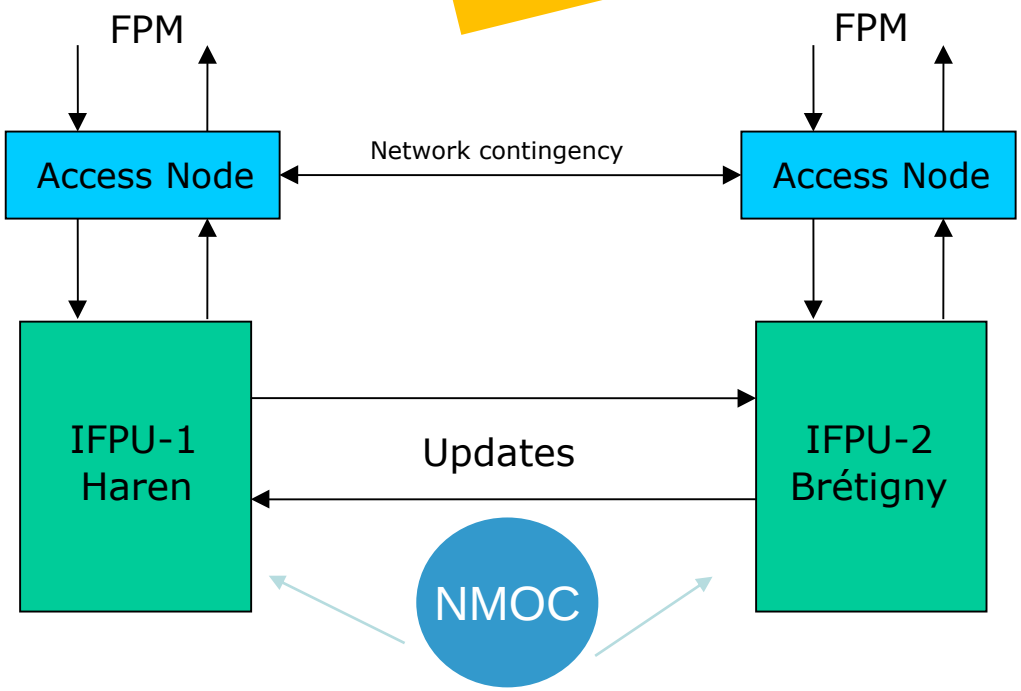
Contingency

- For contingency, the Network Manager has two identical IFPS Units that are geographically separated (Belgium and France).



Contingency

No FPL is lost



Supports immediate failover

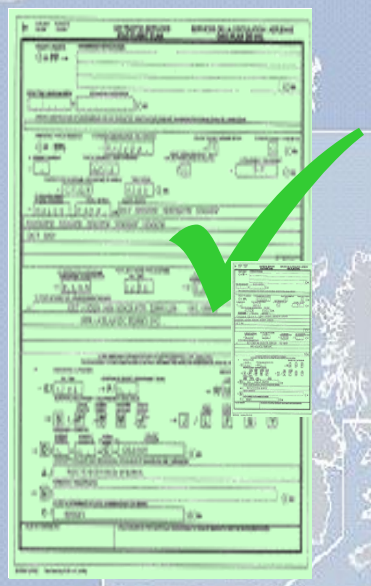
Supports distributed processing and master/replica (single queue)

Operating in distributed configuration till recently; now operating in master/replica for human resource optimisation

Flight Planning in Europe **with NM IFPS**

One FPL for all NM area

- Full acknowledgement process
- Dynamic re-processing
- Highly automated (>99%)



NM IFPS

1 Flight Plan processed every 3 sec

Above **90000** Flight Plan messages/day

PROCESS OVERVIEW

Process Overview

Aircraft Operators	Responsible for flight planning submission of related messages directly or via ARO (IFPS Manual & AIP compliant)
Network Manager	Responsible for processing and distribution (IFPS)
IFPS Staff	Responsible for manual processing and FE activities
ATS Units	Provision of FPL messages to IFPS and responding
ATC	Responsible as a subset of ATS

Process Overview

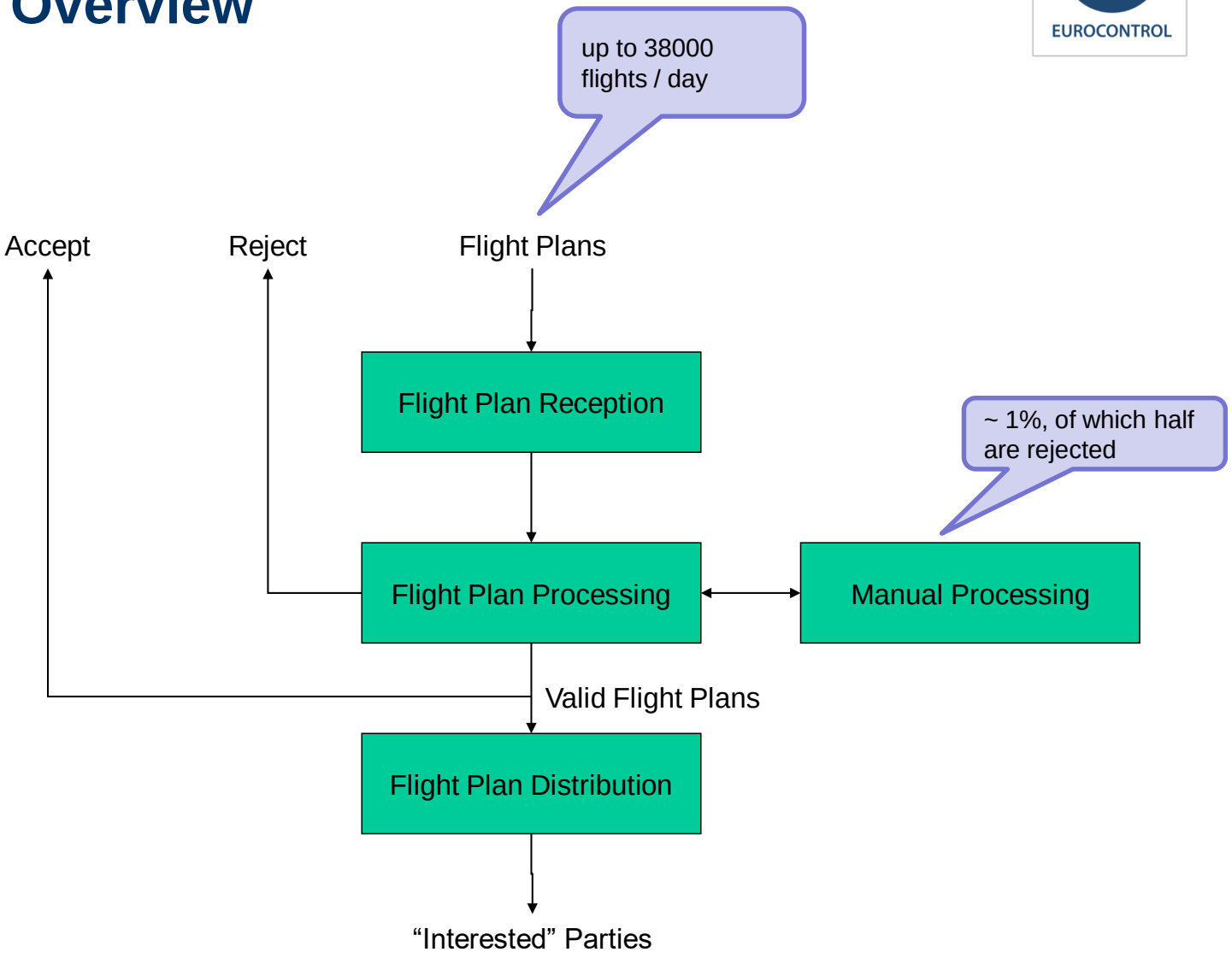
Pilot	Responsible to communicate to AO for receiving and using FPL data
ATS Reporting Office	Flight planning submission of related messages received from an AO. Acting as nominated agent.
States National Authorities	Responsible for supporting related procedures as specified.
Network Manager EUROCONTROL	Supervisory responsibility of initial FPL PLANNING OPERATIONS.
Originator	Person submitting and receiving on behalf of AO. Responsibility remains on AO.

Process Overview

Responsibilities

Reception, verification and distribution	▪The IFPS is responsible for the reception, verification and distribution of flight plan data for all flights with an IFR/GAT portion within the IFPZ.
Airspace Data Line	▪Use can be made of the AD line for addressing to outside addresses, the responsibility for the correctness of these addresses lies with the filer only.
Communication of changes	▪It is the responsibility of the message filer to ensure that any changes made to that message are checked and communicated to any necessary person(s) prior to the departure of that flight.

Process Overview



Process Overview

Flexibility

- Although messages could fail IFPS checking when using the IFPUV, the same message could be subject of a manual ‘’IGNORE ERROR’’ by IFPS staff:
  - temporary instruction
  - unusual profile behaviour, etc.
- If case of operational questions about the correctness of the error raised, the user should contact the relevant IFPS unit.

Flexibility

NM always strives to offer different set of different alternative solutions to the operational stakeholders

Process Overview

Corrections

Coordinated approach

- Any changes made to the trajectory of a flight by an IFPS operator will be coordinated with the originator of the message.

Level correction

- The use of RMK/IFPSRA (IFPS reroute accepted) in the FPL allows the IFPS operator to alter the TRACK/LEVEL without coordination. Attention however is made to changes of the original countries over flown (overfly permits).

Corrective actions

- IFPS is in NO obliged to undertake corrective action. i.e. the use of RMK/IFPS REROUTING ACCEPTED does not prevent FPL or CHG messages from being rejected.

Process Overview

Corrections

Corrections

- When a message is rejected by the IFPS staff due to a trajectory error, the IFPS staff should, wherever possible, also send a message proposing an alternative available route for that flight.

ALTERNATIVES

Process Overview

Rejections

Automatic rejections

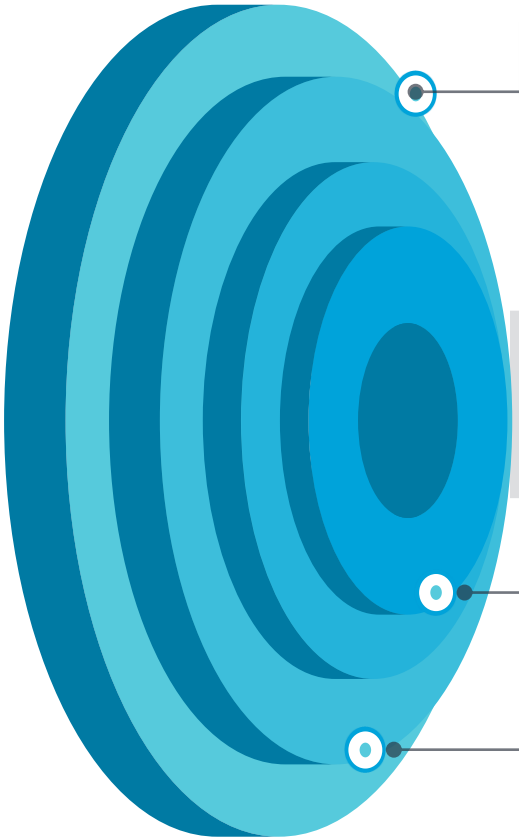
- The IFPS has the possibility to automatically reject messages based on one or several criteria such as originator address and/or type or errors and/or type of messages etc…

Rejection catalogue

- The rejection criteria are input in the “rejection catalogue”.
- The system shall detect and automatically reject any message containing an error listed in the rejection catalogue.

SERVICES AND COMPONENTS

Flight Plan Management Services



Flight and Trajectory Management

- Planning, tactical and post-operational
- End-to-end flight status management
- 4D trajectory computation
- Flight Plan Data Distribution

Flight Plan Management Services

Flight Monitoring & Alerting

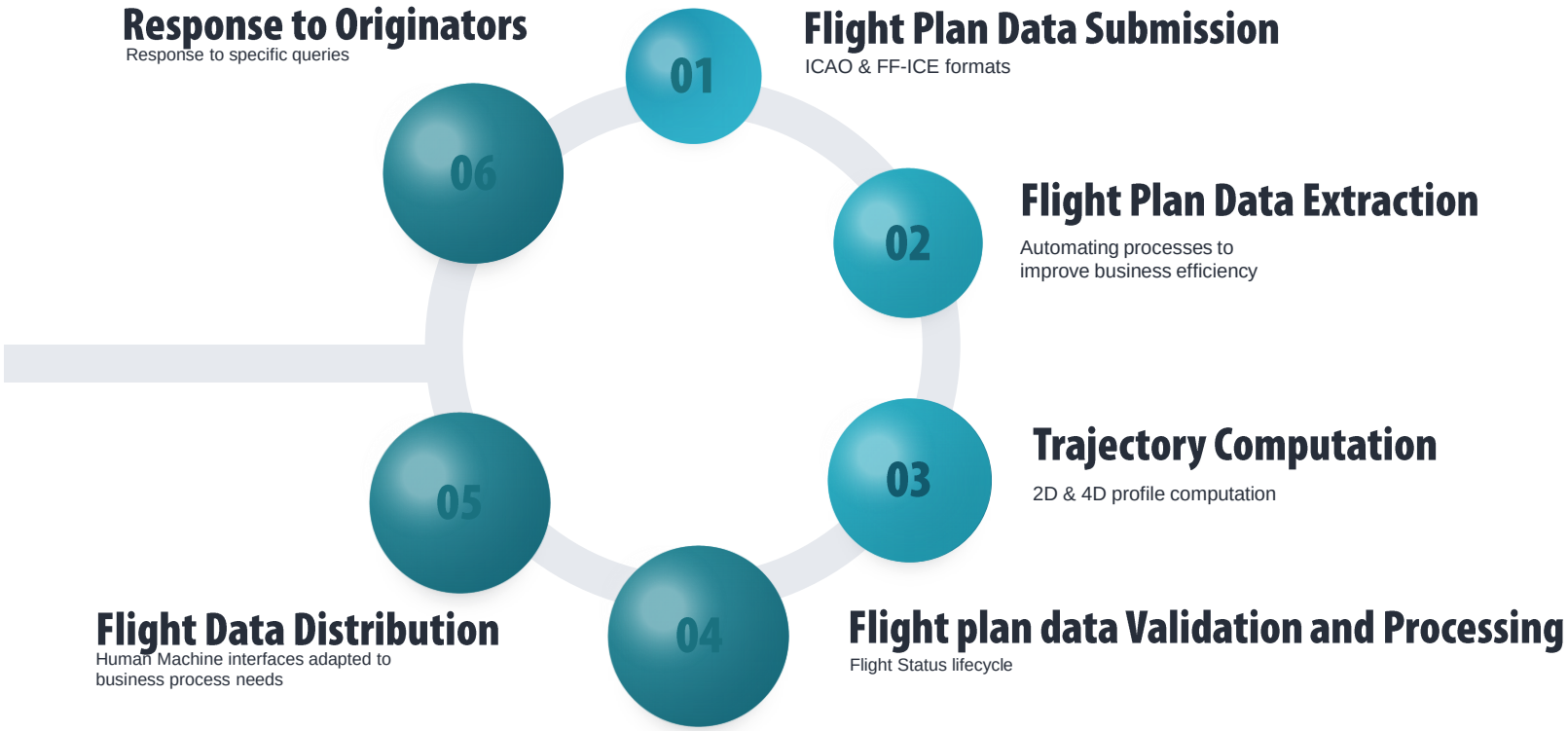
- Safety & Security
- Slots & schedules

Flight Assistance

- Flight Plan checking and filling
- Route Alternatives

Flight Plan Management Services

Flight and Trajectory Management



Flight and Trajectory Management

Flight Plan Data Submission

Flight Plan Submission

Formats / ICAO

Standard

- Those prescribed by ICAO in PANS-ATM Doc 4444 and
- In some cases the EUROCONTROL Specification for ATS Data Exchange Presentation (ADEXP)

The following is an example of a filed flight plan message sent by London Airport to Shannon, Shanwick and Gander Centres. The message may also be sent to the London Centre or the data may be passed to that centre by voice.

FPL-ACA101-IS
–B773/H-CHOV/C
–EGLL1400
–N0450F310 L9 UL9 STU285036/M082F310 UL9 LIMRI
52N020W 52N030W 50N040W 49N050W
–CYQX0455 CYYR
–EET/EISN0026 EGGX0111 020W0136 CYQX0228 040W0330 050W0415 SEL/FJEL)

The following is an example of a modification message sent by Amsterdam Centre to Frankfurt Centre correcting information previously sent to Frankfurt in a filed flight plan message. It is assumed that both centres are computer-equipped.

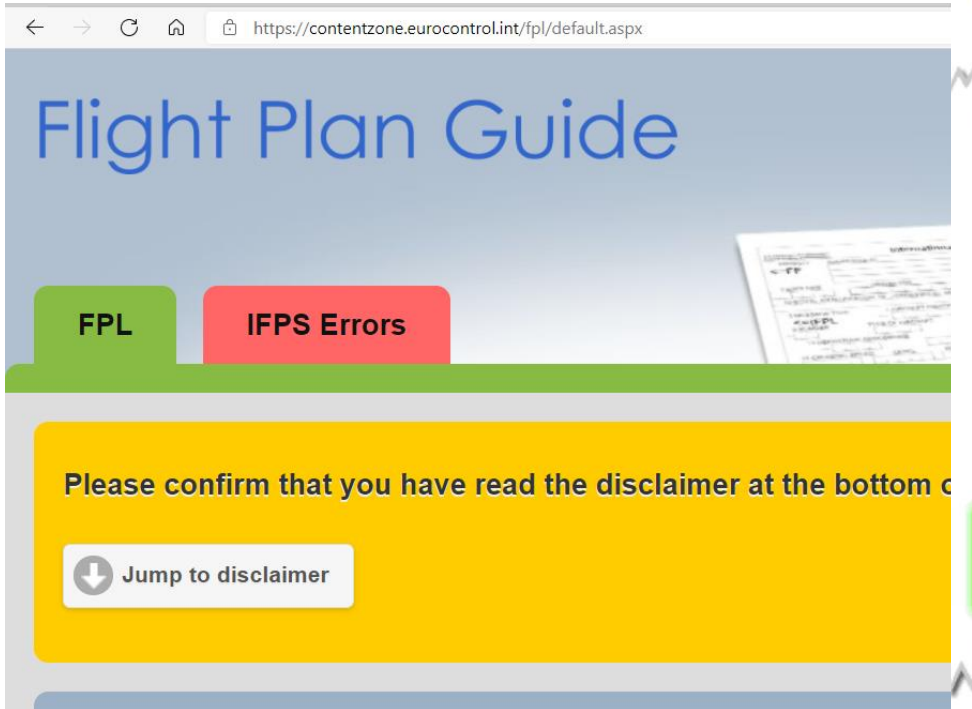
(CHGA/F016A/F014-GABWE/A2173-EHAM0850-EDDF-DOF/080122-8/I-16/EDDN)

Flight Plan Submission

ICAO Format - Flight Plan Guide

Flight Plan format, information and possible errors based on the official Network manager IFPS operational Manuals.

- https://contentzone.eurocontrol.int/fpl/default.aspx
- https://www.eurocontrol.int/publications/ifps-users-manual-0



This image shows the relevant fields highlighted on a Flight Plan.

Flight Plan Submission

Formats / ADEXP

Standard

ATS Data Exchange Presentation (ADEXP) is an agreed standard for the transmission of ATS
message data.
Designed by EUROCONTROL for the exchange of
messages between computers either directly or via a network.

Use

- Flight planning: exchange of flight plan data and associated messages between the IFPS, ATS and AOs.
- ATFCM: exchange of messages between the ETFMS of the NM and AOs and ATS.
- Air Traffic Control coordination: exchange of tactical coordination messages between ATCU.
- Airspace management: exchange of data between National ATSU, the NM and Aos concerning airspace availability.
- Civil/military coordination: messages concerning civil/military flight data and airspace crossing messages.

Flight Plan Submission

Formats / ADEXP

Standard

ATS Data Exchange Presentation (ADEXP) is an agreed standard for the transmission of ATS message data.
Designed by EUROCONTROL for the exchange of messages between computers either directly or via a network.

Example of a cancel message in the ADEXP format

```
-TITLE ICNL
-BEGIN ADDR
        -FAC CFMUTACT
        -FAC EGTTZGZP
        -FAC EHAAZQZX
        -FAC EHAAZRAA
        -FAC EGLLZEZX
        -FAC EGZYTTTE
        -FAC EGZYTTFO
        -FAC EGLLZTZP
        -FAC EGLLZPZI
        -FAC EGLLZTZR
        -FAC EGZYTTAD
        -FAC EGZYADEX
-END ADDR
-ADEP EGLL
-ADES EHAM
-ARCID ABC434
-EOBD 050106
-EOBT 1135
-FILTIM 061014
-IFPLID AA47868964
-ORGNID EGLLABCX
-ORIGIN –NETWORKTYPE AFTN –FAC EGLLABCX
-SRC FPL
```

Flight Plan Submission

Formats / ICAO

Example of a message sequence: FPL – AFP – ACH

Original flight plan:

(FPL-ABC456-IS
-BE20/H-SDGRWY/C
-LFSB0845
-N0220F180 TORPA V40 LUL G4 RLP G21 MONCE
-LFJL0040
-PBN/B2D2 REG/FGFAF DOF/200420)

AFP submitted to the IFPS for processing (indicating a change to VFR at the end of the flight):

-TITLE IAFP
-ARCID ABC456
-**FLTRUL Y**
-ADEP LFSB
-ESTDATA –PTID LUL –ETO 200420091134 –FL F180
-ROUTE N0220F180 TORPA V40 LUL G4 **RLP VFR**
-ADES LFJL

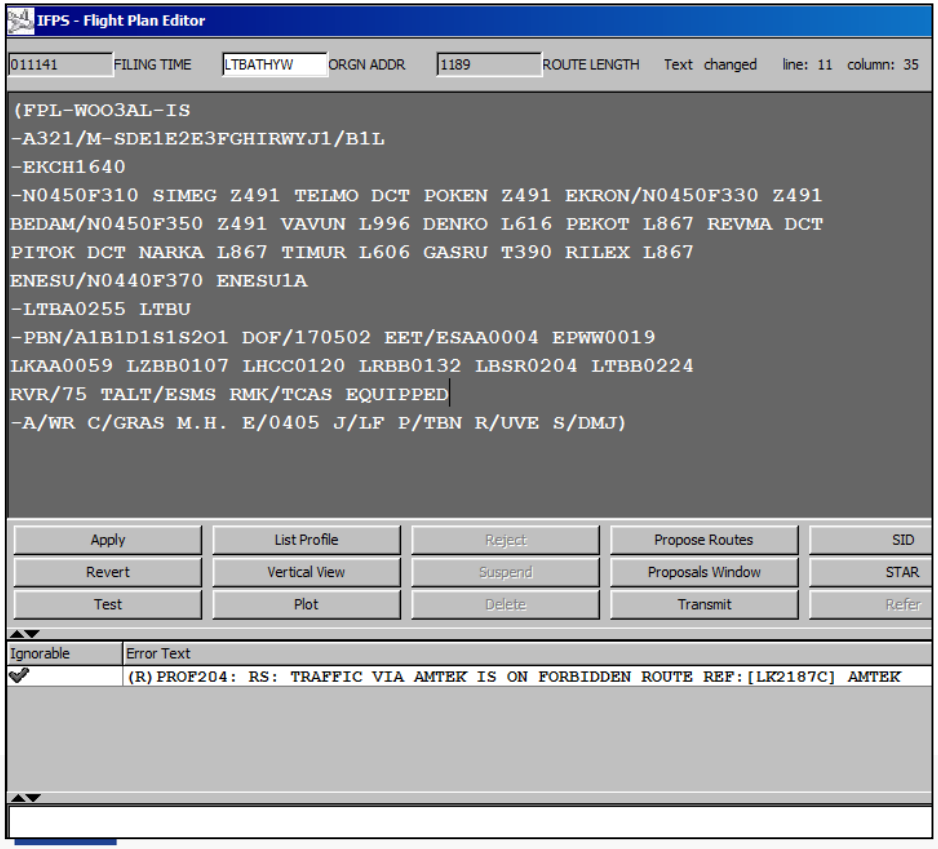
ACH output by the IFPS in ICAO format:

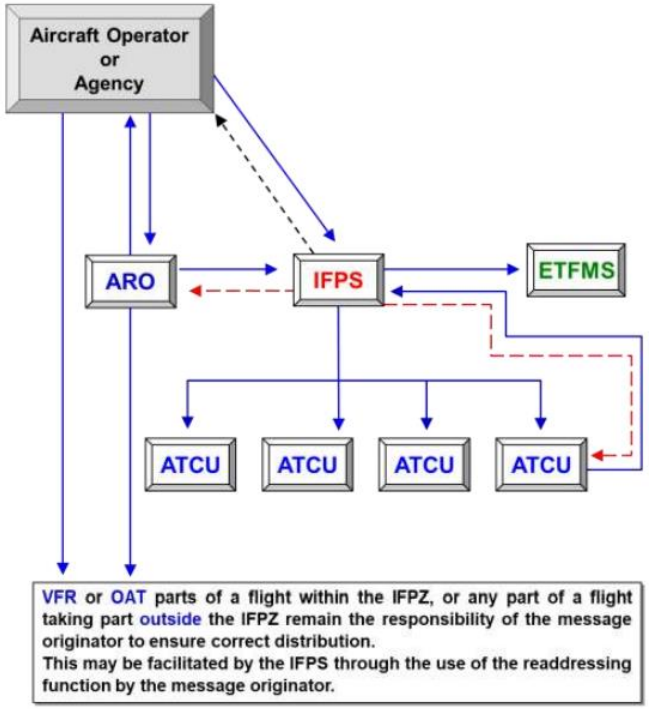
(ACH-ABC456-LFSB0845-LFJL-DOF/200420-8/YS-14/LUL/0911F180
-15/N0220F180 TORPA V40 LUL G4 **RLP VFR**-18/PBN/B2D2 DOF/200420 REG/FGFAF SRC/AFP)
Upon successful processing of an ACH for a change of flight rules, IFPS shall distribute an ACH to all ATC Units concerned with the flight that are situated downstream of the estimate point in the AFP, but not to the originator of the AFP message.

Flight Plan Submission

- Flight plans and associated update messages may be submitted as individual messages.

- The IFPS checks all messages received for compliance with all format and data conventions.





Flight Plan Submission

Associated Messages (ICAO 2012)

- The NM is compliant with the ICAO 2012 flight plan messages before departure for IFR/GAT flights operating in the IFPZ in order to obtain the demand.
  - FPL – Flight Plan
  - CHG – Change
  - DLA – Delay
  - CNL – Cancelation
  - DEP – Departure
  - RQP – Request Flight Plan
  - RQS - Request Supplementary Flight Plan
  - AMOD – ATC Modification

Flight Planning messages processed by NM

Flight Plan Submission

Associated Messages (ICAO 2012)

- The NM systems shall accept the post-departure flight planning messages:
  - AFP - ATC Flight Plan Proposal
  - FNM - Flight Notification Message
  - MFS - Message from Shanwick/Santa Maria
  - ARR - Arrival
  - AFIL (FPL) - Air Filed Flight plans

Post departure Flight Planning messages processed by NM

Flight Plan Submission

Associated Messages (FF-ICE)

The NM systems support the following FF-ICE services:

- Filing service
- Flight Data Request service

Which includes the FF-ICE messages (eFPL) in FIXM format:

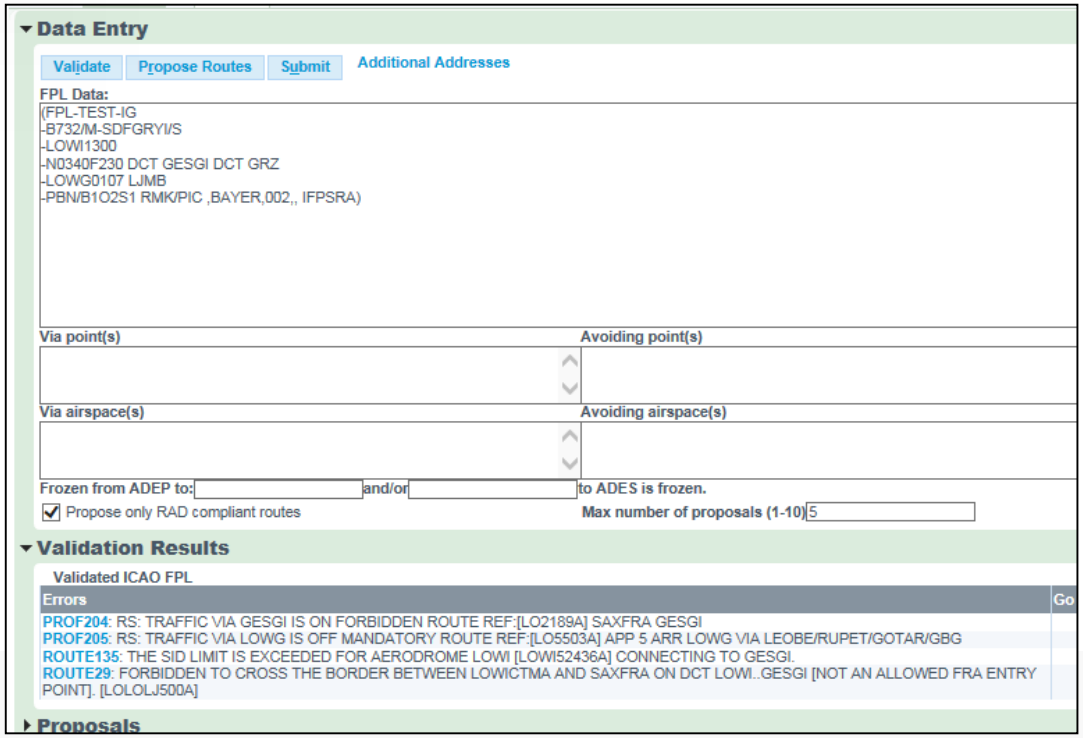
- Filed Flight Plan
- Flight Plan Update
- Flight Cancellation
- Flight Data Request
- Filing Status
- Submission Status

Flight Plan Submission
External Interfaces

External interfaces

Flight plan messages can be submitted to IFPS via:

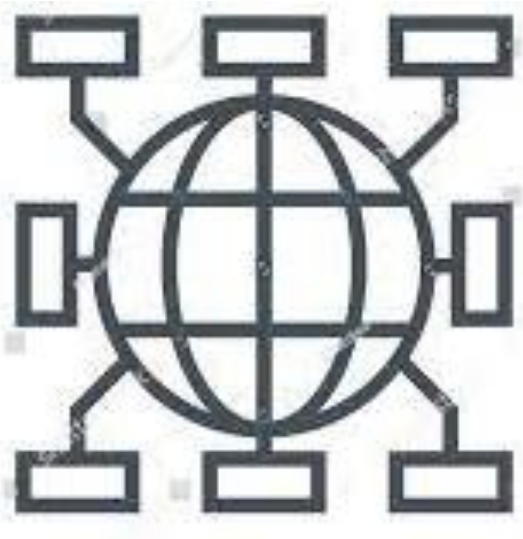
- AFTN, TYPE B (SITA)
- NM SWIM B2B Web Service or
- by using the NM Internet Applications (NOP Portal/NMP Flight).



Flight Plan Submission

Internal Interfaces

- With Service Layer: CORBA interfaces, IDL
  - To support the HMI and the B2B
- With ETFMS: TCP/IP based, ADEXP
  - For the exchange of flight plan data, support of re-routing, ensure flight status consistency, etc.
- With ENV: FTP, DOM+
- With DWH: FTP



Flight and Trajectory Management

Flight Plan Data Extraction

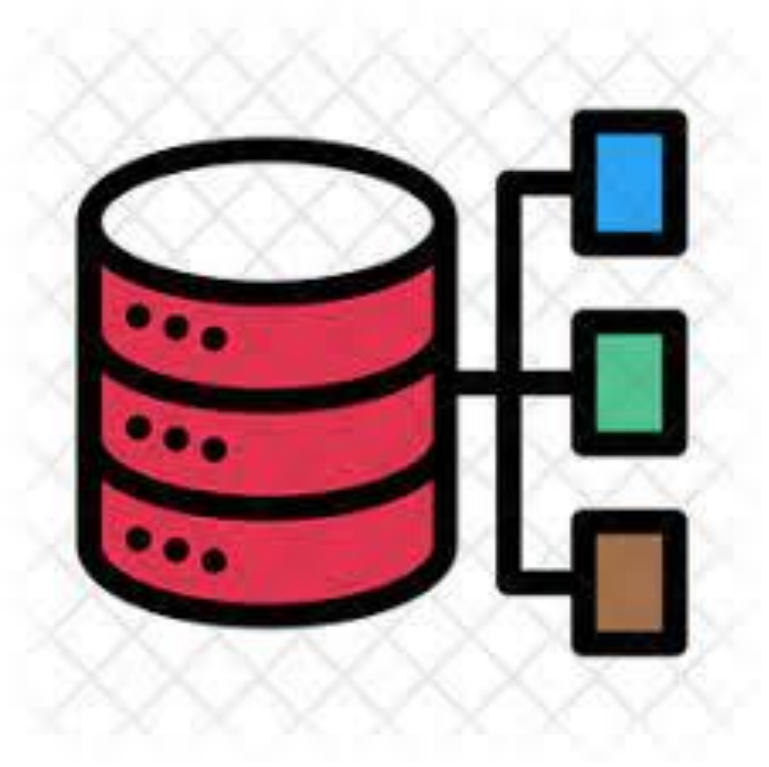
Flight Plan Data Extraction

Data Parsing

- The NM systems extract data from flight plan messages and associate it to previous flight plan messages, where possible.

- The flight plans messages are converted (from either ICAO, ADEXP or FIXM formats) into an internal format that is used to build the profile and perform the necessary validations.

- Upon reception of any message, the IFPS attempts to associate incoming FPL data with existing flight data or invalid flight plan messages.



Flight Plan Data Extraction

Association

Message correlation

These associations make use of data in the flight planning messages for correlation (in particular ARCID, ADEP, ADES, EOBT, EOBD, REG) and also of specific fields aimed at this purpose, such as the IFPLID (assigned by IFPS to a flight) and GUFI (FF-ICE).

GUFI
(Global Unique Flight Identifier)

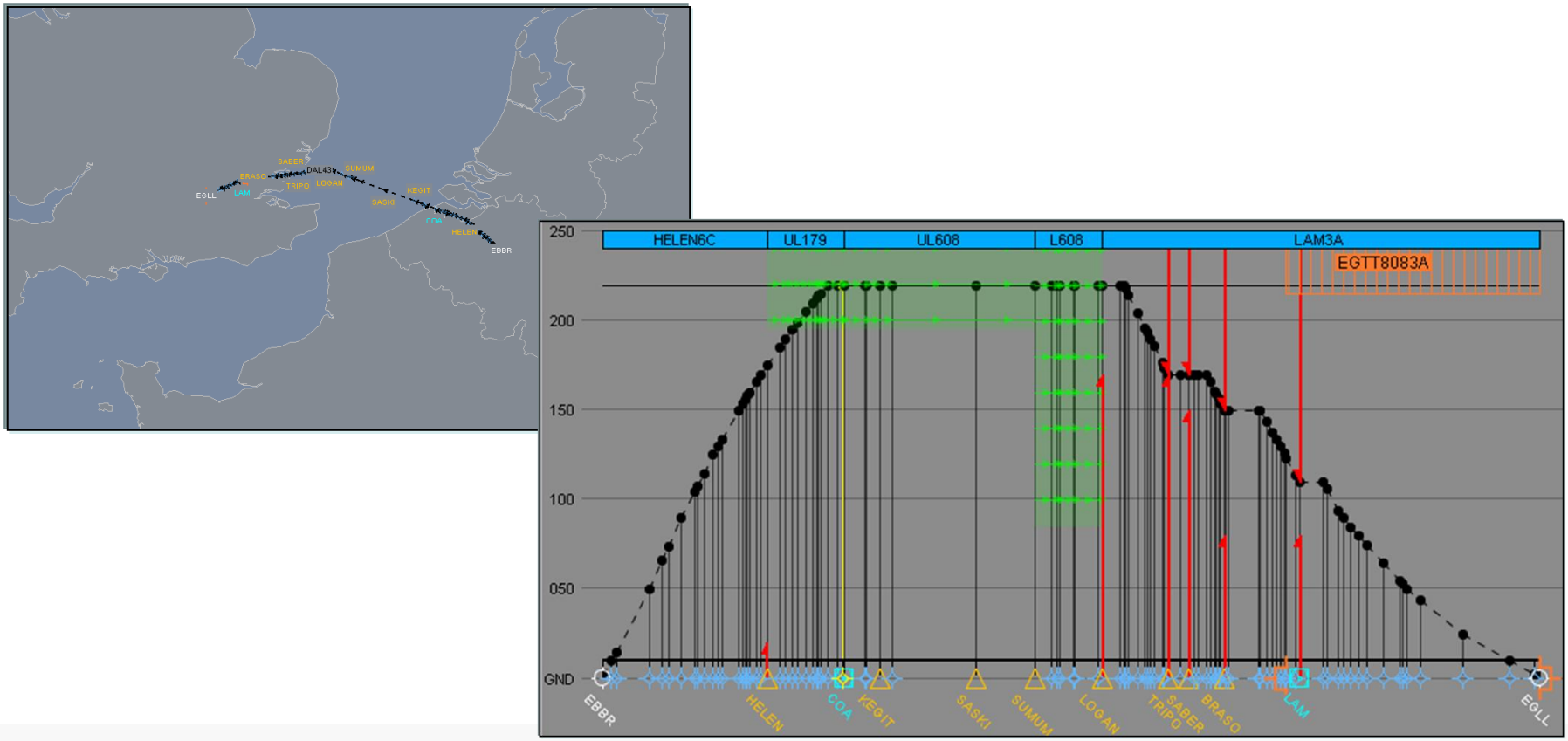
The NM systems check that any GUFI provided in FIXM is unique and has a valid syntax. In case of an update flight plan message, the GUFI shall match that of an existing flight plan. Otherwise, errors (EFPM) shall be raised.

Flight and Trajectory Management

Trajectory Computation

Trajectory Computation

- The IFPS builds a four dimensional profile for every flight.
- The profile is used to check the compliance with the requirements and constraints defined by the air traffic services within the IFPZ.



Trajectory Computation

Information Used

- Flight rules and flight type.
- Aircraft type and the corresponding performance data from the NM CACD.
- Aerodrome of departure and estimated off-block time.
- Initial speed and requested flight level.
- Route elements including change of speed/level.
- Aerodrome of destination, total estimated elapsed time.
- Item 18: PBN, EET, DOF, DLE, RMK.

Trajectory Computation

2D Track

The first step for the trajectory computation requires the generation of a 2D track.
The 2D track which the ADEP (if present) followed by the identified points, routes and terminal procedures and DCT segments and the ADES.

Enriching 2D track

The calculation of the trajectory continues with a profile model that combines the 2D track description and requested flight levels and speeds with the performance characteristics from the flight's aircraft type, taking into consideration the Profile Tuning Restrictions (PTR).

Trajectory Computation

Additional Information

Aircraft Operators are able to provide following additional information:

- Taxi (taxi time)
- Take-off weight (TOW)
- Distance at location (DAL)
- Top of climb (TOC)
- Top of descent (TOD)
- Bottom of climb (BOC)
- Bottom of descent (BOD)

Checking additional Information

- If data provided inconsistent based on IFPS computation is disregarded
- Parameters established to process sand decide the outcome

Trajectory Computation

Flight Profiles

The profiles are required primarily to validate and distribute a flights associated messages in the IFPS according to geographical criteria (e.g. Points, Sectors) in conjunction with Flight Levels and time(s).

The profile for any given flight must provide the means to determine the Flight_Levels and times at which it is expected to enter / exit / over fly any geographical entity that is a potential parameter for validation and distribution.

4D Trajectory

The availability of meteorological data enables a more accurate calculation of the flight profile. The meteorological data consist of processing wind information that is periodically updated.

The trajectory computation for flights submitted through FF-ICE flight plan messages benefits from climb/descent performance data and the 4D trajectory calculated by the airspace user.

Flight and Trajectory Management

Flight Plan Data Validation & Processing

Flight Plan Data Validation & Processing

Processing	The NM process flight planning messages for IFR/GAT portions inside the IFPZ.
Validation	The NM automatically validate flight plan messages against different checks.
ACK/REJ	The process results in the acknowledgement of the message where no errors are detected (ACK) or the rejection when they are (REJ).
MAN	Alternatively, FPL data with specific detected errors may be passed to an operator for further analysis (MAN).

Flight Plan Data Validation & Processing

A flight plan message will either:

- be accepted by IFPS and distributed to ATC,
- or rejected by IFPS and the message originator must re-submit the message with the reason for rejection corrected.

```
-TITLE ACK -MSGTYP IFPL -FILTIM 020557 -ORIGINDT 1705020557
-BEGIN ADDR
       -FAC DUBOEFR
-END ADDR
-IFPLID AA63198883
-BEGIN MSGSUM -ARCID RYR53DW -ADEP EBCI -ADES LEVC -EOBT 1120 -EOBD 170502 -ORGN
DUBOEFR -END MSGSUM
```

```
-TITLE REJ -MSGTYP IFPL -FILTIM 021239 -ORIGINDT 1705021239
-BEGIN ADDR
       -FAC DUBOEFR
-END ADDR

-POSRTE N0330F190 LISTO L612 HON/N0346F230 L15 PIXUP/N0367F270 L15
BETPO/N0345F230 L15 BIG Q70 DET/N0351F230 Q70 ITVIP/N0342F210 Q70
MOKBU/N0310F150 Q70 KOK

-ERROR (R)PROF205: RS: TRAFFIC VIA EGCN EGNH EGNJ EGNM EGNO EGNT EGNV EGCC
IS OFF MANDATORY ROUTE REF:[EG2560B] HON L/UL15 BIG
-OLDMSG
(FPL-RYR5XA-IS
-B738/M-SDGHIRWXYZ/SB1
-EGCC1805
```

Flight Plan Data Validation & Processing

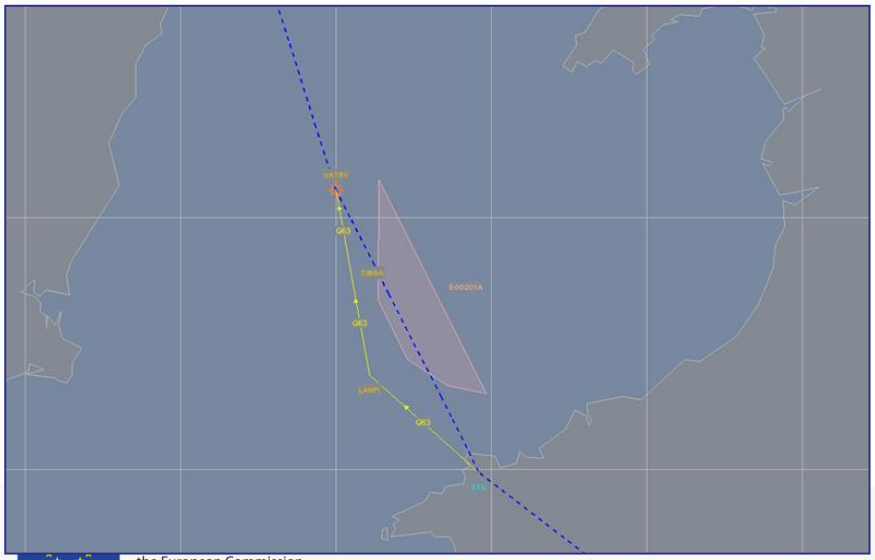
Revalidation

IFPS Revalidation

The IFPS continuously reassesses all stored flights to ensure that the planned route remains consistent with published requirements and constraints.

IFPS - Flight Plan List - Non-Compliant

IFplId	Title	Arcid	Adep	Ades	Eobt	Eobd	MAX-RFL	Length	Duration	Address	ANU	FileTime	Status	Reval Status
AA63174706		DFKGI	LFMK	EDTL	0930	170502	260	531	02:10	KAUSZXBT	ROCKETRT	011108	TERMINATED	SUSPENDED
AA63184733		AFR11XX	LFPG	EIDW	1310	170502	320	492	01:22	DUBAPWX	BCYAOCC	011941	SUSPENDED	SUSPENDED
AA63193076		RYR12K	EGKK	EIDW	1350	170502	260	340	01:07	DUBOEFR	RYRAOCC	020112	SUSPENDED	SUSPENDED
AA63194185		BEE2CK	EGTE	EIDW	1350	170502	240	248	00:56	KDENXLDG	XLD1	020209	SUSPENDED	SUSPENDED
AA63185890		DAH2017	LEAL	DAOO	1620	170502	310	197	00:33		DAHRPLO	012020	SUSPENDED	SUSPENDED

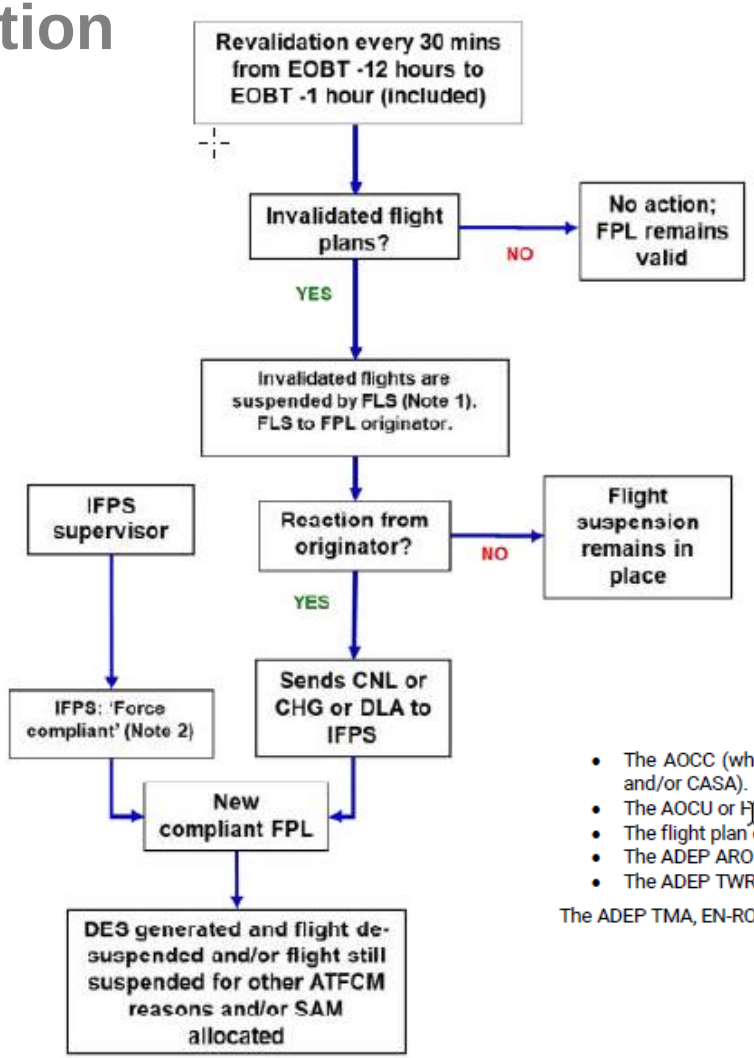


Time at which the flight plan is failing its first revalidation is between EOBT -12 hours to EOBT -1 hour (included): REVAL SUSPENDED

Time at which the flight plan is failing its first revalidation is EOBT −1 hour (excluded) to EOBT: REVAL ADIVISORY

Flight Plan Data Validation & Processing

Revalidation

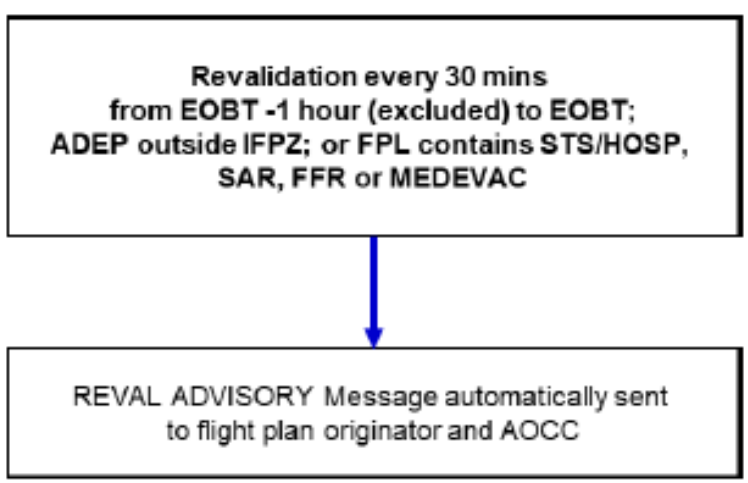


- The AOCC (when that AOCC is defined as receiving copies of IFPS ORM messages, IFPS and/or CASA).
- The AOCU or Handling Agent or both or none according to ENV setting.
- The flight plan originator and to the originator of any subsequent associated messages
- The ADEP ARO if no AOA is retrieved.
- The ADEP TWR, or the ADEP FMP if no TWR in the ATFM adjacent area.

The ADEP TMA, EN-ROUTE ACCs and ADES TMA if requested by the ATC.

Flight Plan Data Validation & Processing

Revalidation



Flight Plan Data Validation & Processing

RVSM

The NM systems check that any flight planning to enter the EUR RVSM and 8.33 kHz VHF (except where exempted or UHF allowed) airspace:

Is suitably equipped to do so by checking Items 8, Item 10, Item 15 and Item18.

As a result, errors (EFPM) may be generated.

Flight Plan Data Validation & Processing

Flight Plan validation against CACD

The NM systems check that the four-dimensional profile does not contain any inconsistencies or violations.

The rules to adhere to are stored in the environment database (CACD):

- ✓ CDR availability
- ✓ FUA restrictions / RAD restrictions / EU/EURO restrictions
- ✓ PBN restrictions - PTRs
- ✓ Flight property restrictions / FRA DCT restrictions
- ✓ Aerodrome flight rule restrictions- DCT limitation restrictions

As a result, due to violations of constraints error (PROF) shall be generated, except for PTRs. These shall result in a vertical adaptation of the profile."

Flight Plan Data Validation & Processing

Automation & Error Management

Automation and Error Management

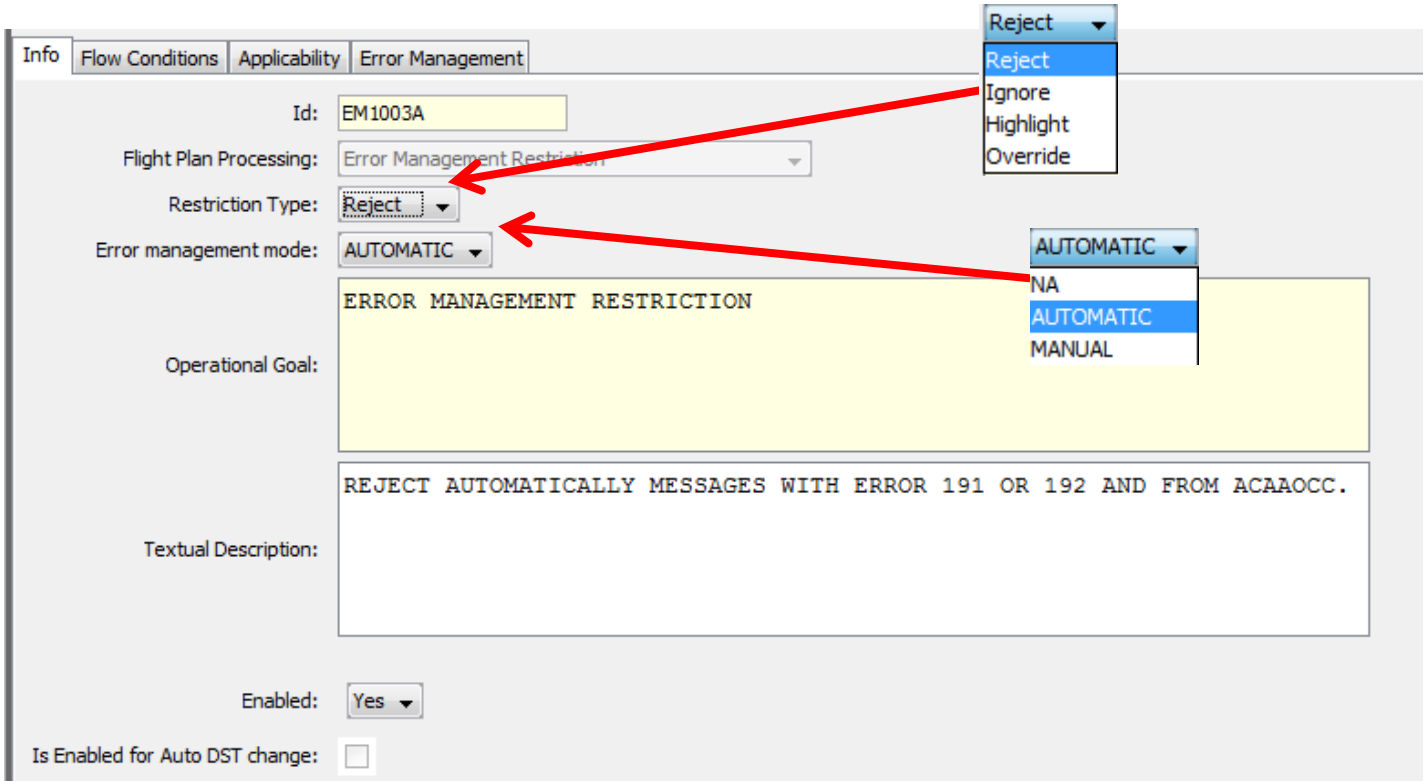
The NM systems support the IFPS staff to set up rules that allow to find conditions of a flight in flight plan messages fields - from several fields and using logical connectors- and:

- Force manual processing.
- Automatically ignore an error.
- Automatically reject the message.
- Automatically replace content.
- Automatically delete content.
- Automatically highlight errors for IFPS users.
- Automatically override content.
- In addition to the above, it shall support the prioritization of these rules amongst them.

Flight Plan Data Validation & Processing

Automation & Error Management

- Error Management has 4 tabs: **Info**, Flow Conditions, Applicability and Error Management:



Flight Plan Data Validation & Processing

Error types

Route element of FPL is not adhering to defined format or is not compliant with CACD

ROUTE

SYNTAX

Error due to non compliance with FPL Format

Inconsistencies / violations due to profile calculation

PROFILE

EFPM

Expanded Flight Plan Message (EFPM) error type

Warns for difficulties for new checks to be carried out by the IFPS (e.g. RVSM and 8.33 kHz.)

WARNING

Flight Plan Data Validation & Processing

Error types

- The address list (ADDR) error type.
- The association (ASSOC) error type.
- The file load (LOAD) error type.
- The general (GEN) error type.
- The syntax (SYN) error type.
- The Expanded Flight Plan Message (EFPM) error type.
- The ROUTE error type.
- The REROUTEING error type contains all those errors relating to the AOWIR use.
- The Profile (PROF) error.

Flight Plan Data Validation & Processing

Error types

SYNTAX (SYN)

The syntax error type contains all those errors raised when the submitted message does not adhere to the prescribed formats and manner of specifying data as described in ICAO Doc. 4444,

Appendices 2 & 3; ICAO Doc. 7030, EUR Region; the IFPS Software Requirements document, and in IFPS Users Manual.

Flight Plan Data Validation & Processing

Error types - SYN

FPL Data:

```
(FPL-SYN-IS
-B738/M-SDGILRWYZ/SB1
-EGSS1320
-N0441F370 CLN8R CLN P44 SOMVA OAT UP155 OKOKO UZ303 DHE  P729 TUDLO
-EKCH0113 ESMS
-PBN/A1B1D1O1S2 COM/TCAS REG/OOABC
EET/EHAA0017 EDVV0039  EKDK0054 OPR/RYR PER/C RVR/200)
```

Validation Results

Validated ICAO FPL

Errors
SYN109: FIELD CONTAINS INVALID CHARACTER(S) AT ROW= 2, COL= 19 (SEQPT)
SYN70: FIELD TEXT TOO SHORT AT ROW= 4, COL= 2 (ADEP)

Flight Plan Data Validation & Processing

Error types

ROUTE (RTE)

The Route error type contains all those errors raised where the data format and content in the route portion of the submitted message do not adhere:

to the prescribed formats and manner of specifying data,
or are inconsistent with the NM CACD.

Flight Plan Data Validation & Processing

Error types - RTE

FPL Data:

```
(FPL-RTE-IS
-B738/M-SDGILRWYZ/SB1
-EGSS1320
-N0441F370 CLN8R CLN P44 SOMVA UP155 OKOKO UZ303 DHE UL608 DOSUR
P729 TUDLO
-EKCH0113 ESMS
-PBN/A1B1D1O1S2 COM/TCAS REG/OOABC
EET/EHAA0017 EDVV0039  EKDK0054 OPR/RYR PER/C RVR/200)
```

Validation Results

Validated ICAO FPL

Errors
ROUTE139: UL608 IS PRECEDED BY DHE WHICH IS NOT ONE OF ITS POINTS
ROUTE140: UL608 IS FOLLOWED BY DOSUR WHICH IS NOT ONE OF ITS POINTS

Flight Plan Data Validation & Processing

Error types

PROFILE (PROF)

The Profile error type contains all those errors raised where data inconsistencies or violations are found during the calculation of the flight profile of the submitted message.

Flight Plan Data Validation & Processing

Error types - PROF

FPL Data:

(FPL-PROF-IS
-B738/M-SDGILRWYZ/SB1
-EGSS1320
-N0441F370 CLN8R CLN P44 SOMVA UP155 OKOKO UZ303 DHE UP729 DOSUR
P729 TUDLO
-EKCH0113 ESMS
-PBN/A1B1D1O1S2 COM/TCAS REG/OOABC
EET/EHAA0017 EDVV0039 EKDK0054 OPR/RYR PER/C RVR/200)

Validation Results

Validated ICAO FPL

Errors

PROF204: RS: TRAFFIC VIA EHTRA10AZ:F245..F660 [201909090630..201909091500] IS ON FORBIDDEN ROUTE REF:[EHTRA10AZR] RAD APPENDIX 7 / AREA ACTIVE BY AUP/UUP

Flight Plan Data Validation & Processing

Error types

Expanded Flight Plan Message (EFPM)

The Expanded Flight Plan Message (EFPM) error type contains those errors raised when data in the submitted message is inconsistent either:

- with other Items in that message or
- with the existing IFPS flight plan database, or
- there is insufficient data to create a flight plan.

Flight Plan Data Validation & Processing

Error types - EFPM

FPL Data:

(FPL-EFPM-IS
-B738/M-SDGHILRWXYZ/SB1
-EGSS1755
-N0439F350 CLN P44 RATLO M197 REDFA UL620 TULIP UY12 SPY UN873 GRONY UM105 EEL UN125 WSN L23
GIBMA GIBMA2P
-EDDW0058 EDDV
-PBN/A1B1D1O1S2 COM/TCAS DOF/190909 REG/EIGJF EET/EHAA0018 EDVV0043 EDWW0045 RVR/200
IFP/MODESASP)

Validation Results

Validated ICAO FPL

Errors

(R)EFPM321: FPL WITH SAME REG MARKINGS AND OVERLAPPING FLYING PERIOD EXISTS:RYR13BB EGSS1755 EDDW0058

Flight Plan Data Validation & Processing

Error types

WARNINGS

The Warning error type contains those errors that are generated to provide indications of difficulties in advance of the introduction of specific new checks to be carried out by the IFPS, e.g. RVSM and 8.33 kHz. Under these conditions, the error message is attached to the output message by the IFPS, but no manual processing error is raised.

Flight and Trajectory Management

Flight Plan Data Distribution

Flight Plan Distribution

Messages & Format

Messages

The NM systems distribute the following flight planning messages at prescribed times that have been validated to the intersected ATS Units and any other addresses defined in the additional addresses line of the flight plan messages:

- FPL – Flight Plan
- CHG - Change
- DLA - Delay
- CNL – Cancel
- DEP - Departure
- ARR - Arrival
- SPL – Supplementary message
- ACH – ATC Change
- APL – ATC Flight Plan

Flight Plan Distribution

Messages & Format

eFPL FIXM

Those ANSPs migrating to eFPL / FIXM need to receive flight plan information in this format to benefit from it.

ANSPs will choose those events that trigger a publication of flight plan information via B2B.

The NM systems transmit to subscribed ATS users flight plan information via B2B in FIXM format in response to certain events (Publish-Subscribe B2B service).

Flight Plan Distribution

Addressing

Flight plan addressing

- The NM systems redistribute the flight plan messages that passed validation to ATS.
- The NM systems calculate those airspaces that a flight profile penetrates, and therefore identify which Air Traffic Services Units (ATSU) shall require a copy of the flight plan or any associated messages for that flight.
- The NM systems provide a copy of the flight plan or any associated messages to:
  - ADEP – Airport Departure
  - ADES – Airport Destination
  - On Route inside IFPZ (flight plan profile) – see next slide
  - AD Line – if specified
- IFPS does NOT address :
  - VFR – Visual Flight Rules
  - OAT
  - ALTN AD – Alternated Aerodrome

Flight and Trajectory Management

Response to specific messages

Response to specific messages

Target Information

RQS

Upon request through a RQS message (Request Supplementary Flight Plan Message), the NM provides ATS with information that is not normally transmitted.

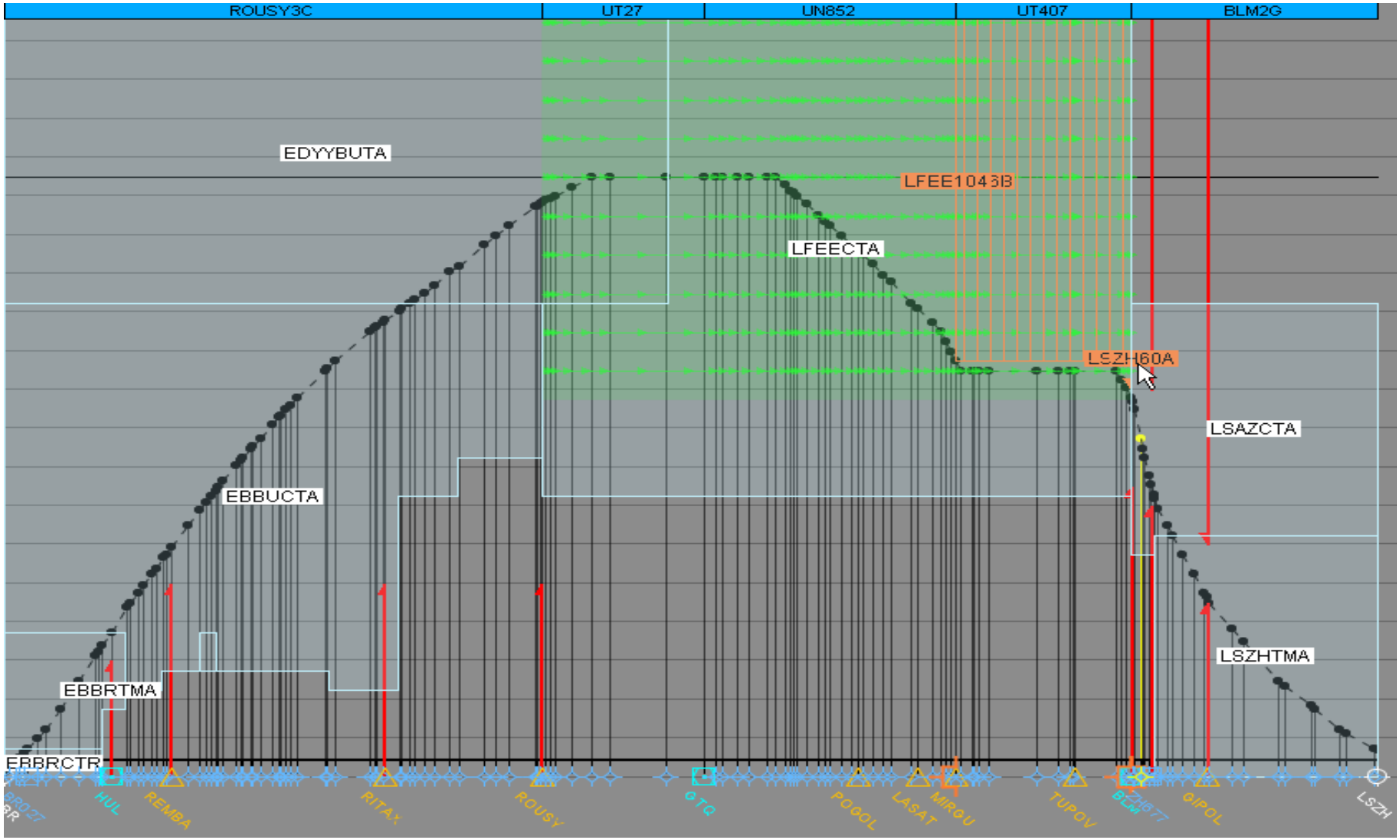
RQP

Upon request through a RQP message (Request Flight Plan), the NM provides ATS with a copy of existing FPL(s) that match it.

Post departure messages

Post departure messages from ATS need to be re-distributed to downstream ATS units indicating, where possible, that they are linked to existing flight data.

3D Profile


ROUSY3C
UT27
UN852
UT407
BLM2G
EDYYBUTA
LFEE1043B
LFEECTA
LSZH60A
LSAZCTA
EBBUCTA
EBBRTMA
LSZHTMA
EBBRCTR
HUL
REMBA
RITAX
ROUSY
GTQ
POGOL
LASAT
MIRGU
TUPOV
BLM
GIPOL
LSZH

Addressing from Profile

IFPS - Flight Plan History - SWR77P-EBBR-LSZH-1750-140106

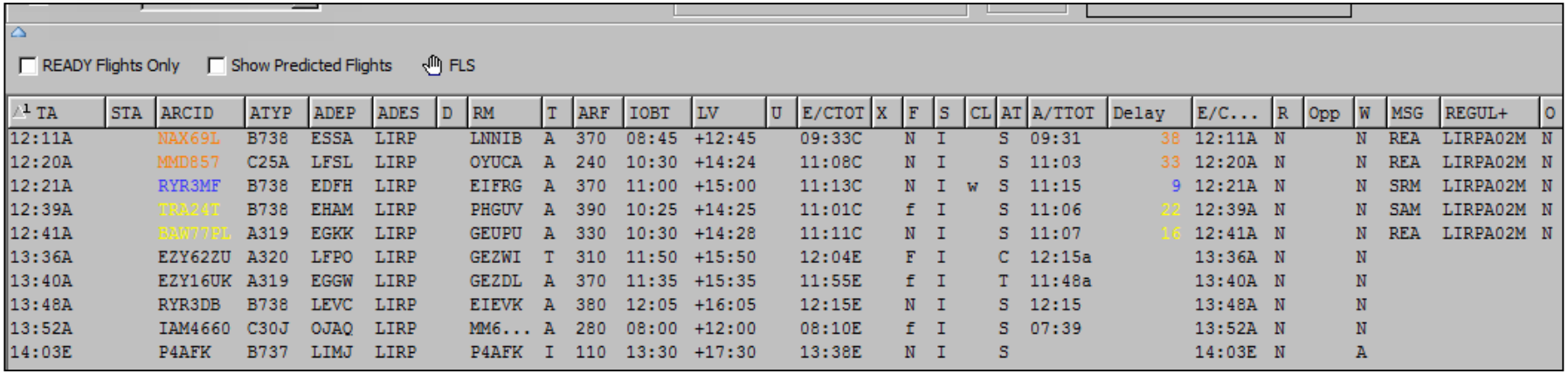
FPD_ID : AA99683123 Status : Active

Time Stamp	Classification	Mode	Msg In	Msg Out	Originator	Name
2014/01/06 06:46:10	CREATE	AUTO	IFPL		LSZHHDL18	vn_omh
2014/01/06 06:46:15	TRANSMIT_OK	AUTO		IFPL	EDDAYGCD	
2014/01/06 06:46:15	TRANSMIT_OK	AUTO		ACK	LSZHSWRO	
2014/01/06 06:46:15	TRANSMIT_OK	AUTO		IFPL	CFMUTACT	
2014/01/06 06:46:15	TRANSMIT_OK	AUTO		IFPL	LSZHZTZX LSZHSWRO	
2014/01/06 06:49:02	TRANSMIT_OK	AUTO		IFPL	EBBRZPZX LFPBYRYD EBURZQZX EBBUZQZX LSAZZQZX	
2014/01/06 06:49:02	TRANSMIT_OK	AUTO		IFPL	LFFFSTIP LSAZZQZG EBBRCATX	
2014/01/06 09:50:00	REVALIDATION_OK	AUTO				
2014/01/06 10:20:00	REVALIDATION_OK	AUTO				
2014/01/06 10:50:00	REVALIDATION_OK	AUTO				
2014/01/06 11:20:00	REVALIDATION_OK	AUTO				
2014/01/06 11:50:00	REVALIDATION_OK	AUTO				
2014/01/06 12:20:00	REVALIDATION_OK	AUTO				
2014/01/06 12:50:00	REVALIDATION_OK	AUTO				
2014/01/06 13:20:00	REVALIDATION_OK	AUTO				
2014/01/06 13:50:00	REVALIDATION_OK	AUTO				
2014/01/06 14:20:00	REVALIDATION_OK	AUTO				
2014/01/06 14:20:51	TRANSMIT_OK	AUTO		IFPL	EDYYZQZA EBBRAMSX EDDXYIYT	
2014/01/06 14:50:00	REVALIDATION_OK	AUTO				
2014/01/06 15:20:00	REVALIDATION_OK	AUTO				
2014/01/06 15:50:00	REVALIDATION_OK	AUTO				
2014/01/06 16:20:00	REVALIDATION_OK	AUTO				
2014/01/06 16:50:00	REVALIDATION_OK	AUTO				
2014/01/06 17:00:51	TRANSMIT_OK	AUTO		IFPL	EDYYZQZX	
2014/01/06 17:20:00	REVALIDATION_OK	AUTO				
2014/01/06 17:50:00	REVALIDATION_OK	AUTO				
2014/01/07 02:45:00	CLOSE_FPD	AUTO				

Flight Plan Distribution

Flight plan distribution

As well as distributing the flight plans to ATC, IFPS sends a copy to the Network Manager Enhanced Tactical Flow Management System. The ETFMS system stores and maintains the flight, including it in any required flow management processes.



READY Flights Only | Show Predicted Flights | FLS

TA	STA	ARCID	ATYP	ADEP	ADES	D	RM	T	ARF	IOBT	LV	U	E/CTOT	X	F	S	CL	AT	A/TTOT	Delay	E/C...	R	Opp	W	MSG	REGUL+	O
12:11A		NAX69L	B738	ESSA	LIRP		LNNIB	A	370	08:45	+12:45		09:33C		N	I		S	09:31	38	12:11A	N		N	REA	LIRPA02M	N
12:20A		MMD857	C25A	LFSL	LIRP		OYUCA	A	240	10:30	+14:24		11:08C		N	I		S	11:03	33	12:20A	N		N	REA	LIRPA02M	N
12:21A		RYR3MF	B738	EDFH	LIRP		EIFRG	A	370	11:00	+15:00		11:13C		N	I	w	S	11:15	9	12:21A	N		N	SRM	LIRPA02M	N
12:39A		TRA24T	B738	EHAM	LIRP		PHGUV	A	390	10:25	+14:25		11:01C		f	I		S	11:06	22	12:39A	N		N	SAM	LIRPA02M	N
12:41A		BAW77PL	A319	EGKK	LIRP		GEUPU	A	330	10:30	+14:28		11:11C		N	I		S	11:07	16	12:41A	N		N	REA	LIRPA02M	N
13:36A		EZY62ZU	A320	LFPO	LIRP		GEZWI	T	310	11:50	+15:50		12:04E		F	I		C	12:15a		13:36A	N		N			
13:40A		EZY16UK	A319	EGGW	LIRP		GEZDL	A	370	11:35	+15:35		11:55E		f	I		T	11:48a		13:40A	N		N			
13:48A		RYR3DB	B738	LEVC	LIRP		EIEVK	A	380	12:05	+16:05		12:15E		N	I		S	12:15		13:48A	N		N			
13:52A		IAM4660	C30J	OJAQ	LIRP		MM6...	A	280	08:00	+12:00		08:10E		f	I		S	07:39		13:52A	N		N			
14:03E		P4AFK	B737	LIMJ	LIRP		P4AFK	I	110	13:30	+17:30		13:38E		N	I		S			14:03E	N		A			

Flight Assistance

Other Flight Planning Services

Flight Planning Assistance

01 Flight Plan Preparation & Filing

02 Flight Plan Route Alternatives

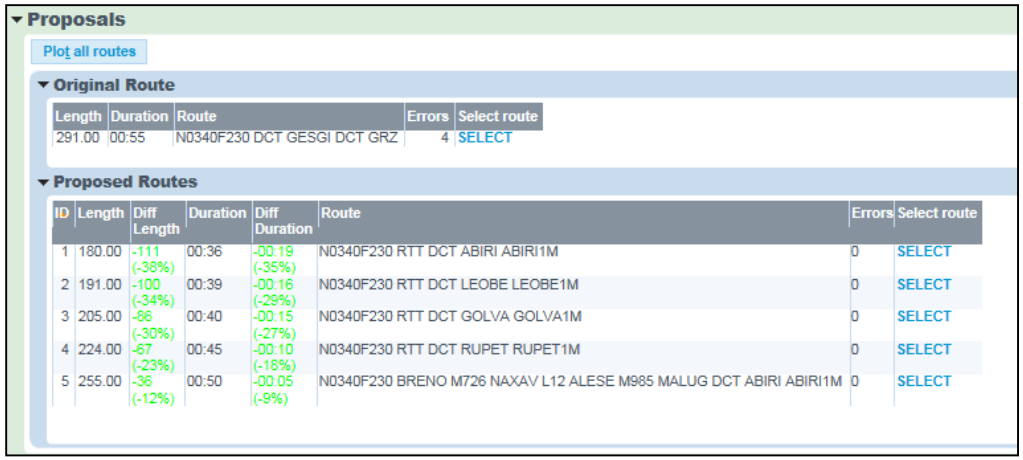
Specific Services

01 Alternatives Validation, Trial & Filing

02 Compute Alternatives with predefined criteria

03 ATFM Evaluation of Alternatives

The Network Manager provides flight plan filing assistance to Airspace Users via both B2C and B2B interfaces.



Proposals

Plot all routes

Original Route

Length	Duration	Route	Errors	Select route
291.00	00:55	N0340F230 DCT GESGI DCT GRZ	4	SELECT

Proposed Routes

ID	Length	Diff Length	Duration	Diff Duration	Route	Errors	Select route
1	180.00	-111 (-38%)	00:36	-00:19 (-35%)	N0340F230 RTT DCT ABIRI ABIRI1M	0	SELECT
2	191.00	-100 (-34%)	00:39	-00:16 (-29%)	N0340F230 RTT DCT LEOBE LEOBE1M	0	SELECT
3	205.00	-86 (-30%)	00:40	-00:15 (-27%)	N0340F230 RTT DCT GOLVA GOLVA1M	0	SELECT
4	224.00	-67 (-23%)	00:45	-00:10 (-18%)	N0340F230 RTT DCT RUPET RUPET1M	0	SELECT
5	255.00	-36 (-12%)	00:50	-00:05 (-9%)	N0340F230 BRENO M726 NAXAV L12 ALESE M985 MALUG DCT ABIRI ABIRI1M	0	SELECT

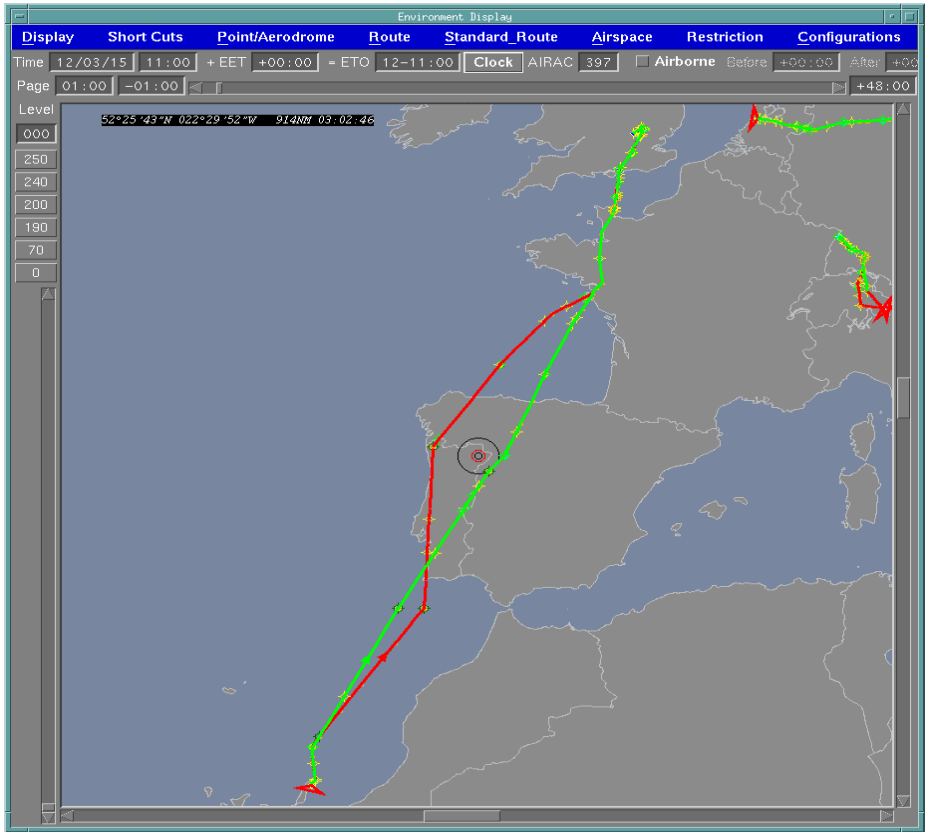
```
-TITLE REJ -MSGTYP IFPL -FILTIM 021239 -ORIGINDT 1705021239
-BEGIN ADDR
       -FAC DUBOEFR
-END ADDR

-POSRTE N0330F190 LISTO L612 HON/N0346F230 L15 PIXUP/N0367F270 L15
BETPO/N0345F230 L15 BIG Q70 DET/N0351F230 Q70 ITVIP/N0342F210 Q70
MOKBU/N0310F150 Q70 KOK

-ERROR (R)PROF205: RS: TRAFFIC VIA EGCN EGNH EGNJ EGNM EGNO EGNT EGNV EGCC
IS OFF MANDATORY ROUTE REF:[EG2560B] HON L/UL15 BIG
-OLDMSG
(FPL-RYR5XA-IS
-B738/M-SDGHIRWXYZ/SB1
-EGCC1805
```

Flight efficiency

- The NM signed the Flight Efficiency Plan in 2008 and agreed with partners to work in an even closer partnership along with airlines, airports and ANSPs to identify solutions and launch operational actions that will lead to fuel and emissions savings in the short term.



Flight efficiency

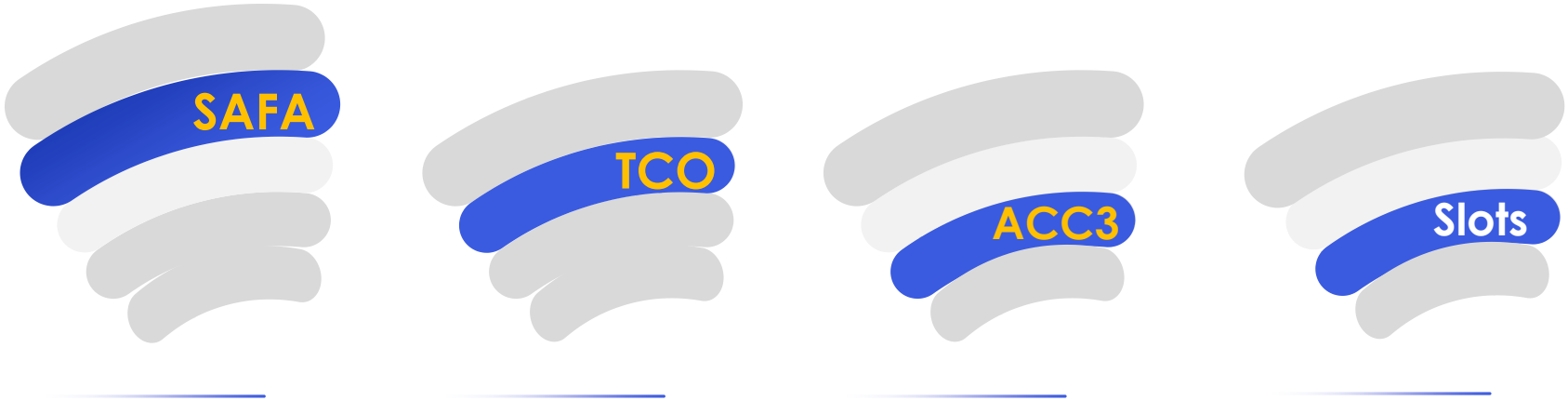
Route opportunities	NM system looks for opportunities during the tactical day of operations. The opportunities are define based on periodical or key events (e.g. released constrained milestones)
CDM	The opportunities are presented and offered to airspace users using the B2B and B2C interfaces.
Customer tailored	NM adapts the opportunities raised as coordinated with the airspace user. The opportunities are adapted to specific cost criteria based on individual parameters.

Flight Monitoring & Alerting

Other Flight Planning Services

Flight Monitoring & Alerting

- Monitoring and alerting of flight plans/schedules/intentions
- Safety & Security & Airport Slots
- Alert relevant National Authorities



EU Safety Alarming Functions

https://ec.europa.eu/transport/modes/air/safety/safa_en

EU Ramp Inspections Programme

The EU Ramp Inspections Programme is a European Union Programme that concerns the performance of ramp inspections on aircraft used either by third country operators (Safety Assessment of Foreign Aircraft - SAFA) or by operators under the regulatory oversight of another EU Member State (Safety Assessment of Community Aircraft- SACA). The Programme is regulated by Regulation (EU) No 965/2012 , which entered into force on 28 October 2012, and it provides for the inspection of aircraft for compliance with the

Air
- Airport
- Aviatio
- Civil Inve
- EU
- Euro (EA
- Euro
- Safe
- Stre thro
- The
- ENCA
- Enviro
- Europe (UAS)
- Interna
- SESAR

ANNEX A

LIST OF AIR CARRIERS WHICH ARE BANNED FROM OPERATING WITHIN THE UNION, WITH EXCEPTIONS[1]

Name of the legal entity of the air carrier as indicated on its AOC (and its trading name, if different)	Air Operator Certificate ('AOC') Number or Operating Licence Number	ICAO airline designation	State of the Operator
BLUE WING AIRLINES			
IRAN ASEMAN AIRLINES			
IRAQI AIRWAYS			
All air carriers certified by the authorities with responsibility for regulatory oversight of Afghanistan, including			

Detection of flight plans from a non-EU airport that use aircraft part of the safety list of aircraft prohibited to enter European airspace and alerting European Commission, EASA and the NSA (black list)

Air

From non-EU countries

Detection of flight plans of air cargo or mail carriers from a non-EU airport that are not allowed and alerting EC, EASA, NSA (white list)

Air carriers that fly air cargo or mail into the EU from a non-EU airport are required to comply with the EU ACC3 programme for inbound cargo and mail. Only air carriers that comply with this programme can be designated as an 'Air Cargo or Mail Carrier operating into the Union from a Third Country Airport' (ACC3) and may thus carry cargo or mail into the EU. ACC3 designation is required for each non-EU airport from which an air carrier flies air cargo or mail to the EU.

ACC3s must ensure that all cargo and mail is physically screened according to EU standards or comes from an EU aviation security validated secure supply chain. EU aviation security validation of ACC3's cargo and mail operations at each departure airport for EU bound flights is mandatory since 1 July 2014.

https://ec.europa.eu/transport/modes/air/security/cargo-mail/non-eu_en

EU Safety Alarming Support System

EU Safety Alarming Support System

- FAAS – Flight Assessment and Alert System
- Safety Assessment and Alert System
- Alerts about banned AOs and ACs trying to fly the European airspace
- ACC3/CARGO: alerts about non-certified Cargo flights trying to fly the European airspace

Third Country Operator authorisation (TCO)

Third Country Operators (TCO)

- The NM monitors flight planning messages and produce alerts when a flight operating into the EU does not have an TCO authorization.
- By maintaining a database of TCO-approved lists and alarms with its parameters (contact information for alerts, exceptions).
- Processing incoming flight planning messages against the latest values in the TCO database.
- Producing and distributing alerts per flight for those flights that have been matched with the TCO database.

Call Sign Similarity Tool

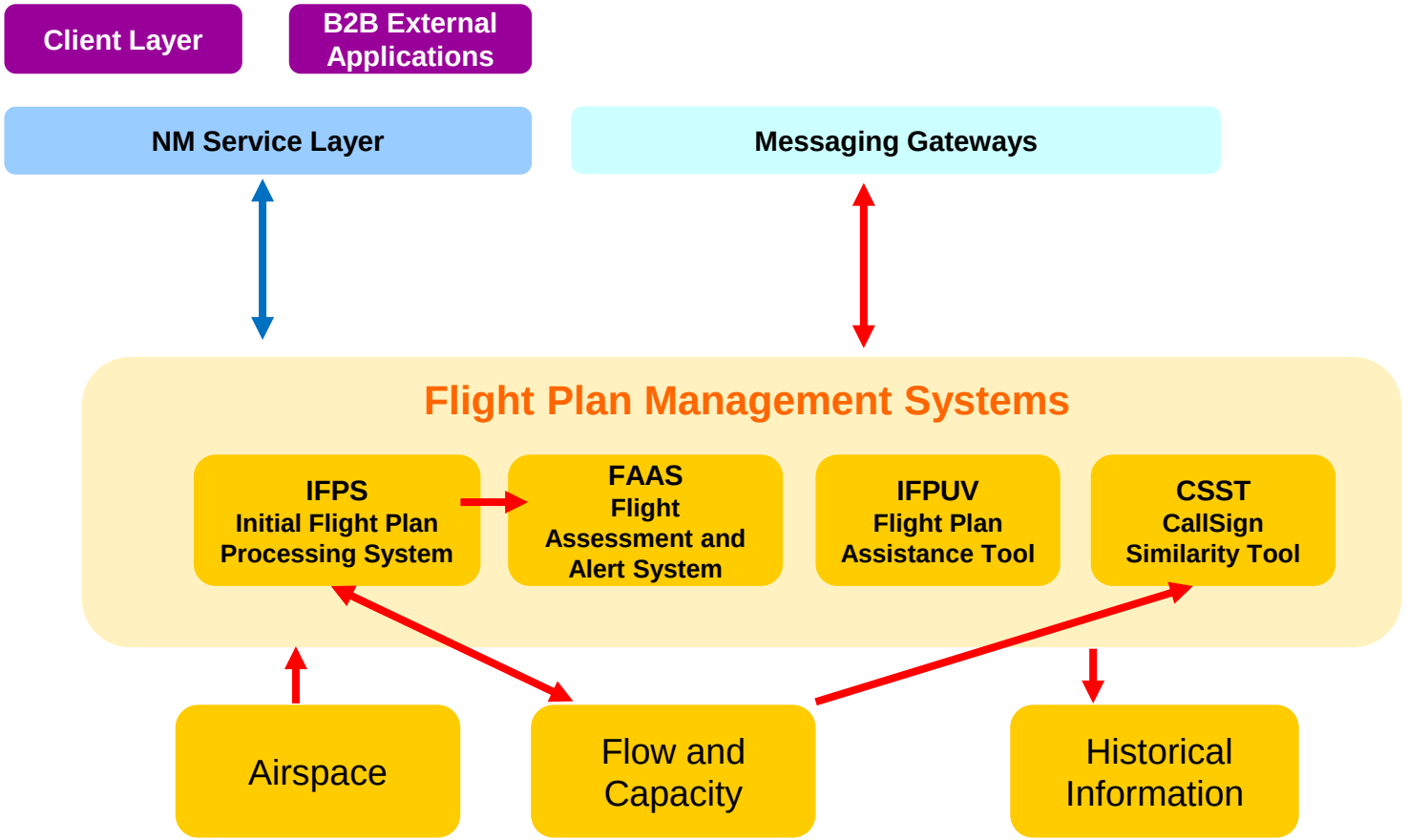
Call Sign Similarity Tool (CSST)

Call Sign Similarity detection and de-confliction in airline schedules aims to reduce the level of operational call sign confusion events and therefore improve levels of safety
http://www.icao.int/MID/Documents/2015/CSC%20WG1/1-CSS%20Project%20Overview.pdf

- *Anagrams:*
  - *DEC – DCE*
  - *152 – 125*
  - *1524 – 1425*
- *Final identical figures / letters:*
  - *ABC 458Z – ABC 179Z*
  - *ABC 45 MU – ABC 76 TU*
  - *ABC 648 – ABC 748*
  - *ABC 23 XG – DEF 56 XG*
- *Parallel figures / letters:*
  - *1458 – 1478*
- *Block figures / letters:*
  - *ABC – ABO*
  - *ABC 128 – ABC 128T*
  - *ABC 573 – ABC 57*
  - *ABC 573 – ABC 575*
  - *ABC 52 – ABC 57*
- *Phonetic parallel:*
  - *712 – 7012*

OPERATIONAL SYSTEMS

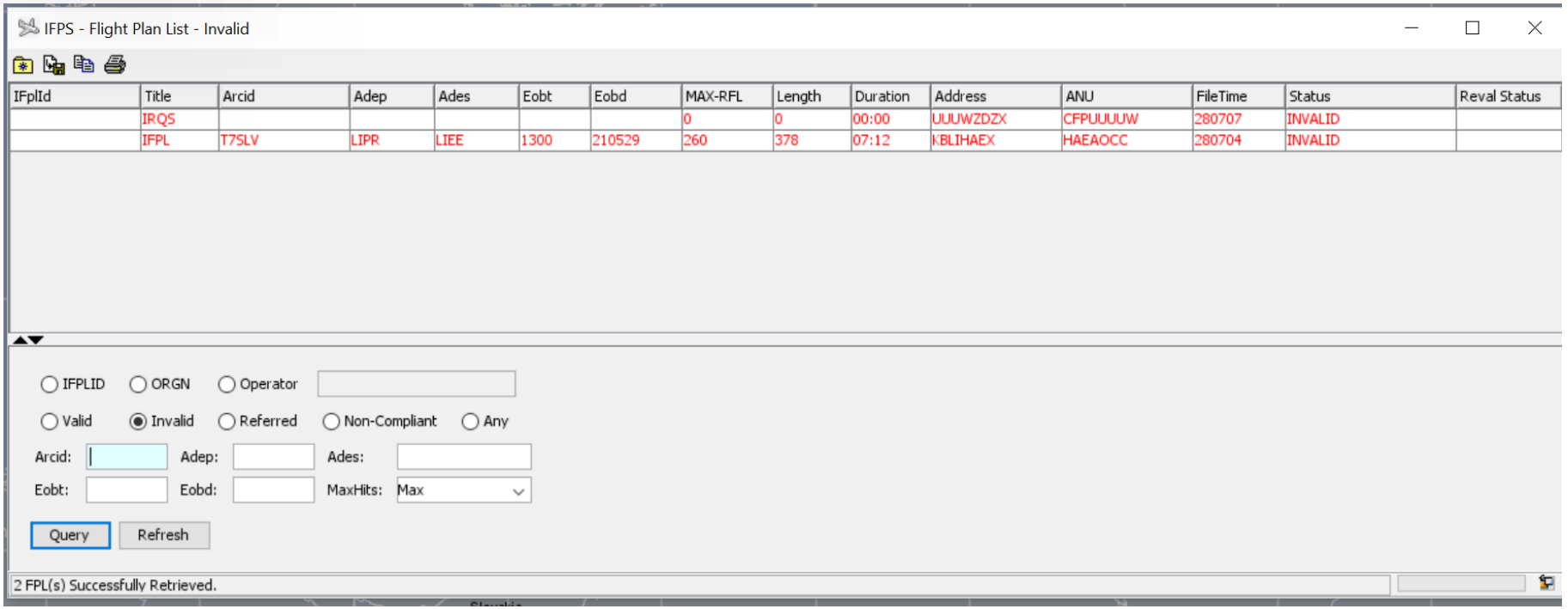
Flight Plan Management Systems



IFPS Interface

IFPS Interface

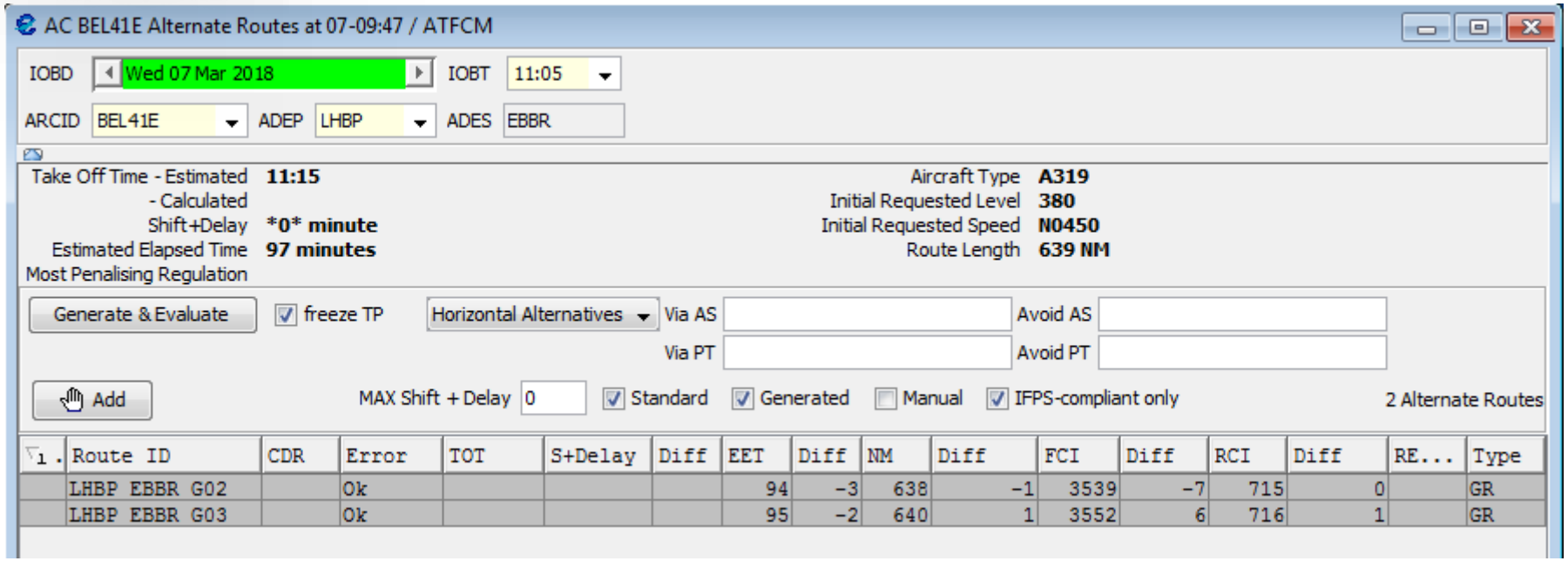
Invalid flight plans queue used by NM operators on daily basis:



Advanced Flight Management interface

Advanced Flight Management interface

The Advanced flight management tab allows user to enter a flight plan directly in ADEXP or ICAO format, validate it against IFPUV, request for route proposals, and then submit it.
User may either type in the data, or paste it from an external Flight Plan editing application.

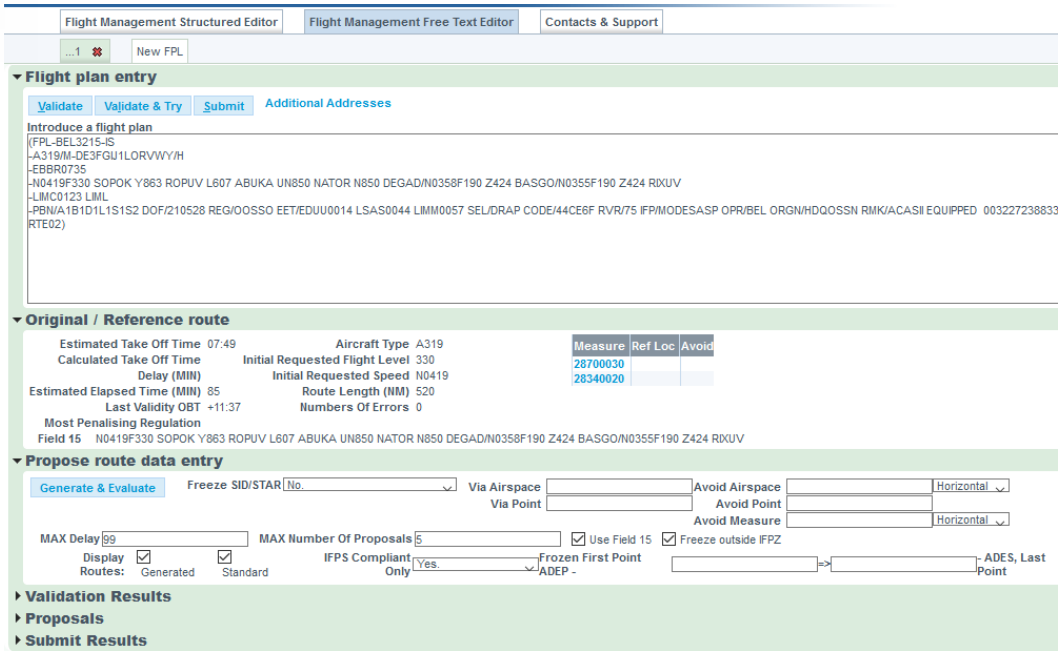


IFPS Validation system (IFPUV).

IFPS Validation system (IFPUV).

It is aimed to allow Airspace Users and Aerodrome Reporting Offices to submit their flight plans to a dedicated test system for validation, prior to their submission to the operational system.

It may also be used to find an IFPS compliant route.



OPERATIONAL DOCUMENTATION

IFPS Users Manual

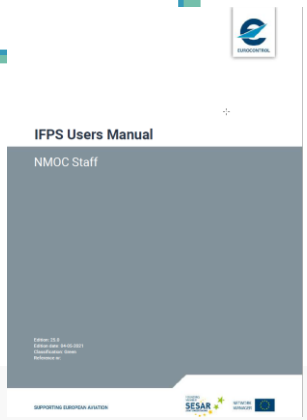
Scope

Applies to the process of flight plan submission, modification and distribution.
The provisions of the document apply to:

- Network Operations staff engaged in IFPS operations.
- Aircraft Operators (AOs).
- ATS Reporting Offices (AROs).
- Message originators.
- Air Traffic Services Units (ATSUs) while processing flight plan data.

Flight Portions

The procedures in this document apply to the initial flight planning process for all IFR GAT portions of flights intended to be conducted in any part of the IFPZ.



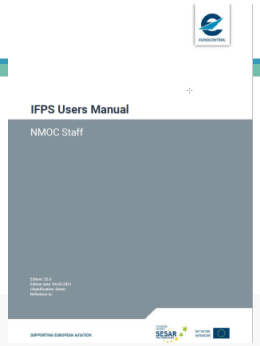
IFPS Users Manual

EUR REGION

Forms part of the Network Operations Handbook as referred to in ICAO document, REGIONAL SUPPLEMENTARY PROCEDURES, EUR REGION (DOC 7030).

Publication

Versions of the manual shall normally be published at least one month prior to the date of applicability and the date of application of the procedures shall be notified in each issue.
Specific temporary procedures may be introduced under the authority of the Network Manager.



FLIGHT PLAN AND DATA EVOLUTION

Flight Plan and Flight Data Evolution

FF-ICE/1

- 4D Trajectory
- GUFI, FIXM filing and distribution
- Planning service
- Trajectory negotiation

- Integration of aircraft Trajectory in NM systems

- Use PBN and other CNS capabilities in flight planning and flow management

- VFR / OAT in current studies

Flight Plan and Flight Data Evolution

Flight Plan and Flight Data Evolution

Benefits (for airlines)

- Process simplification – 21st century!
- Less flight plan rejections
- Full automation
- Airline preferences (routes)
- Awareness of constraints – better planning
- Better use of resources
- Better use of CNS capabilities of aircraft

QUESTIONS ?