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Abstract

These guidelines provide clarifications and best practices concerning the OLDI data exchanges for flights between air traffic control units using electronic data transfer between flight data processing systems.

This specific edition of the guidelines is in direct support to the EUROCONTROL Specification for On-Line Data Interchange Edition 6.0.

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DOCUMENT CHANGE RECORD

The following table records the complete history of the successive editions of the present document.

EDITION NUMBER	EDITION DATE	REASON FOR CHANGE	PAGES AFFECTED
1.0	14/06/2019	First release	All
1.1	14/07/2020	Updated edition to align with the publication of OLDI Edition 5.0 Foreword Deletion of section 2.2.4 on REV update Updated SSR example 1 (10:06-26) Updated SSR example 2 (10:10-12, 10:25-26) Updated SSR example 3 (10:04, 10:11 and 10:14) New section 2.4 on evolution of OLDI for FRA Updated FRA scenario 1 (12:41) Updated FRA scenario 7 (10:51) New section on en-route cruising level (ECL) Deletion of last sentence of 3.1.3, 3.1.4 Deletion of sections 3.1.6 and 3.1.7 on MAC, ABI, ACT, PAC, RAP updates Review of guidance on PNT message and example Updated AMA forward example (10:18-19, 10:25) Deletion of section 3.5.10, route field in AMA message Deletion of section 3.5.12 on AMA update Deletion of sections 3.6.4 and 3.6.5 on LOF update Replace ATC B by ATC C in case study 1 (13:52) Clarified description of flight in case study 2 Reviewed figure 27	 ix-x 13 17-18 21-22 25 27-28 38 65 69-75 77, 78 79 83-89 94-97 104 104 107 153 156 167
1.2	15/06/2022	New paragraph for utilisation of APP type Amendment of paragraph 3.6.1 and 3.7.1 Deletion of paragraph 3.6.2 Addition of paragraph 3.9	
2.0	23/04/2026	The significant changes are elaborated in the FOREWORD chapter of these guidelines	

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FOREWORD

1 Responsible Body

The EUROCONTROL Guidelines for On-Line Data Interchange (OLDI) have been prepared by the EUROCONTROL Network Manager Directorate (NMD) in close cooperation with the operational stakeholders and ATM system manufacturers within the OLDI Group of the NETOPS cooperative arrangement who provided the main content.

2 Relationship with EUROCONTROL Specification OLDI Edition 6.0

The need for the development of implementation guidance was previously identified by the OLDI Group and acknowledged by NETOPS when preparing previous editions of the EUROCONTROL OLDI Specification.

These guidelines continue to address that need, by providing updated clarifications for the OLDI Specification Edition 6.0 content and, best practices for the implementation of OLDI message exchanges and associated operational processes and procedures.

3 Relationship to Other Documents

These Guidelines support the implementation of EUROCONTROL Specification for On-Line Data Interchange (OLDI) (*EUROCONTROL-SPEC-106), edition 6.0.*

Regarding the format of OLDI messages, it refers to the EUROCONTROL Specification for ATS Data Exchange Presentation (ADEXP) (*EUROCONTROL-SPEC-107)* Edition 4.0 for OLDI messages in the ADEXP format.

The IFPS messages described in these guidelines relating to OLDI message exchanges are defined by the EUROCONTROL NM document “Flight Progress Messages Document” Edition 3.000.

4 Significant Changes from OLDI Guidelines Edition

The OLDI Guideline 1.2 was thoroughly reviewed and updated. Many changes have been performed in order to align it with the OLDI Edition 6.0. The changes are clustered as:

1. Substantial revision of existing chapters (from the previous edition) and
2. New content to support the new elements introduced by the OLDI Specification Edition 6.0.

4.1 Substantial revision of existing chapters

- Update of section 1.9 – Reference material
- Minor changes of sections 3.1 and 3.2, ICAO format example removed, and the content of REV message aligned.
- Major changes of section 3.3, enhanced ORCAM was removed, and all figures and examples were designed and redrafted.
- Major changes of sections 3.4 and 3.5 all examples were reviewed and amended, figures redesigned, gate concept introduced as well as the possibility of sharing trajectory data. All message in examples aligned in the provision of OLDI 6.0.
- Minor amendments of section 3.6 (utilisation of ECL) by adding route to ACT message examples and removing item that did not change in REV message content.
- Minor amendments of section 4.1 (MAC message explanatory notes).
- Significant amendments of section 4.2 (SDM message) with a new example.

- Minor amendments of section 4.3 (SDM message explanatory notes) by removing the possibility to exchange frequency using the SDM message
- Major changes of PNT explanatory notes, examples and figure as well, to align it with the amended PNT content in the specification.
- Minor text alignment of section 4.5 and amendment of use case depiction (all Figures were amended).
- Minor updates and text revision of section 4.7.
- Complete review of section 4.8 with many updates and changes.
- A significant update of section 4.9 to reflect the elaborated purpose of TIM and new FDM.
- Chapter 5 related to the ATC exchanges with NM (AFP, APL, ACH) and now reflects the way in which IFPS is handing these messages. The figures have been amended, background section completely reviewed, and ICAO format examples removed. The section related to the OLDI-FO content mapping was completely suppressed.
- Minor adaptation and rewording of chapter 6.
- Slight adaptation and change of figures contained in chapter 7, the essence basically remains the same.
- A minor update of chapter 12.

4.2 New content

- New chapter 2 of the OLDI Guideline addresses the transition from the OLDI Specification 5.1 to the OLDI Specification 6.0 with recommendations about how to manage OLDI interfaces in an environment with mixed use of the current and previous OLDI specifications.
- New section 4.6 related to the RST and PST messages that exchange STAR/arrival runway per flight (introduced by OLDI 6.0) contain explanatory notes, relevant exchanges and examples.
- New section 4.11 relates to the FDM message for the exchange of frequency per flight (introduced by OLDI 6.0) containing explanatory notes, relevant exchanges and examples.
- New chapter 8 relates to the SFP message that exchanges sectorisation and frequency plan data (SFP introduced in OLDI 6.0) contains explanatory notes, relevant exchanges and examples.
- The Civil-Military coordination and airspace crossing exchanges that were contained in Chapter 8 of OLDI Specification edition 5.1 were moved into chapter 9 of this OLDI Guideline.
- New chapter 10 concerns the Advanced coordination process and relevant message exchanges. These messages were considered to be immature to be integrated in OLDI Specification Edition 6.0, therefore, this OLDI Guideline now contains the advanced coordination message set which can be revisited in a future edition of the OLDI specification/OLDI Guidelines.
- New chapter 11 related to the SKIP mechanism (greatly extended by OLDI 6.0, especially with the addition of an ATS unit skip feature) contains explanatory notes, relevant message exchanges and examples.
- Diagram and Figures contained in the Annexes C and D of the OLDI Specification edition 5.1 were moved in the chapter 13 of this OLDI Guideline.

1 Introduction

1.1. Purpose of the document

During the drafting of the Edition 4.3 of the EUROCONTROL Specification for On-Line Data Interchange (OLDI), the OLDI Sub-Group identified the need to prepare additional guidelines in support of its implementation, both clarifying certain provisions of the OLDI specification and, preparing the ground for a future edition.

Edition 2.0 of these EUROCONTROL Guidelines contains the agreed clarifications and best practices applicable to a number of OLDI messages, functions, relevant processes and some Human Machine Interface aspects as outlined in Section 1.3. In addition, the guidelines document specific issues reported by several operational stakeholders and their potential solutions that may be further developed in the context of future OLDI Specification review cycles. In view of the central role of OLDI in ATM systems, the potential solutions have been included in these guidelines so that they can be brought to the attention of all stakeholders and initiate early discussions to resolve any potential operational issues.

Edition 1.2 of this guideline was thoroughly reviewed by the OLDI Sub-Group. The resulting edition 2.0 of the OLDI Guideline is now complimentary to and fully aligned with Edition 6.0 of the OLDI Specification. Many sections of this document have been revisited and some of the messages described in former editions of the specification have been placed in this Guideline.

1.2. EUROCONTROL Guidelines

EUROCONTROL Guidelines, as defined in EUROCONTROL Regulatory and Advisory Framework (ERAF), are advisory materials and contain:

“Any information or provisions for physical characteristic, configuration, material, performance, personnel or procedure, the use of which is recognised as contributing to the establishment and operation of safe and efficient systems and services related to ATM in the EUROCONTROL Member States.”

Therefore, the application of EUROCONTROL Guidelines document is not mandatory.

In addition, EUROCONTROL Regulatory and Advisory Framework specifies that:

“EUROCONTROL Guidelines may be used, inter alia, to support implementation and operation of ATM systems and services, and to:

- complement EUROCONTROL Rules and Specifications;
- complement ICAO Recommended Practices and Procedures;
- complement EC legislation;
- indicate harmonisation targets for ATM Procedures;
- encourage the application of best practices;
- provide detailed procedural information.”

These EUROCONTROL Guidelines have been developed under the EUROCONTROL Regulatory and Advisory Framework (ERAF) and are maintained by EUROCONTROL in accordance with this Framework.

1.3. Structure of the document

The structure of these guidelines is as follows:

Section 2: Transition from OLDI 5.1 to OLDI 6.0:

Section 3: Clarification and guidelines applicable to all OLDI messages:

- STAY indicator processing
- Change of ADES processing
- SSR code management for OLDI
- The handling of FRA environments with OLDI
- Utilisation of the En-route Cruising Level

Section 4: Clarification of operational use and purposes of some OLDI messages:

- Redrafting of MAC messages to comply with the operational stakeholder needs, especially in cases of trilateral coordination
- CDN message intent, purpose and operational use
- Operational scenario of flight transfer data exchanges in the context of CPDLC exchanges. The transfer phase data exchanges without CPDLC and procedures applied in case of wrong transfer
- SDM message intent, purpose and operational use
- PNT message intent and operational use
- AMA message clarifications
- LOF upgrade to cater for ATNB2 needs

Section 5: OLDI relationship with other methods for flight data exchanges:

- Clarify the OLDI content and timing versus the current ANSPs/NM data exchanges

Section 6: OLDI situation awareness messages

- Runway Configuration message (RCM)
- OLDI data exchanges with TWR units

Section 7: OLDI relationship with the Core FDP functions

- OLDI handling of re-entrant flight

Section 8: Exchange of sectorisation and Frequency plan

Section 9: Civil - Military Co-ordination – Airspace Crossing

Section 10: Advanced coordination exchanges

Section 11: Explanatory notes of SKIP mechanism

Section 12: OLDI testing and validation

Section 13: Diagrams

1.4. Applicability

These guidelines are intended to be read and used by all Air Navigation Service Providers (ANSPs) in the EUROCONTROL Member States (43) and Comprehensive Agreement States (3) that implement the EUROCONTROL On-Line Data Interchange Specification.

1.5. Conventions

Throughout this document, recommendations and best practices are indicated using the words “these guidelines recommend”.

Throughout this document, numbered requirements of the form OLDI-XXX-XXX-X are those of the EUROCONTROL OLDI Specification [RD 1] .

An arrow is used to indicate the transfer between two ATS centres and may be preceded by a message describing which message is being sent. For example, MAC ACC A → UAC C is a MAC message sent from ACC A to UAC C abrogating the coordination.

1.6. Maintenance of the document

The EUROCONTROL Guidelines for On-Line Data Interchange (OLDI) have been prepared by the EUROCONTROL Network Manager Directorate (NMD) in close cooperation with the operational stakeholders within the OLDI Sub-Group of the NETOPS cooperative arrangement who provided the main content.

These Guidelines have been published under the EUROCONTROL Regulatory and Advisory Framework (ERAF) and are maintained by EUROCONTROL in accordance with this Framework.

The maintenance procedures for these guidelines are described in detail in ANNEX B - Document Update Procedures.

1.7. Definitions

No specific definitions have been elaborated for the purpose of these Guidelines. Refer to the definitions contained in the reference material (see Section 1.9).

1.8. Abbreviations

The abbreviations applied within this document are listed in ANNEX A – List of abbreviations.

1.9. Reference material

This section describes any relevant material used for the development of this document.

[RD 1] EUROCONTROL Specification for On-Line Data Interchange (OLDI) (*EUROCONTROL-SPEC-106)*, Edition 6.0, TBD

[RD 2] EUROCONTROL Specification for ATS Data Exchange Presentation (ADEXP), (*EUROCONTROL-SPEC-107)* Edition 4.0, TBD

[RD 3] PANS-ATM] Procedures for Air Navigation Services - Air Traffic Management, ICAO Document 4444, Sixteenth Edition, Amendment 12, dated 28th November 2024

[RD 4] EUROCONTROL Network Manager Flight Progress Messages Document, Edition 2.9, dated 01 October 2023

[RD 5] EUROCONTROL IFPS User's Manual MAINT-2 External Edition, dated 17 May 2024

[RD 6] Commission Implementing Regulation (EU) No 716/2014 of 27 June 2014 on the establishment of the Pilot Common Project supporting the implementation of the European Air Traffic Management Master Plan

[RD 7] Commission Implementing Regulation (EU) No 2021/116 of 1 February 2021 on the establishment of the Common Project One supporting the implementation of the European Air Traffic Management Master Plan

[RD 8] Commission Implementing Regulation (EU) 2023/1771 of 12 September 2023 amending Implementing Regulation (EU) 2017/373 as regards air traffic management and air navigation

services systems and constituents and repealing Regulations (EC) No 1032/2006, (EC) No 633/2007 and (EC) No 262/2009.

OLDI modernisation study edition 1.0, developed by LEONARDO, dated 2nd December 2023.

ATC-ATC TBO group- recommendations for way forward, dated October 2024.

2 Transition from OLDI 5.1 to OLDI 6.0

OLDI edition 6.0 introduced a wide range of changes in comparison with OLDI edition 5.1. There is no single approach for this transition that fits all the operational contexts as it depends on the current OLDI capabilities, ANSPs vision and identified operational needs, the ANSP's implementation roadmaps, investment plans, budget as well as the capabilities of adjacent ATSUs and provisions of relevant Letter of Agreement (LoA). This paragraph intends to provide guidance to the possible approach of ANSP transition to OLDI 6.0.

Most changes introduced by OLDI edition 6.0 can be clustered as:

- Changes of mandatory data items in the coordination and transfer processes covered by COMMISSION IMPLEMENTING REGULATION (EU) 2023/1771;
- Changes of data items for the OLDI messages outside of 2023/1771;
- New messages that have been added in edition 6.0.

It is recommended that implementers start the transition to edition 6.0 by adapting the OLDI messages referenced by the mandatory and optional process defined by COMMISSION IMPLEMENTING REGULATION (EU) 2023/1771. These mandatory and optional process are covered by the provisions of OLDI specification edition 6.0 as:

- Chapter 6
- Paragraphs 7.1 and 7.2
- Paragraphs 8.2 and 8.3
- Chapter 9

Nowadays, the content of each specific OLDI message in most cases is adaptable in terms of data items, therefore, changes such as the mandatory utilisation of route and message reference data items for ABI/ACT/REV/PAC and MAC may be achieved via FDPS configuration. In this case, those data items would already exist as possible elements of the message payload.

In the case of FDPSs that do not support adaptation of OLDI message contents or if previously optional fields were not procured, ANSPs would require an upgrade of the OLDI module.

The inclusion of newly added optional fields (i.e. Trajectory Data, Arrival Runway, Departure Runway) for these messages cannot be covered by the configuration optimisation, meaning that an OLDI module upgrade would be necessary. However, their implementation mostly depends on an operational assessment with their adjacent ATSUs and eventual amendment of the respective LoA.

The compliance of BFD and CFD could easily be achieved via configuration of existing messages. The management of new optional fields and the manual sharing of BFD would require an upgrade of OLDI modules.

The LOF and NAN messages were slightly adapted to support the SKIP mechanism. The ANSPs that opt to implement the OLDI SKIP mechanism should request the required modification of LOF/NAN messages.

Similarly, the COF and MAS messages were slightly adapted to support the SKIP mechanism. The ANSPs that opt to implement the OLDI SKIP mechanism should also request the modification of COF/MAS messages. As with the previous messages, the inclusion of other optional fields for COF message (Sector Identifier and Released Flight Level Limit) may not be covered by the configuration of the message contents. They depend on the operational need

that would be reflected in the LoA provisions with adjacent ATSUs and would require the upgrade of the OLDI module.

The second priority for the transition to edition 6.0 would be the content adaptation of the remaining OLDI messages that are operationally deployed or in the pipeline for operational deployment. Much like in the aforementioned messages, for some messages, the compliance with OLDI edition 6.0 could be achieved via configuration of existing OLDI modules (AMA, SDM, COD), while for other messages (TIM, PNT, OCM, CRQ, CRP) an upgrade of the relevant OLDI module would be needed.

The compliance of OLDI dialogue messages (RAP, RRV, CDN, RTI, TIP) with edition 6.0 in most of the cases could be achieved via configuration of existing OLDI modules, as edition 6.0 requires a reduced number of data items to be used.

The third priority would be the upgrade of OLDI modules that in most cases have not been deployed like RLS and RRQ. If these messages are available in the FDPS of the concerned ANSPs, a slight adaptation or software change might be needed.

The fourth priority would be to procure and implement the complete set or sub-set of new messages (FDM, PST, RST, SFP, SCO, SKC, BYP and SKN), depending on the identified operational needs and capabilities of adjacent ATS units. It should be noted that some message sets like SKIP-related messages or PST/RST might only be required by some OLDI enabled ANSPs. On the other hand, the implementation of SFP and/or FDM would depend on the path chosen in coordination with partner ATS units. Depending on ANSP operational needs and business plan, the procurement of these new message sets/sub-sets may be elevated in terms of priorities and planned further in time.

The OLDI Sub-Group decided to make the ADEXP format the only one referred to in edition 6.0 for the exchange of OLDI messages. However, up to edition 5.1, the ICAO format was also maintained in the OLDI specification for a sub-set of messages and with some specific limitations. As part of the transition to edition 6.0, it is likely that the exchange of OLDI messages in ADEXP format is not achieved by all ATS units at the same time. Some neighbouring ATS units may even decide to maintain the use of ICAO format in OLDI messages for an undefined period of time. To maintain basic interoperability in a mixed environment, the OLDI Specification edition 5.1 (and previous editions) remain available for implementers to maintain basic OLDI exchanges using the ICAO format. This means that ANSPs that migrated to OLDI 6.0 might establish OLDI exchanges with some adjacent ATS unit(s) using OLDI 6.0 with ADEXP format but still maintain the OLDI links with some adjacent ATS unit(s) using OLDI 5.1 exchanging OLDI messages in ICAO or ADEXP formats.

In some cases, especially for those ANSPs bordering ECAC region, the exchanges of OLDI message using the ICAO format might need to be operative for a longer period. Therefore, these ANSPs might consider implementing an ADEXP/ICAO converter that will translate the messages between the two formats, as maintaining the different editions of OLDI specifications within the FDPS of concerned ATSU could not be feasible in long term. For these specific cases, the FDPS of concerned ATSU could be upgraded to support OLDI edition 6.0 using only ADEXP, while the operational exchange with neighbouring ATSU that do not support the ADXEP format exchanges could be done using the ADEXP/ICAO converter. In this regard, it is considered that only the basic set of OLDI messages with an amount of data items very likely reduced, compared to the items in OLDI 6.0, would need to be converted, thus, having a limited and straightforward scope.

It must be noted that the ICAO format is not able to support all features described in the OLDI Specification and it is not considered for further evolutions of the OLDI Specification. Therefore,

ANSPs are encouraged to migrate to ADEXP to benefit from more advanced and comprehensive ATC-ATC exchanges.

2.1. Traceability of requirement between different versions of OLDI specification

The OLDI specification edition 6.0 introduced a wide variety of changes, as all requirements of edition 5.1 have been assessed and a large majority of them amended. In addition, new message and corresponding requirements have been developed as well as additional requirements related to the substantial changes of existing messages set.

The requirements that were not altered and remain with the same numbering are contained in the table below.

OLDI 5.1	OLDI 6.0	OLDI 5.1	OLDI 6.0
OLDI-GEN-20-O	OLDI-V6-GEN-20-O	OLDI-CDN-160-M	OLDI-V6-CDN-160-M
OLDI-GEN-30-O	OLDI-V6-GEN-30-O	OLDI-SBY-10-M	OLDI-V6-SBY-10-M
OLDI-REF-20-M	OLDI-V6-REF-20-M	OLDI-ACP-10-M	OLDI-V6-ACP-10-M
OLDI-REF-30-M	OLDI-V6-REF-30-M	OLDI-RJC-10-M	OLDI-V6-RJC-10-M
OLDI-MAC-100-R	OLDI-V6-MAC-100-R	OLDI-RJC-100-M	OLDI-V6-RJC-100-M
OLDI-PAC-20-M	OLDI-V6-PAC-20-M	OLDI-RJC-110-M	OLDI-V6-RJC-110-M
OLDI-PAC-60-M	OLDI-V6-PAC-60-M	OLDI-RRQ-10-M	OLDI-V6-RRQ-10-M
OLDI-PAC-80-M	OLDI-V6-PAC-80-M	OLDI-RRQ-50-M	OLDI-V6-RRQ-50-M
OLDI-PAC-220-M	OLDI-V6-PAC-220-M	OLDI-RRQ-60-M	OLDI-V6-RRQ-60-M
OLDI-BFD-10-M	OLDI-V6-BFD-10-M	OLDI-RRQ-80-M	OLDI-V6-RRQ-80-M
OLDI-CFD-10-M	OLDI-V6-CFD-10-M	OLDI-RRQ-90-M	OLDI-V6-RRQ-90-M
OLDI-CFD-40-M	OLDI-V6-CFD-40-M	OLDI-RRQ-100-M	OLDI-V6-RRQ-100-M
OLDI-CFD-70-O	OLDI-V6-CFD-70-O	OLDI-RLS-10-M	OLDI-V6-RLS-10-M
OLDI-CFD-80-M	OLDI-V6-CFD-80-M	OLDI-RLS-30-M	OLDI-V6-RLS-30-M
OLDI-CFD-90-M	OLDI-V6-CFD-90-M	OLDI-RLS-70-M	OLDI-V6-RLS-70-M
OLDI-CFD-100-M	OLDI-V6-CFD-100-M	OLDI-RLS-80-M	OLDI-V6-RLS-80-M
OLDI-CFD-110-M	OLDI-V6-CFD-110-M	OLDI-RLS-90-M	OLDI-V6-RLS-90-M
OLDI-CFD-130-M	OLDI-V6-CFD-130-M	OLDI-RTI-10-M	OLDI-V6-RTI-10-M
OLDI-CFD-140-M	OLDI-V6-CFD-140-M	OLDI-RTI-10-M	OLDI-V6-RTI-10-M
OLDI-TFD-10-M	OLDI-V6-TFD-10-M	OLDI-RTI-70-M	OLDI-V6-RTI-70-M
OLDI-TFD-20-M	OLDI-V6-TFD-20-M	OLDI-RTI-80-M	OLDI-V6-RTI-80-M
OLDI-TFD-40-M	OLDI-V6-TFD-40-M	OLDI-RTI-90-M	OLDI-V6-RTI-90-M
OLDI-TFD-110-M	OLDI-V6-TFD-110-M	OLDI-RTI-100-M	OLDI-V6-RTI-100-M
OLDI-COF-10-M	OLDI-V6-COF-10-M	OLDI-RTI-110-M	OLDI-V6-RTI-110-M
OLDI-MAS-10-M	OLDI-V6-MAS-10-M	OLDI-TIP-10-M	OLDI-V6-TIP-10-M
OLDI-MAS-20-M	OLDI-V6-MAS-20-M	OLDI-TIP-90-M	OLDI-V6-TIP-90-M
OLDI-MAS-60-M	OLDI-V6-MAS-60-M	OLDI-TIP-100-M	OLDI-V6-TIP-100-M
OLDI-TIM-10-M	OLDI-V6-TIM-10-M	OLDI-TIP-110-M	OLDI-V6-TIP-110-M
OLDI-ROF-10-M	OLDI-V6-ROF-10-M	OLDI-TIP-120-M	OLDI-V6-TIP-120-M
OLDI-ROF-30-M	OLDI-V6-ROF-30-M	OLDI-TIP-130-M	OLDI-V6-TIP-130-M
OLDI-ROF-50-M	OLDI-V6-ROF-50-M	OLDI-OCC-10-M	OLDI-V6-OCC-10-M
OLDI-LOF-20-M	OLDI-V6-LOF-20-M	OLDI-OCM-10-M	OLDI-V6-OCM-10-M
OLDI-NAN-10-M	OLDI-V6-NAN-10-M	OLDI-OCM-150-M	OLDI-V6-OCM-150-M
OLDI-COD-10-M	OLDI-V6-COD-10-M	OLDI-OCM-170-M	OLDI-V6-OCM-170-M
OLDI-PNT-10-M	OLDI-V6-PNT-10-M	OLDI-OCM-180-M	OLDI-V6-OCM-180-M
OLDI-SDM-10-M	OLDI-V6-SDM-10-M		
OLDI-CRP-130-M	OLDI-V6-CRP-130-M		
OLDI-DIA-10-M	OLDI-V6-DIA-10-M		
OLDI-DIA-20-M	OLDI-V6-DIA-20-M		
OLDI-DIA-50-R	OLDI-V6-DIA-50-R		
OLDI-RAP-10-M	OLDI-V6-RAP-10-M		
OLDI-RAP-140-M	OLDI-V6-RAP-140-M		
OLDI-RAP-150-M	OLDI-V6-RAP-150-M		
OLDI-RRV-10-M	OLDI-V6-RRV-10-M		
OLDI-CDN-10-M	OLDI-V6-CDN-10-M		

OLDI-CDN-30-M	OLDI-V6-CDN-30-M		
OLDI-CDN-60-M	OLDI-V6-CDN-60-M		
OLDI-CDN-140-M	OLDI-V6-CDN-140-M		
OLDI-CDN-150-M	OLDI-V6-CDN-150-M		

The content of requirements listed below has not been altered, but they have been rearranged and a different requirement number has been assigned.

OLDI 5.1	OLDI 6.0	OLDI 5.1	OLDI 6.0
OLDI-GEN-100-R	OLDI-V6-TEC-30-R	OLDI-BFD-120-M	OLDI-V6-BFD-90-M
OLDI-GEN-120-M	OLDI-V6-TEC-50-M	OLDI-BFD-130-M	OLDI-V6-BFD-100-M
OLDI-GEN-130-M	OLDI-V6-GEN-70-M	OLDI-COF-110-M	OLDI-V6-COF-120-M
OLDI-GEN-140-M	OLDI-V6-GEN-80-M	OLDI-COF-140-M	OLDI-V6-COF-180-M
OLDI-GEN-180-M	OLDI-V6-GEN-110-M	OLDI-MAS-90-M	OLDI-V6-MAS-110-M
OLDI-GEN-200-M	OLDI-V6-GEN-130-M	OLDI-TIM-40-M	OLDI-V6-TIM-20-M
OLDI-GEN-210-M	OLDI-V6-GEN-140-M	OLDI-TIM-50-M	OLDI-V6-TIM-30-M
OLDI-GEN-240-R	OLDI-V6-GEN-170-R	OLDI-TIM-140-M	OLDI-V6-TIM-160-M
OLDI-GEN-260-M	OLDI-V6-GEN-190-M	OLDI-ROF-60-M	OLDI-V6-ROF-80-M
OLDI-GEN-270-M	OLDI-V6-GEN-200-M	OLDI-ROF-100-M	OLDI-V6-ROF-130-M
OLDI-GEN-290-M	OLDI-V6-GEN-220-M	OLDI-LOF-25-O	OLDI-V6-LOF-30-O
OLDI-GEN-300-O	OLDI-V6-GEN-230-O	OLDI-LOF-110-M	OLDI-V6-LOF-130-M
OLDI-GEN-310-M	OLDI-V6-GEN-240-M	OLDI-LOF-130-M	OLDI-V6-LOF-150-M
OLDI-GEN-350-M	OLDI-V6-GEN-270-M	OLDI-LOF-140-M	OLDI-V6-LOF-160-M
OLDI-GEN-370-M	OLDI-V6-GEN-290-M	OLDI-NAN-80-M	OLDI-V6-NAN-90-M
OLDI-GEN-390-M	OLDI-V6-TEC-60-M	OLDI-NAN-90-M	OLDI-V6-NAN-110-M
OLDI-GEN-400-M	OLDI-V6-TEC-70-M	OLDI-NAN-100-M	OLDI-V6-NAN-120-M
OLDI-GEN-420-R	OLDI-V6-TEC-90-R	OLDI-COD-120-M	OLDI-V6-COD-110-M
OLDI-GEN-440-M	OLDI-V6-TEC-110-M	OLDI-PNT-70-M	OLDI-V6-PNT-50-M
OLDI-GEN-450-R	OLDI-V6-TEC-120-R	OLDI-PNT-80-O	OLDI-V6-PNT-60-O
OLDI-GEN-470-M	OLDI-V6-TEC-130-M	OLDI-PNT-160-O	OLDI-V6-PNT-150-O
OLDI-ABI-50-M	OLDI-V6-ABI-60-M	OLDI-SDM-100-M	OLDI-V6-SDM-60-M
OLDI-ABI-60-M	OLDI-V6-ABI-70-M	OLDI-SDM-130-M	OLDI-V6-SDM-70-M
OLDI-ABI-70-R	OLDI-V6-ABI-80-R	OLDI-SDM-140-M	OLDI-V6-SDM-80-M
OLDI-ABI-160-R	OLDI-V6-ABI-210-R	OLDI-SDM-150-M	OLDI-V6-SDM-90-M
OLDI-ABI-190-R	OLDI-V6-ABI-250-R	OLDI-SDM-160-M	OLDI-V6-SDM-110-M
OLDI-ABI-200-R	OLDI-V6-ABI-260-R	OLDI-SDM-170-M	OLDI-V6-SDM-120-M
OLDI-ACT-40-M	OLDI-V6-ACT-50-M	OLDI-SDM-180-M	OLDI-V6-SDM-130-M
OLDI-ACT-80-M	OLDI-V6-ACT-90-M	OLDI-SDM-190-M	OLDI-V6-SDM-140-M
OLDI-ACT-90-M	OLDI-V6-ACT-100-M	OLDI-AMA-70-M	OLDI-V6-AMA-80-M
OLDI-ACT-100-M	OLDI-V6-ACT-110-M	OLDI-AMA-80-M	OLDI-V6-AMA-90-M
OLDI-ACT-110-M	OLDI-V6-ACT-120-M	OLDI-AMA-90-M	OLDI-V6-AMA-100-M
OLDI-ACT-230-M	OLDI-V6-ACT-240-M	OLDI-AMA-100-M	OLDI-V6-AMA-110-M
OLDI-ACT-260-M	OLDI-V6-ACT-280-M	OLDI-AMA-110-M	OLDI-V6-AMA-120-M
OLDI-ACT-290-M	OLDI-V6-ACT-310-M	OLDI-AMA-120-M	OLDI-V6-AMA-130-M
OLDI-ACT-300-M	OLDI-V6-ACT-320-M	OLDI-AMA-140-M	OLDI-V6-AMA-150-M
OLDI-REV-190-M	OLDI-V6-REV-170-M	OLDI-AMA-150-M	OLDI-V6-AMA-160-M
OLDI-REV-250-M	OLDI-V6-REV-220-M	OLDI-AMA-200-M	OLDI-V6-AMA-230-M
OLDI-MAC-50-M	OLDI-V6-MAC-60-M	OLDI-CRQ-120-M	OLDI-V6-CRQ-90-M
OLDI-MAC-100-R	OLDI-V6-MAC-90-R	OLDI-CRQ-130-M	OLDI-V6-CRQ-100-M
OLDI-MAC-120-M	OLDI-V6-MAC-110-M	OLDI-CRQ-140-M	OLDI-V6-CRQ-110-M
OLDI-MAC-145-O	OLDI-V6-MAC-170-O	OLDI-CRQ-200-M	OLDI-V6-CRQ-170-M
OLDI-MAC-150-R	OLDI-V6-MAC-180-R	OLDI-CRQ-230-M	OLDI-V6-CRQ-200-M
OLDI-PAC-120-M	OLDI-V6-PAC-100-M	OLDI-CRP-60-M	OLDI-V6-CRP-70-M
OLDI-PAC-135-O	OLDI-V6-PAC-120-O	OLDI-CRP-70-M	OLDI-V6-CRP-80-M
OLDI-PAC-260-M	OLDI-V6-PAC-280-M	OLDI-CRP-80-M	OLDI-V6-CRP-90-M
OLDI-PAC-270-M	OLDI-V6-PAC-290-M	OLDI-CRP-100-M	OLDI-V6-CRP-110-M
OLDI-PAC-280-M	OLDI-V6-PAC-300-M	OLDI-DIA-150-M	OLDI-V6-DIA-140-M

OLDI-LAM-10-M	**OLDI-V6-LAM-10-M**	**OLDI-RAP-155-R**	**OLDI-V6-RAP-160-R**
OLDI-LAM-20-M	**OLDI-V6-LAM-20-M**	**OLDI-RAP-170-M**	**OLDI-V6-RAP-180-M**
OLDI-LAM-30-M	**OLDI-V6-LAM-30-M**	**OLDI-RAP-180-M**	**OLDI-V6-RAP-190-M**
OLDI-LAM-40-M	**OLDI-V6-LAM-40-M**	**OLDI-RAP-220-M**	**OLDI-V6-RAP-240-M**
OLDI-LAM-60-M	**OLDI-V6-LAM-60-M**	**OLDI-RAP-230-M**	**OLDI-V6-RAP-270-M**
OLDI-BFD-70-M	**OLDI-V6-BFD-40-M**	**OLDI-RRV-70-R**	**OLDI-V6-RRV-100-R**
OLDI-RRV-90-R	**OLDI-V6-RRV-120-R**	**OLDI-FC-SSR-40-M**	**OLDI-V6-RUL-160-M**
OLDI-RRV-100-R	**OLDI-V6-RRV-130-R**	**OLDI-FC-NR-50-M**	**OLDI-V6-RUL-90-M**
OLDI-RRV-110-R	**OLDI-V6-RRV-160-R**	**OLDI-FC-REF-20-M**	**OLDI-V6-RUL-110-M**
OLDI-RRV-120-R	**OLDI-V6-RRV-190-R**	**OLDI-FC-SSR-40-M**	**OLDI-V6-RUL-160-M**
OLDI-RRV-130-R	**OLDI-V6-RRV-200-R**	**OLDI-FC-SSR-50-M**	**OLDI-V6-RUL-170-M**
OLDI-CDN-90-M	**OLDI-V6-CDN-80-M**	**OLDI-FC-COP-10-M**	**OLDI-V6-RUL-260-M**
OLDI-CDN-170-O	**OLDI-V6-CDN-180-O**	**OLDI-FC-AC-10-M**	**OLDI-V6-RUL-320-M**
OLDI-CDN-180-M	**OLDI-V6-CDN-190-M**	**OLDI-FC-AC-20-M**	**OLDI-V6-RUL-330-M**
OLDI-CDN-200-M	**OLDI-V6-CDN-220-M**	**OLDI-FC-CSR-10-M**	**OLDI-V6-RUL-390-M**
OLDI-SBY-30-M	**OLDI-V6-SBY-40-M**	**OLDI-FC-CSR-40-M**	**OLDI-V6-RUL-400-M**
OLDI-ACP-40-M	**OLDI-V6-ACP-20-M**	**OLDI-FC-AHD-10-M**	**OLDI-V6-RUL-440-M**
OLDI-ACP-110-M	**OLDI-V6-ACP-40-M**	**OLDI-FC-AHD-13-O**	**OLDI-V6-RUL-460-O**
OLDI-ACP-160-M	**OLDI-V6-ACP-100-M**	**OLDI-FC-POS-05-M**	**OLDI-V6-RUL-530-M**
OLDI-ACP-180-M	**OLDI-V6-ACP-110-M**	**OLDI-FC-POS-10-M**	**OLDI-V6-RUL-540-M**
OLDI-RJC-70-M	**OLDI-V6-RJC-60-M**	**OLDI-FC-POS-20-M**	**OLDI-V6-RUL-550-M**
OLDI-RJC-80-M	**OLDI-V6-RJC-70-M**	**OLDI-FC-POS-30-M**	**OLDI-V6-RUL-560-M**
OLDI-RTI-60-M	**OLDI-V6-RTI-50-M**	**OLDI-FC-POS-40-M**	**OLDI-V6-RUL-570-M**
OLDI-TIP-40-M	**OLDI-V6-TIP-30-M**	**OLDI-FC-EQCS-10-M**	**OLDI-V6-RUL-680-M**
OLDI-TIP-50-M	**OLDI-V6-TIP-40-M**	**OLDI-FC-EQCS-20-M**	**OLDI-V6-RUL-690-M**
OLDI-TIP-60-M	**OLDI-V6-TIP-50-M**	**OLDI-FC-PSSR-10-M**	**OLDI-V6-RUL-860-M**
OLDI-TIP-80-M	**OLDI-V6-TIP-70-M**	**OLDI-ACAD-10-M**	**OLDI-V6-RUL-950-M**
OLDI-SKC-40-M	**OLDI-V6-SKC-90-M**	**OLDI-ACAD-20-M**	**OLDI-V6-RUL-960-M**
OLDI-FC-ESTD-50-M	**OLDI-V6-EST-90-M**	**OLDI-ARRSEQ-10-M**	**OLDI-V6-RUL-1020-M**
OLDI-FC-ESTD-60-M	**OLDI-V6-EST-100-M**		
OLDI-FC-NR-20-M	**OLDI-V6-RUL-60-M**		
OLDI-FC-NR-30-M	**OLDI-V6-RUL-70-M**		

All other requirements contained in the OLDI specification 6.0 not listed in the tables above have been amended or added.

3 Clarifications and Guidelines Applicable to all OLDI Messages

3.1. STAY indicator processing

3.1.1 Introduction

The STAY indicator has been introduced by the Initial Flight Plan Processing System (IFPS) to enable the definition of time delays within the flight plans associated with certain special en-route activities, such as training flights, air-to-air refuelling, and photographic missions etc. The use of the indicator is permitted for flights within the IFPS zone; this feature shall enable the Air Traffic Control (ATC) to make an accurate profile calculation.

Within the flight plan (FPL), the STAY feature is expressed as follows, depending on the format:

- ICAO format – STAY indicator in field 15 and item STAYINFO in field 18
- ADEXP format - STAY indicator in the item ROUTE (ICAO field 15 information) and primary field STAYINFO

The ADEXP Standard defines the following ways to express the STAY feature:

- Within primary field ROUTE – which is in fact identical to how STAY is noted in the ICAO field 15
- Primary field STAYINFO – containing additional information related to the stay data in the ROUTE
- Primary field STAY – containing definition of entry/exit fixes, activity interval – contains the same information as STAY in ICAO field 15
- Subfield PTSTAY – used within field PT/AD, containing activity interval starting at the fix and ending at following fix plus STAY identifier – pointing to the field STAYINFO

The OLDI Specification does not contain any requirements relating to how the STAY indicator should be expressed in OLDI messages.

These guidelines provide best practice on how to insert the STAY indicator in terms of STAY in OLDI messages, it can be specified for two different sets of messages:

- OLDI ABI, ACT, REV and RRV messages in ADEXP format for which the route is expressed with ADEXP primary item ROUTE
- OLDI BFD and CFD messages in ADEXP format for which the trajectory is expressed with ADEXP primary field RTEPS (BFD, CFD)

3.1.2 STAY information in ADEXP format

When the ADEXP format is used two elements need to be considered

1. OLDI messages contain ADEXP field ROUTE – which is in fact in the syntax of ICAO field 15 – including STAY feature as defined by IFPS.
2. the ADEXP Specification defines primary field STAY – and this field carries the same information as the STAY item in the ICAO field 15

Both items carry the same information justifying the need to harmonise their use in the context of OLDI notification and coordination messages.

As the FPL disseminated by IFPS would already include the STAY indicator within the routing information, these guidelines recommend making use of item ROUTE (encoded in ICAO field 15 format) instead of making use of ADEXP primary field STAY. Furthermore, this avoids FPDS to compose a new field and ensures consistency between OLDI messages in ICAO and ADEXP formats.

In case of exchanging trajectory points, these guidelines recommend that the STAY feature is expressed within primary field RTEPTS in subfields PT or AD using the ADEXP subfield PTSTAY.

Use of the ADEXP primary field STAYINFO is considered optional.

3.1.3 Examples of messages with STAY feature

Original FPL message

(FPL-OMDCR-IX
-P28U/L-SDFGRY/S
-LZZI1300
-N0120A080 MAKAL P27 HLV STAY1/0020 HLV P27 ZLA
-LZZI0200 LKTB
-PBN/A1B2 DOF/171128 OPR/ZXQ ORGN/LZIBZPZX RMK/TRG STAYINFO1/ILS LKTB)

BFD message to local military

-TITLE **BFD**
-REFDATA
-SENDER -FAC **PR**
-RECVR -FAC **MI**
-SEQNUM **352**
-ARCID **OMDCR**
-ADEP **LZZI**
-ADES **LZZI**
-EOBT **1100**
-SSRCODE **A1474**
-FLTRUL **I**
-FLTTYP **X**
-ARCTYP **P28U**
-WKTRC **L**
-RFL **F080**
-ASPEED **N0120**
-BEGIN EQCST -EQPT **W/NO** -EQPT **Y/EQ** -EQPT **U/NO** -END EQCST
-ESTDATA -PTID **BILNA** -ETO **171127124000** -FL **F080**
-CSTAT -STATID **COO**
-BEGIN RTEPTS
-PT -PTID **BILNA** -FL **F080** -ETO **171127124000** -PTSTAY **STAY1 0030**
-PT -PTID **SOPAV** -FL **F080** -ETO **171127131800**
-PT -PTID **NS98** -FL **F080** -ETO **171127132000**
-PT -PTID **BILNA** -FL **F080** -ETO **171127132500**
-END RTEPTS
-ALTRNT1 **LKMT**
-OPR **ZXQ**
-RMK **TRG**
-TTLEET **0130**

-STAYINFO -STAYIDENT **STAY1** -REMARK **ILS LKTB**

Original FPL

(FPL-NATO02-IM
-E3TF/H-SFGHIRTUWXY/CS
-ETNG0800
-N0420F310 NG13 BAM DCT ELBAL DCT BETZO DCT DODEN DCT BOMBI UL984 SULUS UZ650 VEMUT GAT Z650 ROKEM STAY1/0240 NEPOV N871 DOKEL P733 TOMTI OAT P733 EBOGU STAY2/0230 DEKUT/N0420F280 N858 SUBIX UL980 PENEK DCT RISOK TL2 BIGGE DCT GETNI DCT KOPAG DCT NVO DCT GIX/N0250A030 DCT ETNG DCT GIX
-ETNG0900 EBMB
-STS/STATE PBN/B2 DOF/171128 REG/LXN90450 ORGN/ETNGZPZX RMK/OAT OVER GERMANY DCN CZECH REPUBLIC 17NATOCZE REQ APCH AT ETNG FOR 30MIN PRIOR LANDING FUEL1100 POB21 STAYINFO1/REQ ORBIT DLA IN AREA CZ1 FM0900 TIL1140 14NM AROUND 4926N01356E AND 4902N01426E RACETRACK CCW AT FL310 STAYINFO2/REQ ORBIT DLA IN AREA PL1 FM1230 TIL1500 15NM AROUND 5338N01645E AND 5353N01753E RACETRACK CCW AT FL310)

ABI message

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **DM**
    -RECVR -FAC **PR**
    -SEQNUM **473**
-ARCID **NATO02**
-SSRCODE **A0137**
-ADEP **ETNG**
-COORDATA -PTID **VEMUT** -TO **0849** -TFL **F310**
-ADES **ETNG**
-ARCTYP **E3TF**
-FLTTYP **M**
-BEGIN EQCST -EQPT **W/EQ** -EQPT **Y/EQ** -END EQCST
-WKTRC **H**
-ROUTE **N0420F310 TIPAM VEMUT GAT Z650 ROKEM STAY1/0240 NEPOV N871 DOKEL P733 TOMTI OAT P733 EBOGU STAY2/0230 DEKUT/N0420F280 N858 SUBIX UL980 PENEK DCT RISOK TL2 BIGGE DCT GETNI DCT KOPAG DCT NVO DCT GIX/N0250A030 DCT ETNG DCT GIX**
-STAYINFO -STAYIDENT **STAY1** -REMARK **REQ ORBIT DLA IN AREA CZ1 FM0900 TIL1140 14NM AROUND 4926+**
-STAYINFO -STAYIDENT **STAY2** -REMARK **REQ ORBIT DLA IN AREA PL1 FM1230 TIL1500 15NM AROUND 5338+**

3.2. Processing destination aerodrome (ADES) changes

3.2.1 Introduction

This section addresses the cases when flights have to land at a different destination aerodrome in cases such as the planned destination aerodrome becomes unavailable or there is an on-board emergency. In addition to the foreseen operational procedures, OLDI messages may be transmitted to inform about the change of destination aerodrome. The ATS Unit in control of the flight can update the system flight plan route to perform the re-routing of the flight leading to the transmission of OLDI messages. The re-routing information may also propagate to other downstream ATS Units as revised ABI or REV messages.

To avoid any possible problems during activation and correlation, these guidelines recommend that any revised ABI message containing a change of destination aerodrome is sent before the transmission of an ACT message. As bilaterally agreed, if the flight had been previously notified or co-ordinated by means of an OLDI message, a MAC message will be sent to the downstream ATS Unit that is no longer involved in the new flight trajectory.

3.2.1 Messages content

When informing a change of destination aerodrome, these guidelines recommend that the OLDI message includes updated routing information to the new destination aerodrome.

3.2.2 ADEXP format

The OLDI Specification indicates that fields **ades** (for the new destination aerodrome) and **adesold** (for the previous (planned) destination aerodrome) may be used if bilaterally agreed.

When inf0orming of a change of destination aerodrome by transmitting an OLDI message, these guidelines recommend inserting both **ades** and **adesold** fields in the message.

3.2.2.1 Processing in the Receiving Unit

The receiving system should attempt the association of an OLDI message that contains a change in destination aerodrome with a corresponding flight plan. If an associated flight plan is found, the flight plan should be updated with the new destination aerodrome and the route to the new destination aerodrome.

3.2.3 Examples

1. Frankfurt is the initial destination aerodrome for flight DLH757. After an initial ABI message was sent from Sofia ACC to Bucharest ACC, the flight is re-routed to new destination aerodrome Munich. A revised ABI is sent containing the old destination aerodrome Frankfurt, the new destination aerodrome Munich and the updated route to Munich.

Example:

Initial ABI (with destination Frankfurt):

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **SF**
    -RECVR -FAC **OP**
    -SEQNUM **257**
-ADEP **VABB**
-ADES **EDDF**
-COORDDATA

-PTID **LUGEB**
-TO **0425**
-TFL **F360**
-ALTNZ **EDFH**
-ARCID **DLH757**
-ARCTYP **B744**
-WKTRC **H**
-SSRCODE **A2345**
-BEGIN EQCST
-EQPT **W/EQ**
-EQPT **Y/NO**
-EQPT **R/EQ**
-SUREQPT **S/EQ/E**
-END EQCST
-FLTRUL **I**
-FLTTYP **S**
-REG **DABVS**
-RMK **TCAS**
-PBN **A1B1C1D1L1O1S1S2**
-SUR **RSP180**
-DAT **1FANSP**
-NAV **RNVD1E2A1**
-ROUTE **N0415F380 UL333 DASIS/N0485F360 UR660 ERZ UW704 SONAD UL746 INB/N0485F380 UL746 ODERO L746 NEPOT L851 DEGET DCT ARSIN DCT SUBEN T161 NIMDI/N0479F360 T161 ERNAS/N0454F280 T161 ASPAT ASPAT2E**

Revised ABI for a change in destination from Frankfurt to Munich:

-TITLE **ABI**
-REFDATA
-SENDER -FAC **SF**
-RECVR -FAC **OP**
-SEQNUM **278**
-ADEP **VABB**
-ADES **EDDM**
-ADESOLD **EDDF**
-COORDDATA
-PTID **LUGEB**
-TO **0425**
-TFL **F360**
-ALTNZ **EDFH**
-ARCID **DLH757**
-ARCTYP **B744**
-WKTRC **H**
-SSRCODE **A2345**
-BEGIN **EQCST**
-EQPT **W/EQ**
-EQPT **Y/NO**
-EQPT **R/EQ**
-SUREQPT **S/EQ/E**
-END EQCST
-FLTRUL **I**
-FLTTYP **S**
-REG **DABVS**

-RMK **TCAS**
-PBN **A1B1C1D1L1O1S1S2**
-SUR **RSP180**
-DAT **1FANSP**
-NAV **RNVD1E2A1**
-ROUTE **N0415F380 UL333 DASIS/N0485F360 UR660 ERZ UW704 SONAD UL746 INB/N0485F380 UL746 ODERO DCT DEGET DCT ARSIN DCT SITNI DCT BAGSI DCT MATIG DCT AMADI Q113 NAPSA NAPSA2A**

2. Flight WZZ5JV has initial destination aerodrome Varna. When the flight is under control of Bucharest ACC it is re-routed to a new destination, aerodrome of Burgas, after being previously co-ordinated with Sofia ACC by an ACT message. A REV message is sent to Sofia ACC containing the old destination aerodrome Varna, the new destination aerodrome Burgas and the updated route to Burgas.

Example:-TITLE **ACT**
-REFDATA
    -SENDER -FAC **OP**
    -RECVR -FAC **SF**
    -SEQNUM **250**
-ARCID **WZZ5JV**
-SSRCODE **A2246**
-ADEP **EGGW**
-ADES **LBWN**
-COORDATA
    -PTID **REF01**
    -TO **2250**
    -TFL **F310**
-ARCTYP **A320**
-WKTRC **M**
-FLTTYP **S**
-BEGIN **EQCST**
    -EQPT **W/EQ**
    -EQPT **Y/EQ**
-END EQCST
-REF
    -REFID **REF01**
    -PTID **ORTIP**
    -BRNG **087**
    -DISTNC **002**
-ROUTE **N0446F350 DCT 4606N02027E DCT BULEN L744 EXIGA**
-FLTRUL **I**

REV for a change in destination from Varna to Burgas:

-TITLE **REV**
-REFDATA
    -SENDER -FAC **OP**
    -RECVR -FAC **SF**
    -SEQNUM **275**
-ARCID **WZZ5JV**
-ADEP **EGGW**
-ADES **LBBG**

-ADESOLD **LBWN**

3. A medical flight departed from Sofia Airport (LBSF) to Skopje Airport (LWSK). For this example, Sofia TMA is a part of the ATC system ATS A and Skopje part of ATS B. FPLs for this flight were distributed to both ATS A and ATS B and CAM messages had also been correctly received and processed in both ATS units.

-TITLE **CAM**
-ARCID **ZZZ785**
-ADEP **LBSF**
-ADES **LWSK**
-SSRCODE **A4455**
-SEQUENCEDATA
    -TXTIME **100955073628**
    -NUM **23**

After the flight was airborne, an ABI message was sent from ATS A to ATS B.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
-SEQNUM **025**
-ARCID **ZZZ785**
-SSRCODE **A4455**
-ADEP **LBSF**
-COORDATA
    -PTID **NORAD**
    -TO **0956**
    -TFL **F120**
-ADES **LWSK**
-ARCTYP **AS50**

Afterwards, the pilot advised ATS A that he was diverting to Ohrid Airport (LWOH). The ATS A ATCO correctly updated the flight plan, which triggered both a new ABI to ATS B and also an IAFP message to IFPS.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **097**
-ARCID **ZZZ785**
-SSRCODE **A4455**
-ADEP **LBSF**
-COORDATA
    -PTID **NORAD**
    -TO **0956**
    -TFL **F120**
-ADES **LWOH**
-ARCTYP **AS50**

-TITLE **IAFP**
-ARCID **ZZZ785**
-ADEP **LBSF**
-ESTDATA
    -PTID **KORAB**
    -ETO **180127094900**
    -FL **F070**
-ROUTE **N0120F100 IM8 UM333 NORAK UG897 IM8**
-ADES **LWOH**
-ADESOLD **LWSK**

Upon reception of the ABI message, ATS B used the criteria {callsign, departure aerodrome, destination aerodrome} to attempt association with an existing system flight plan. However, the ABI message included a combination that could not be associated to an existing FP and for this reason a new FPL was automatically created by the system. This triggered a new FPL IAFP message to be sent to IFPS and a new COR message to be sent to CCAMS. This created undue burden on ATS B in having to manage two flight plans for the same flight.

If the revised ABI message contained the ADESOLD field, which was also used for message association purposes, then none of the resulting burden would have occurred in ATS B.

3.3. OLDI messages and management of SSR codes

3.3.1 Background

The first OLDI Specification was developed in 1992, when SSR Mode A code management was governed by the principle of Originating Regional Code Assignment (ORCAM). In the last decades, new SSR code management techniques emerged to improve the management of discrete codes and see the introduction of conspicuity codes. Nowadays, most European ANSPs use the Centralised Code Assignment and Management System (CCAMS) and conspicuity code management while enhanced ORCAM is not used in Europe. However, some European ANSPs still use the basic ORCAM as they have not updated yet their ATM system to manage CCAMS and the A1000 code.

3.3.2 SSR code item managed by OLDI

Despite all SSR code management technological improvements, the basic principle for the exchange of SSR code remains unchanged. All ICAO documentation indicates that the code to be exchanged between ATS units is the assigned code to the flight to be transferred. If the assigned SSR code is not retainable by the receiving ATS unit, it is the responsibility of receiving ATS unit to allocate a discrete SSR code for that flight, using the FDPS capability to automatically assign a code from the pool of available codes. In rare cases, the transferring ATS unit might get information from the receiving ATS unit (electronically, by phone or in a procedural way) about the new SSR code to be assigned. This information could be provided by OLDI messages using the next SSR code data item, if both systems support the exchange of this information.

In cases when the ABI message is sent by the transferring unit before the flight is assumed, the ABI message needs to contain the SSR code that will be assigned by the transferring unit (in case the SSR code assigned by the upstream unit is not retainable). The current SSR code assigned by the upstream ATS unit to the transferring ATS unit might be provided in the ABI message as previous SSR code. However, such information exchange is not part of the ABI message as specified by OLDI Specification [RD 9]. If it is considered beneficial for the purpose of early correlation, some modifications to the OLDI Specification would need to be foreseen.

To determine the benefit of such information exchanges, this section analyses a series of examples.

The table below summarises the content of SSR data item regarding OLDI message content taking into considerations that several ATS units in Europe rely on the Centralised SSR Code Assignment and Management System (CCAMS) for IFR/GAT traffic and there may be different SSR code management capabilities of transferring and receiving ATS units.

		System capabilities of the accepting ATS unit	
		CCAMS	**ORCAM**
System capabilities of the transferring ATS unit	**CCAMS**	CCAMS code from the transferring ATS unit, retainable by the accepting ATS unit and also communicated earlier by CCAMS	CCAMS code from the transferring ATS unit, the CCAMS code may be retained or an ORCAM code assigned by the accepting ATS unit
	ORCAM	ORCAM code from the transferring ATS unit, the ORCAM code may be retained or a CCAMS code assigned by the accepting ATS unit	ORCAM code from the transferring ATS unit, the ORCAM code may be retained or a new ORCAM code assigned by the accepting ATS unit

Table 1 - SSR Code Management Capabilities and OLDI Message Content

In case that correlation is established with the downlinked aircraft identification, the assigned SSR code will be A1000, and the same logic is applied. However, A1000 should be retained from the moment it is assigned, irrespective of whether the ATS units are part of CCAMS or not.

3.3.3 Example 1 - ABI message with unassigned SSR code

This example depicts the case when the ABI message is sent with a code that is still to be assigned to the flight by the transferring unit. This example is illustrated by **Error! Reference source not found.**. It involves 3 ATS units with Areas of Responsibility (AoR) presented in red for ATS A, in blue for ATS B and in purple for ATS C. ATS A and ATS B allocate their codes based on ORCAM, while ATS C is CCAMS capable. ATS B is a rather small ATS unit and the maximum transversal time in any direction of flight is less than 15 minutes.

The flight WZZ123 departed from LGAT at 07:30 and it is planned to land at EDDM.

IFPS distributed the original FPL (FPL-WZZ123-IS –B737/M-SRWY/C –LGAT0730 -N0420F370 MIRIX UM761 BELOG UM231 NIQAT UL544 RADOX UL601 –EDDM0200) to ATC A, ATS B and ATS C.

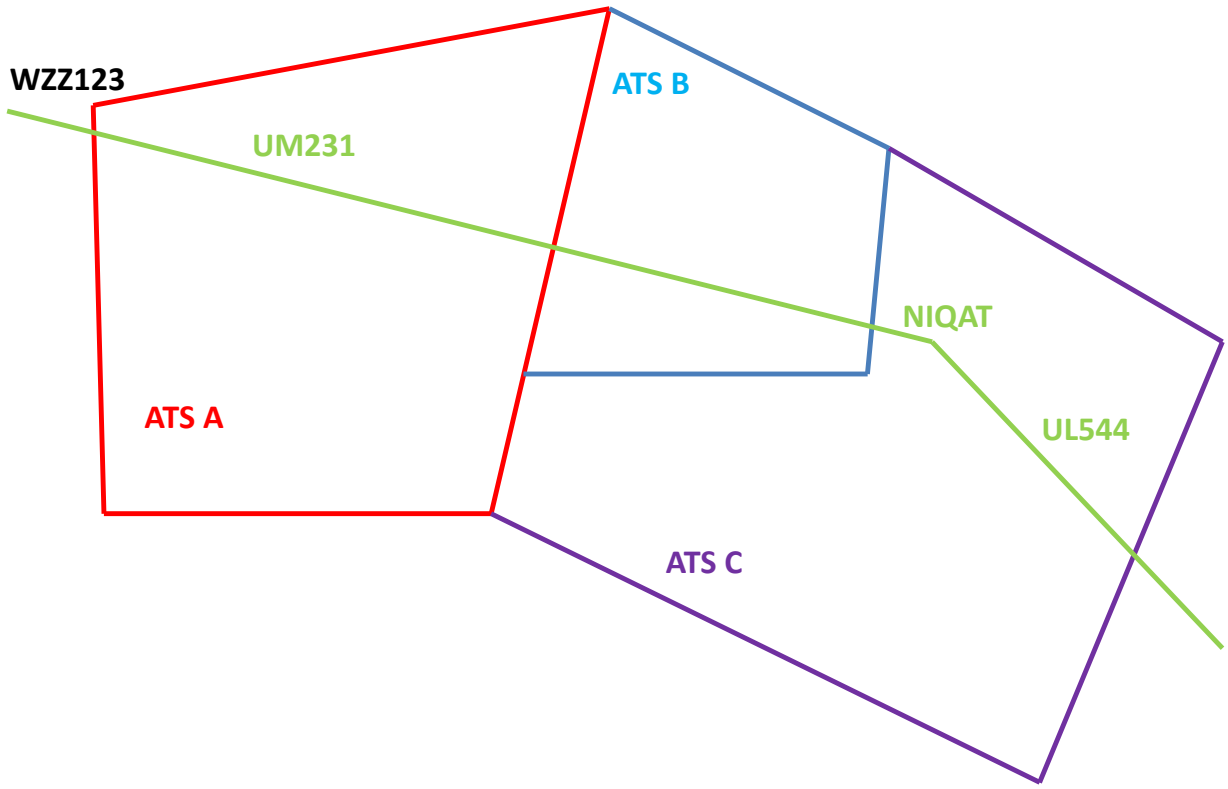


Figure 1- SSR Code Management (3 ATSUs)

09:50 WZZ123 overflies the entry point of ATS A, the flight is assumed by ATS A and a discreet SSR code 5667 is assigned.

09:52 ATS A sends an ABI message to ATS B.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSA**

-RECVR -FAC **ATSB**
-SEQNUM **768**
-ARCID **WZZ123**
-SSRCODE **A5667**
-ADEP **LGAT**
–COORDATA
-PTID **OUT01**
-TO **1012**
-TFL **F370**
-ADES **EDDM**
-ARCTYP **B737**
-ROUTE **N0440F370 DIKAM UM231 NIQAT**

09:52 ATS B returns a LAM message and tries to update the system flight plan (SFPL) with the ABI message data. The SSR code management function identifies that SSR code 5667 is not retainable within ATS B AoR and it identifies that a new SSR code 4421 needs to be assigned. ATS B uses the current code 5667 to correlate WZZ123 and assigns 4421 as next SSR code.

10:01 ATS A sends an ACT message to ATS B.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **787**
-ARCID **WZZ123**
-SSRCODE **A5667**
-ADEP **LGAT**
-COORDATA
-PTID **OUT01**
-TO **1011**
-TFL **F370**
-ADES **EDDM**
-ARCTYP **B737**
-ROUTE **N0440F370 DIKAM UM231 NIQAT**

10:01 ATS B returns a LAM message and updates the SFPL with the new time at the COP contained in ACT message. The correlation is kept as well as the new SSR code to be assigned.

10:06 ATS B sends an ABI message to ATS C, the SSR code contained in ABI message will not be the current SSR code assigned by ATS A, but the SSR code that will be assigned by ATS B. The current SSR code might be provided as previous SSR code data item in order to facilitate an early correlation of the flight, but this field is not part of the ABI message specification - it is only included as an optional field for the BFD and CFD messages.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **009**
-ARCID **WZZ123**
-SSRCODE **A4421**
-ADEP **LGAT**
-COORDATA
-PTID **OUT28**
-TO **1026**
-TFL **F370**

-ADES **EDDM**
-ARCTYP **B737**
-ROUTE **N0440F370 UM231 NIQAT UL544**

10:06 ATS C returns a LAM message and updates the SFPL with the ABI message data. However, the correlation cannot be established, as code 4421 is still not yet assigned.

10:06 ATS B sends a BFD message to ATS C to provide a notification about the current SSR code in use.

-TITLE **BFD**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **015**
-ARCID **WZZ123**
-SSRCODE **A4421**
-PREVSSRCODE **A5667**

-ROUTE **N0440F370 UM231 NIQAT UL544**

10:06 ATS C returns a LAM message and updates the SFPL with the BFD message data. The SSR code in the received ABI (to be assigned by ATS B) is stored as current SSR code, while the SSR code in the BFD message (currently used by ATS A) is stored as previous SSR code. To avoid miscorrelation, ATS C might ensure the correlation geo-check (match in previous SSR code between the track and updated SFPL with BFD message and that track is contained within an eligibility volume based on the flight expected position) is applied. If the geo-check is successful, the correlation can be established.

10:07 ATS C generates a code request (COR) to CCAMS with A4421. It should be noted that an automatic generation of COR message could be differently sequenced, after the reception of ACT from ATS B at 10:15. The CCAMS service receives the code request and identifies that A4421 cannot be retained. ATS C receives a code assignment message (CAM) with CCAMS code 0227, to be applied when ATS C assumes the flight. ATS C stores this code as next SSR code.

10:11 ATS A instructs the flight WZZ123 to contact ATS B by sending a COF message.

-TITLE **COF**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **851**
-ARCID **WZZ123**

10:12 ATS B indicates the establishment of radio contact with the flight WZZ123 by sending a MAS message.

-TITLE **MAS**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **311**
-ARCID **WZZ123**

10:12 ATS B instructs flight WZZ123 to change to SSR code 4421.

10:13 The pilot changes the SSR code and flight WZZ123 squawks 4421.

10:13 ATS A terminates the SFPL for flight WZZ123; therefore, this code change is irrelevant to ATS A. ATS B maintains the correlation as the new code is stored in the next SSR code field of the SFPL. ATS C maintains the correlation as the newly assigned SSR code was already notified.

10:15 ATS B sends ACT to ATS C

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **027**
-ARCID **WZZ123**
-SSRCODE **A4421**
-ADEP **LGAT**
-COORDATA
    -PTID **OUT28**
    -TO **1025**
    -TFL **F370**
-ADES **EDDM**
-ARCTYP **B737**
-ROUTE **N0440F370 UM231 NIQAT UL544**

10:15 ATS C sends a LAM message to ATS B and updates the SFPL with the new time at the COP.

10:25 ATS B instructs the flight WZZ123 to contact ATS C, by sending a COF message.

-TITLE **COF**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **051**
-ARCID **WZZ123**

10:26 ATS C indicates the establishment of radio contact with the flight WZZ123 by sending a MAS message.

-TITLE **MAS**
-REFDATA
    -SENDER -FAC **ATSC**
    -RECVR -FAC **ATSB**
    -SEQNUM **597**
-ARCID **WZZ123**

10:26 ATS C instructs flight WZZ123 to change to SSR code 0227 received by CCAMS.

10:26 The pilot changes the SSR code and flight WZZ123 squawks 0227.

This example shows that, if the BFD message is not exchanged, ATS C cannot correlate the flight between 10:06 (when ATS B sent the ABI message with the planned SSR code to be assigned, but not with current code) and 10:13 (when the flight is assumed by ATS B and the SSR code is changed by the pilot).

3.3.4 Example 2 - ABI message with previously assigned SSR code

This second example concerns the same flight and ATS units as in the first example. It differs in that ATS B provides the currently assigned SSR code by ATS A when sending the ABI message to ATC C, instead of the SSR code that will be assigned by ATC B once the flight is assumed. However, even when sending the current SSR code within the ABI/ACT messages with ATS C, the problem of lost correlation persists.

This second example differs from 10:06 when ATS B sends the ABI message to ATC C.

10:06 ATS B sends an ABI message to ATS C, the SSR code contained in the ABI message is the current SSR code assigned by ATS A, not the SSR code that will be assigned by ATS B.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **068**
-ARCID **WZZ123**
-SSRCODE **A5667**
-ADEP **LGAT**
-COORDATA
    -PTID **OUT28**
    -TO **1026**
    -TFL **F370**
-ADES **EDDM**
-ARCTYP **B737**
-ROUTE **N0440F370 DIKAM UM231 NIQAT**

10:06 ATS C returns a LAM message and updates the SFPL with the ABI message data. The correlation is established as the current SSR code is provided.

10:07 ATS C generates a code request (COR) to CCAMS with A5667. It should be noted that an automatic generation of COR message could be differently sequenced, after the reception of ACT from ATS B at 10:15. The CCAMS service receives the code request and identifies that A5667 cannot be retained. ATS C receives a code assignment message (CAM) with CCAMS code 0227, to be applied when ATS C assumes the flight. ATS C stores this code as next SSR code.

-TITLE **CAM**
-ARCID **WZZ123**
-ADEP **LGAT**
-ADES **EDDM**
-SSRCODE **A0227**
-SEQUENCEDATA
    -TXTIME **100759071215**
    -NUM **69**

10:07 ATS B identifies the need to change the assigned SSR code. No BFD message is sent to ATS C providing a notification of the SSR code that will be assigned by ATC B once the flight is assumed.

10:11 ATS A instructs the flight WZZ123 to contact ATS B by sending a COF message.

-TITLE **COF**
-REFDATA

-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **951**
-ARCID **WZZ123**

10:12 ATS B indicates the establishment of radio contact with the flight WZZ123 by sending a MAS message.

-TITLE **MAS**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **311**
-ARCID **WZZ123**

10:12 ATS B instructs the flight WZZ123 to change to SSR code 4421.

10:13 The pilot changes the SSR code and flight WZZ123 squawks 4421.

10:13 ATS A terminates the WZZ123 SFPL; therefore, this code change is irrelevant to ATS A. ATS B maintains the correlation as the new code is stored in SFPL next SSR code field. ATS C may lose correlation for some period.

10:13 ATS B sends the revised ABI message to ATS C, the SSR code contained in the revised ABI message is the current SSR code assigned by ATS B. Optionally, since the new SSR code in the ABI differs from the one provided by CCAMS, ATS C could send a new code request to CCAMS including the newly received SSR code in the ABI message A4421 to try to retain this code.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **098**
-ARCID **WZZ123**
-SSRCODE **A4421**
-ADEP **LGAT**
-COORDATA
-PTID **OUT28**
-TO **1026**
-TFL **F370**
-ADES **EDDM**
-ARCTYP **B737**
-ROUTE **N0440F370 DIKAM UM231 NIQAT**

10:13 ATS C returns a LAM message and updates the SFPL with the ABI message data. The correlation is re-established as currently assigned SSR code is provided.

10:15 ATS B sends ACT to ATS C

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **113**
-ARCID **WZZ123**

-SSRCODE **A4421**
-ADEP **LGAT**
-COORDATA
-PTID **OUT28**
-TO **1025**
-TFL **F370**
-ADES **EDDM**
-ARCTYP **B737**
-ROUTE **N0440F370 DIKAM UM231 NIQAT**

10:15 ATS C sends a LAM message to ATS B and updates the SFPL with the new time at the COP.

10:25 ATS B instructs the flight WZZ123 to contact ATS C by sending a COF message.

-TITLE **COF**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **098**
-ARCID **WZZ123**

10:26 ATS C indicates the establishment of radio contact with the flight WZZ123 by sending a MAS message.

-TITLE **MAS**
-REFDATA
-SENDER -FAC **ATSC**
-RECVR -FAC **ATSB**
-SEQNUM **597**
-ARCID **WZZ123**

10:26 ATS C instructs the flight WZZ123 to change the SSR code 0227 received by CCAMS.

10:26 The pilot changes the SSR code and flight WZZ123 squawks 0227.

This example shows that ATS C was able to establish code correlation at 10:06 but this could not be maintained or lost until 10:13 due to the code change. This can be explained by several local factors such as:

- ATS C correlation termination timing
- Pilot timing to change SSR code
- Provision of revised ABI by ATS B with the assigned SSR code at 10:13
- Time for the processing of revised ABI and update the SFPL by ATS C
- ATS C correlation reestablishment timing

This means that the correlation might be maintained or lost for several seconds/minutes, depending on message initiation transaction and processing time, as well the correlation re-establishment timing.

3.3.5 Example 3 - Brief entry into intermediate ATS unit

This third example depicts the correlation establishment problem in case of very short, traversed sectors, especially imminent in case of vertically layered ATS units. This example is illustrated

by **Error! Reference source not found.**. It involves 3 ATS units with Areas of Responsibility (AoR) presented in red for ATS A, in purple for ATS B and in orange for ATS C. ATS A and ATS B assign their codes based on ORCAM, while ATS C is CCAMS capable. ATS B is an Upper Air Control Centre above the lower airspace controlled by ATS C for Munich Airport (EDMM). The AoR of ATS A is between FL 090 and FL 460. In case of descending/climbing traffic towards EDDM, the ATS B traversal time is extremely short (less than 5 minutes).

The flight WZZ881 departed from LRCL at 09:00 and it is planned to land at EDDM. IFPS distributed the original FPL (FPL-WZZ881-IS –A320/M-SRWY/C –LRCL0900 -N0430F330 MORUN UM771 LABOG UM117 KEKOM UL544 RADOX UL601–EDDM0130) to ATC A, ATS B and ATS C.

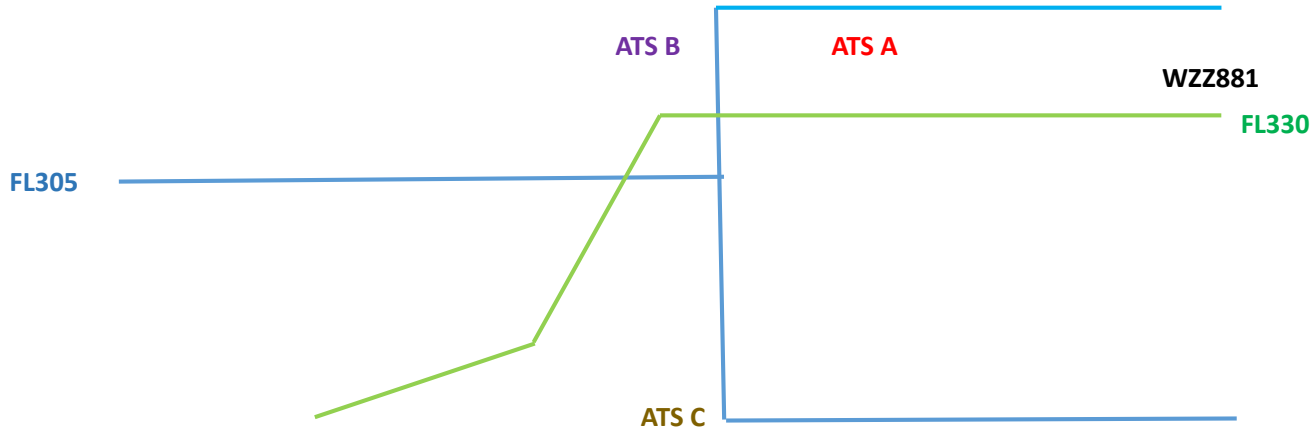


Figure 2- SSR Code Management and Brief Sector Entry

09:50 WZZ881 overflies the entry point of ATS A, the flight is assumed by ATS A and a discrete SSR code 1155 is assigned.

09:51 ATS A sends an ABI message to ATS B.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **115**
-ARCID **WZZ881**
-SSRCODE **A1155**
-ADEP **LRCL**
-COORDATA
    -PTID **OUT04**
    -TO **1011**
    -TFL **F330**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0440F330 FRA01 DCT FRA02 DCT FRA03 DCT FRA04**

09:51 ATS B returns a LAM message and attempts to update the SFPL with the ABI message data. The SSR code management function identifies that SSR code 1155 is not retainable within the AoR of ATS B, and it identifies that a new SSR code needs to be assigned. ATS B uses the current code 1155 to correlate WZZ881 and assigns 3312 as next SSR code.

09:54 ATS B sends an ABI message to ATS C, the SSR code contained in the ABI message will not be the current SSR code applied by ATS A, but the SSR code that will be assigned by ATS B.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **875**
-ARCID **WZZ881**
-SSRCODE **A3312**
-ADEP **LRCR**
-COORDATA
    -PTID **OUT21**
    -TO **1014**
    -TFL **F310**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0440F330 FRA02 DCT FRA03 DCT FRA04 DCT FRA05**

09:54 ATS C returns a LAM message and updates the SFPL with the ABI message data. However, the correlation cannot be established, as code 3312 is not yet assigned.

10:01 ATS A sends an ACT message to ATS B.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **123**
-ARCID **WZZ881**
-SSRCODE **A1155**
-ADEP **LRCR**
-COORDATA
    -PTID **OUT04**
    -TO **1011**
    -TFL **F330**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0440F3730 FRA01 DCT FRA02 DCT FRA03 DCT FRA04**

10:01 ATS B returns a LAM message and updates the SFPL with the new time at the COP contained in the ACT message. The correlation is maintained as well as the new SSR code to be assigned.

10:04 ATS B sends an ACT message to ATS C.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **889**
-ARCID **WZZ881**
-SSRCODE **A3312**
-ADEP **LRCR**
-COORDATA

-PTID **OUT21**
-TO **1014**
-TFL **F310**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0440F330 FRA02 DCT FRA03 DCT FRA04 DCT FRA05**

10:04 ATS C sends a LAM message to ATS B. The SFPL for flight WZZ881 changes to an active status, however, the correlation is not yet established, as the SSR code provided by the ABI and ACT messages is not yet squawked.

10:11 ATS A instructs the flight WZZ881 to contact ATS B by sending a COF message

-TITLE **COF**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **145**
-ARCID **WZZ881**

10:11 ATS B indicates the establishment of radio contact with the flight WZZ881 by sending a MAS message.

-TITLE **MAS**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **831**
-ARCID **WZZ881**

10:12 ATS B instructs the flight WZZ881 to change to SSR code 3312.

10:12 The pilot changes the SSR code and flight WZZ881 squawks 3312.

10:12 ATS A terminates the WZZ881 SFPL, therefore this code change is irrelevant to ATS A. ATS B maintains the correlation as the new code is stored in the next SSR code field of the SFPL. ATS C can establish correlation by using the newly assigned SSR code.

10:14 ATS B instructs the flight WZZ881 to contact ATS C by sending a COF message.

-TITLE **COF**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **922**
-ARCID **WZZ881**

10:14 ATS C indicates the establishment of radio contact with the flight WZZ881 using MAS message.

-TITLE **MAS**
-REFDATA
-SENDER -FAC **ATSC**
-RECVR -FAC **ATSB**
-SEQNUM **597**

-ARCID **WZZ881**

This example shows that ATS C cannot establish correlation with the flight between 09:54 (when ATS B sent the ABI and ACT messages with the planned SSR code to be assigned) and 10:12 (when the flight is assumed by ATS B and the SSR code is changed by the pilot). As WZZ881 enters ATS C airspace at 10:14, the ATS C situational awareness is seriously hampered.

If the previous SSR code had been provided by a BFD message, the correlation would have been established at 09:54 (as long as the BFD message included in the current and previous SSR codes). A similar result might have been obtained if the previous SSR code had been provided in the ABI and ACT messages.

3.3.6 Summary

To overcome the correlation problems (non-establishment or maintenance), the operational Stakeholders might consider replacing the ORCAM SSR code management with the technological improvements related to CCAMS.

Within the ORCAM SSR code management method, the following improvement might be considered as:

- ABI and/or ACT messages might need to include the Previous and Next SSR Mode and Code data items.
- The BFD data exchanges are deemed beneficial to supplement ABI and/or ACT messages.

3.4. Evolution of the OLDI message exchanges and their application in FRA environment

The OLDI Specification was initially developed 25 years ago, considering the airspace concept valid in 1990's and the relevant coordination and transfer procedures applied at the time. As Air Traffic Management and associated concepts and processes evolved during the last two decades, the methods for coordination in transfer have evolved as well. One of the major changes was the initial deployment of Air Ground Data Link (AGDL), which is supported by LOF and NAN messages. The OLDI Specification also addressed the role of the tactical controller involvement in the coordination dialogue process by the implementation of RTI and TIP messages.

The initial deployment of Free Route Airspace (FRA) started in 2009 and has progressed steadily thereafter. Free Route is an operational concept that enables airspace users to fly as close as possible to what they consider their optimal route without the constraints of a fixed route network structure. FRA is a specified airspace within which users may freely plan a route between defined FRA entry points and defined FRA exit points, with the possibility to route via intermediate (published or unpublished) waypoints, without reference to the ATS route network.

The Common Project 1 (CP1) implementing rule mandates the FRA implementation with airspace of EU+ Member States as well as the implementation of Cross Border FRA.

Over the last years, a significant number of States have implemented cross-border FRA. The scope of implementation in some cases has exceeded the CP1 requirement with operations reaching the lower airspace.

The OLDI Specification needs to cope with both the FRA requirement for co-ordination and transfer as well as with the conventional procedures related to the fixed ATS route network.

is chapter addresses the best practices of the OLDI data exchanges within the FRA environment, without any intentions to prescribe the mandatory data exchanges for FRA.

The set of OLDI data messages for FRA environment needs to be aligned with the operational requirements and bilaterally agreed between adjacent ATS units.

Several existing/adapted OLDI features might serve the FRA operational needs, especially those that are deemed very important for State and Regional FRA implementations as:

- There is a need for identification of a dynamic co-ordination point within the FRA environment.
  - The OLDI Specification provides the possibility for the handling of COPs with range and bearing from a reference point.
  - The OLDI Specification provides the possibility, when bilaterally agreed, to handle the coordination point for a flight on a direct route expressed by reference to latitude/longitude.
  - The OLDI Specification also provides the possibility for cases where the COP lies within a bilaterally agreed distance from a published point to exchange this published point as the COP identifier. For example, system parameters for COP definition might be tuned so that all COPs within 5-10 NM distance from a published point are exchanged as the published point. These parameters might be tuned per individual published point and would need to be bilaterally agreed with the adjacent ATS unit. Beyond these parameters, range and bearing from a reference point or latitude/longitude are used.
  - During the deployment of FRA, some ATS units developed a concept similar to gates by taking advantage of the feature mentioned in the above item. They define larger distances (40-60 NM) around bilaterally agreed points so that any COP within

is exchanged as one of those points. With the right choice of points and distances, full interfaces may be covered, thus not needing to exchange range and bearing from a reference point or latitude/longitude.
    - The OLDI Specification Edition 6.0 introduces the concept of gates between adjacent ATS units. The ATS unit entry/exit boundary is divided in gates correlating the LAT/LONG entry/exit point with the gate code. The system calculates the entry/exit gate as the intersection between the boundary and the flight trajectory displaying the gate where the flight will enter/exit the AoR. The OLDI messages contain the gate code plus route or trajectory information.
- FRA requires that ATS units need to be aware of the traffic flying in close proximity to their Area of Responsibility (AoR) but not actually planned to penetrate their sectors, to support conflict probing during FRA clearances.
    - For this type of traffic close to the AoR boundaries, the OLDI specification provides the capability of BFD or CFD data exchanges that might provide the required awareness of traffic intent, which could be used by a conflict probe function.
- FRA requires an exchange of sufficient details for the flight intent for Regional FRA deployment.
    - The exchange of OLDI route information could answer this need for Regional FRA implementations. The updated route info within the OLDI messages is a pre-requisite for having an accurate planned trajectory required for the proper functioning of ATC tools. The content of route information provided by the OLDI messages could be enhanced by using the interactive graphical trajectory editing tools that supports the LAT/LONG point as well as the route points with range and bearing from the published fixes. The REV/RRV/SDM message allows transmitting the route information. SDM permits the route info exchanges until the transfer of the aircraft. Depending on the bi-lateral agreements in place, SDM can be useful to avoid being constrained by the REV/RRV time-out.
    - OLDI Specification Edition 6.0 also provides to possibility to exchanges trajectory points.
    - In case of tactical rerouting initiated by upstream unit, the MAC message might be beneficial for the improved ATCO situational awareness of the change flight intent in the downstream unit.
- In some cases, FRA requires the tactical intervention and coordination at the short notice, which OLDI can support by:
    - In case a tactical DCT is requested by the downstream unit (e.g. in case of activation of a military area or in case of adverse weather), the CDN allows that unit to offer that the aircraft be sent on that DCT. It also allows proposing an alternative transfer flight level.
    - The use of FDM message from the Accepting to the Transferring Unit will help in bringing situational awareness about the sector and frequency to which the flight has to be transferred.
    - At interfaces requiring a lot of tactical “short notice” coordination, the use of TIP and RTI may help alleviating the need for a large amount of verbal coordination.
    -

3.5. OLDI message route information management and Free Route Airspace

3.5.1 Objective

The exchange of route information has existed since the first edition of the OLDI Specification was published in 1992. Route information is contained in a substantial number of OLDI messages, and it is supported by a specific ADEXP primary field. The inclusion of the route information in OLDI messages is considered as a mandatory for OLDI exchanges, starting from OLDI Specification Edition 6.0 However, the ambiguities of processing of the route information

can lead to situations where the route information exchanges are incoherently deployed. Several such cases have been detected by operational stakeholders (mostly during system testing) which hampers the exchange of route information, such as:

- Some systems are sending the complete route information in OLDI messages. The receiving units use this route information to update the system flight plan, therefore potentially deteriorating the route content already extracted;
- Some systems only provide route information relevant to their AoR in OLDI messages. The receiving system replaces the extracted route with the route information sent by the upstream unit and potentially deteriorates the trajectory; manual update of system flight plan might be required.
- In some cases, the route information in the OLDI message is not used to amend the system flight plan trajectory but to completely replace it with the received one. Depending on the trajectory contained in the OLDI message this might lead to the deletion of a portion of the trajectory, which is deemed as operationally unacceptable.

New airspace concepts like Free Route Airspace (FRA) require information about the flight intent and the OLDI message exchanges that include route information can support this operational need. Despite the divergent deployments of OLDI route information exchanges, the OLDI group considers that this issue needs to be addressed from the perspective of cross-border FRA and the requirement of “Trajectory exchanges”.

This requirement was understood in the context of exchange of best possible flight intentions via the OLDI route information field or exchange of trajectory points. Therefore, these guidelines recommend the utilisation of route information adhering to the principles and examples listed below.

3.5.2 High level assumptions

To facilitate the exchanges of trajectories/route information, the OLDI group considers that the following assumptions are applicable. The OLDI specification indicates that the portion of route already overflown should not be included in the OLDI message exchanges. However, this requirement is deemed too restrictive. Therefore, these guidelines recommend that the OLDI messages should contain the route portion between “Route segment start” point and “Route segment end” point, considering the following assumptions:

1. “Route segment start” can be:
   - Last overflown fix, or
   - LAT/LONG (current position), or
   - A predefined distance from the exit point based on bilateral agreements.

   The principles for the route segment start are applied to full FRA, FRA with intermediate points and the fixed route network.

2. “Route segment end” can be:
   - In the context of full FRA, the point to which the flight is cleared and preferably the route after, or
   - In the context FRA with intermediate points, at least the first intermediate point in the downstream ATS and optionally the remaining portion of the route if it is known, or
   - In the context of Fixed Route network, at least a point after COP and optionally the remaining portion of the route if it is known.

3. Alignment of Receiving ATS trajectory with the content of OLDI message route information:
   - Before COP or Gate, a portion of the route might be disregarded by different means (adaptation parameters, VSP, distance), or
   - Within AoR, a re-joining point of received route with the original route needs to be calculated by FDP (if the re-join point is not COP).

It should be noted that by applying these assumptions, the route information content might differ per OLDI messages, depending on the position of the flight.

The above assumptions are considered compatible with the current requirements of the OLDI Specification.

3.5.3 Scenario 1 - Full Free Route

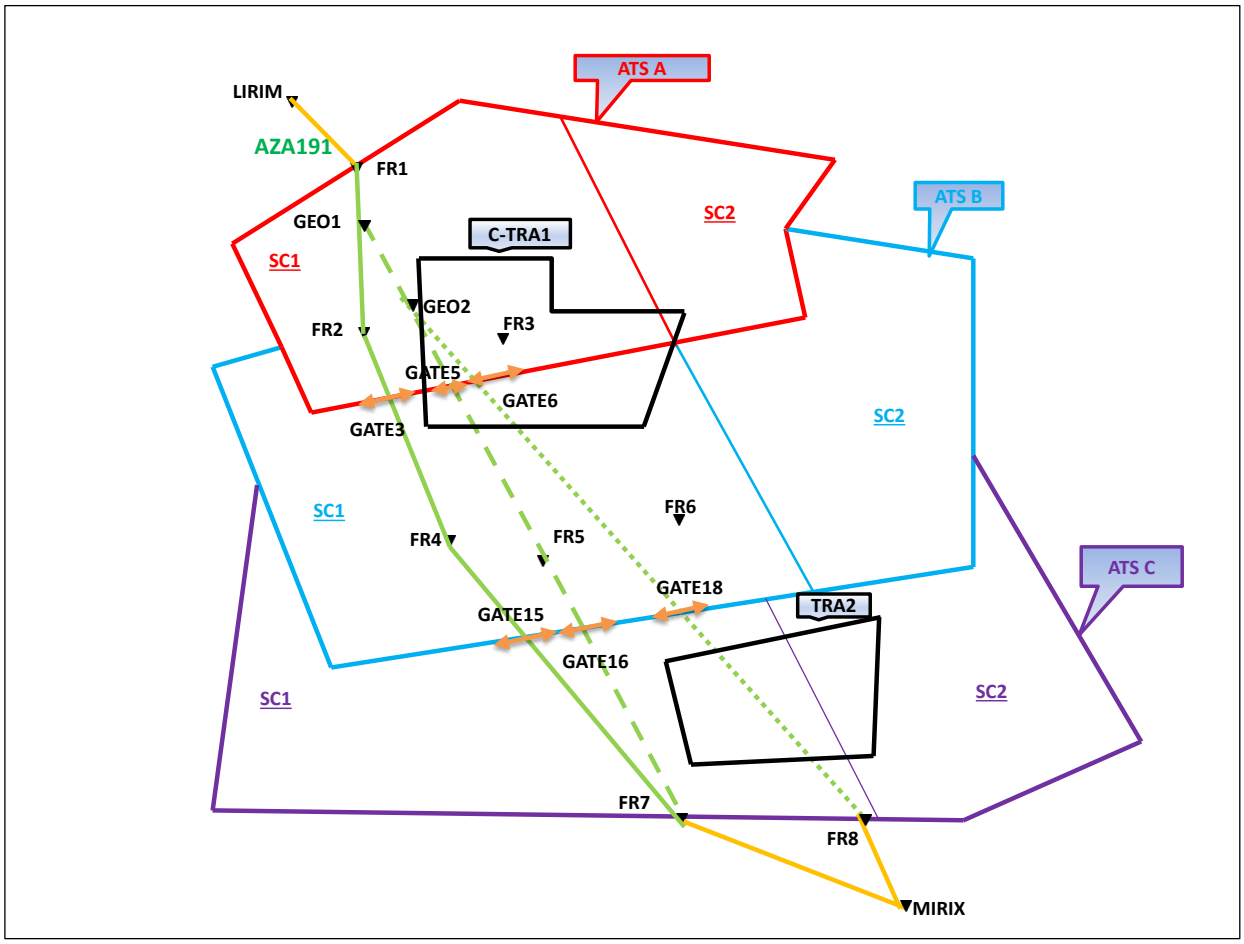


Figure 3- FRA Full Free Route Scenario

This scenario covers the cases of coordination data exchanges with gates (2D airspace structure around FRA point), the crossing boundary is identified by route exchange.

The airspace and flight elements used for this scenario illustrated by **Error! Reference source not found.** are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

- ATS A in red with two sectors SC1 and SC2

- ATS B in blue with two sectors SC1 and SC2
- ATS C in purple with two sectors SC1 and SC2

The flight trajectories are depicted in green and the FRA Exit/Entry points in black. All ATS units deployed FRA without intermediate points, and the fixed route network has been withdrawn. All ATS units retain the relevant static airspace data of the neighbouring FRA.

There is an active cross border area (C-TRA1) within the AORs of ATS A and ATS B, and a Temporarily Restricted Area (TRA2) within the AoR of ATS C, both depicted in black.

As bilaterally agreed, the boundary conditions contained within the estimated data of ABI, ACT and REV messages sent between the concerned ATS units refers to gates. Due to active C-TRA and TRA, the filed flight plan needs to circumnavigate around the reserved airspace. The IFPS distributed the original FPL (FPL-AZA191-IS –A320/M-SRWY/C –LIRF1130 -N0460F330 MIRIJ UM761 LIRIM UL908 FR1 DCT FR2 DCT FR4 DCT FR7 UM221 MIRIX UM231 –LCLK0240) to ATS A, ATS B and ATS C.

12:20 AZA191 overflies point LIRIM.

- ATS A calculates the following 2-D trajectory for flight AZA191 within its Area of Interest (AoI) as: LIRIM FR1 FR2 REF01 FR4 FR7
- ATS B calculates the following 2-D trajectory for flight AZA191 within its AoI as: FR1 FR2 REF01 FR4 REF05 FR7
- ATS C calculates the following 2-D trajectory for flight AZA191 within its AoI as: FR4 REF05 FR7 MIRIX
- REF01 is boundary point between ATSU A and ATSU B and REF05 is boundary point between ATSU B and ATSU C. These are internal points with FDPSs of respective ATSUs, and they are not part of OLDI exchanges and the estimated data within the OLDI messages includes of gates info.

12:22 ATS A sends an ABI message to ATS B. The route elements contained in the ABI message are:

- Route segment start – Last overflown fix (LIRIM);
- Point between segment start /end – FR1;
- Route segment end - the point to which the flight is cleared (FR2) and route after (DCT FR4).
- There is no defined coordination point between ATS A and ATS B, instead gate concept is used. The estimated data within the notification message contains gate info GATE3.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **265**
-ARCID **AZA191**
-SSRCODE **A5571**
-ADEP **LIRF**
-COORDATA
    -GID **GATE3**
    -TO **1242**
    -TFL **F330**
-ADES **LCLK**
-ARCTYP **A320**

-ROUTE **N0460F330 LIRIM DCT FR1 DCT FR2 DCT FR4 DCT FR7**

12:22 ATS B sends a LAM message to ATS A, correlates the received ABI with its corresponding flight plan data and attempts to align the AZA191 trajectory with the ABI message route information. The LIRIM point is disregarded due to its distance from the inbound COP, the remaining part of trajectory (FR1 FR2 FR4 FR7) is identical with the previously extracted from the FPL and the ABI message data is used for the timing recalculation over the points.

12:25 ATS A assumes flight AZA191.

12:27 The cross-border area (C-TRA1) is released earlier than planned. ATS A is notified via the real time Airspace Management (ASM) exchanges that this C-TRA1 is now available for planning purposes.

12:27 ATS A clears the flight AZA191 from the current position (GEO01) direct to FR5. By clearing the flight direct to FR5, the ATS A exit boundary conditions changed, GATE3 is changed with GATE5) that will be used in coordination data. New ATSU A exit point is calculated (REF02) as an intersection of new route and GATE5.The new trajectory for flight AZA191 within the AoI of ATS A is LIRIM FR1 GEO01 REF02FR5 FR7.

12:27 ATS A sends a revised ABI message to ATS B for the change of gate (GATE5 instead GATE3). The route elements contained in the ABI message are:

- Route segment start – Current position (GEO01);

Route segment end - the point to which the flight is cleared (FR5) and route after (FR7)

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **269**
-ARCID **AZA191**
-SSRCODE **A5571**
-ADEP **LIRF**
-COORDATA
    -GID GATE**5**
    -TO **1241**
    -TFL **F330**
-ADES **LCLK**
-ARCTYP **A320**
-GEO
    -GEOID **GEO01**
    -LATTD **420543N**
    -LONGTD **250166W**
-ROUTE **N0460F330 LIRIM DCT FR1 DCT GEO1 DCT FR5 DCT FR7**

12:27 ATS B returns a LAM message and attempts to update the SFPL with the revised ABI message data. The entry gate is changed from GATE3 to GATE5. ATS B keeps the first trajectory point FR1, inserts the start of re-routing point (GEO1) and new route points FR5 and FR7. FDPS calculates entry (REF02)/exit (REF06) points for this flight within ATSU B. The new trajectory for flight AZA191 within the AoI of ATS B is: FR1 GEO01 REF02 FR5 REF06 FR7.

12:31 ATS A sends an ACT message to ATS B.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **389**
-ARCID **AZA191**
-SSRCODE **A5571**
-ADEP **LIRF**
-COORDATA
    -GID **GATE5**
    -TO **1241**
    -TFL **F330**
-ADES **LCLK**
-ARCTYP **A320**
-GEO
    -GEOID **GEO01**
    -LATTD **420543N**
    -LONGTD **250166W**
-ROUTE **N0460F330 LIRIM DCT FR1 DCT GEO1 DCT FR5 DCT FR7**

12:31 ATS B returns a LAM message and the SFPL for flight AZA191 moves to a coordinated status. There is no update of the SFPL trajectory, as the route information provided by the ACT message was identical with route received by ABI message. The gate GATE5 is confirmed.

12:34 ATS B sends an ABI message to ATS C. The route elements contained in the ABI message are:

- Route Segment start – Last overflown fix (GEO01);
- Route Segment end - the point to which the flight is cleared (FR5) and route after (FR7).
- The estimated data within the notification message contains GATE16.
-

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **087**
-ARCID **AZA191**
-SSRCODE **A5571**
-ADEP **LIRF**
-COORDATA
    -GID **GATE16**
    -TO **1254**
    -TFL **F330**
-ADES **LCLK**
-ARCTYP **A320**
-GEO
    -GEOID **GEO01**
    -LATTD **420543N**
    -LONGTD **250166W**
-ROUTE **N0460F330 GEO1 DCT FR5 DCT FR7**

12:34 ATS C returns a LAM message and attempts to update the SFPL with the revised ABI message data. The entry boundary conditions refer to GATE16, while the route differs from FPL ones, the new route provided by ABI message is considered. The ATS C FDP calculates the entry (REF11) points for this flight and identifies the re-joining point of the received route information via ABI with the original route (FR7), extending the route with point MIRAX. The new trajectory for flight AZA191 within the AoI of ATS C is: GEO01 FR5 REF11 FR7 MIRIX.

12:37 The Restricted Area (TRA2) is released earlier than planned. ATS A is notified via the real time ASM exchanges that this TRA is available for GAT traffic.

12:38 ATS A performs the re-routing of the flight AZA191 from the current position (GEO02) direct to FR8. By clearing the flight direct to FR8, the ATS A exit boundary conditions changed from GATE5 to GATE6. ATSU A calculates exit point (REF03) as an intersection of new route and GATE6. The new trajectory for flight AZA191 within the AoI of ATS A is LIRIM FR1 GEO01 GEO02 REF03 FR8

12:38 Due to non-standard conditions, a RRV message is sent to ATS B. The route elements contained in the RRV message are:

- Route Segment start – Current Position (GEO02);
- Route Segment end - the point to which the flight is cleared (FR8). The route after FR8 is not known and therefore is not provided.

-TITLE **RRV**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **457**
-ARCID **AZA191**
-SSRCODE **A5571**
-ADEP **LIRF**
-COORDATA
    -GID **GATE6**
    -TO **1242**
    -TFL **F330**
-ADES **LCLK**
-GEO
    -GEOID **GEO02**
    -LATTD **420621N**
    -LONGTD **250259W**
-ROUTE **N0460F330 GEO2 DCT FR8**
-DCT **GEO2 FR8**
-REASON **MANUAL**

12:38 The ATS B FDP receives the RRV message, returns a SBY message and refers the RRV message to the ATCO of sector SC1.

-TITLE **SBY**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **323**
-MSGREF
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**

-SEQNUM **457**

12:39 ATS B SC1 reviews the ATS A proposal for the change of co-ordination conditions, tests for MTCD's conflict with "what-if" tool and identifies no issue in accepting it. ATS B SC1 accepts the proposed route modifications by sending an ACP message.

-TITLE **ACP**
-REFDATA
-SENDER –FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **369**
-MSGREF
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **457**

12:39 ATSU B FDPS recalculates the trajectory for the flight AZA191.The boundary conditions changed from GATE5 to GATE6. The FDPS of ATS B keeps the point before boundary (GEO02), calculates ATSU entry (REF03) /exit (REF07) points as well as the point to which the flight is cleared (FR8). The new trajectory for flight AZA191 within the AoI of ATS B is: GEO02 REF03 REF07FR8.

12:39 ATS B sends a revised ABI message to ATS C. The route elements contained in the ABI message are:

- Route segment start - Present position (GEO02);
- Route segment end - The point to which the flight is cleared (FR8), the route after is unknown.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **099**
-ARCID **AZA191**
-SSRCODE **A5571**
-ADEP **LIRF**
-COORDATA
-GID **GATE18**
-TO **1256**
-TFL **F330**
-ADES **LCLK**
-ARCTYP **A320**
-GEO
-GEOID **GEO02**
-LATTD **420621N**
-LONGTD **250259W**
-ROUTE **N0460F330 GEO2 DCT FR8**

12:40 ATS C returns a LAM message and attempts to update the SFPL with the revised ABI message data. The gate is changed from GATE16 to GATE18. FDPS of ATS C keeps point GEO02, calculates the new entry point (REF12), identify FR8 as exit point and extend the route

with MIRIX point. and FR8 point is reconfirmed. The new trajectory for flight AZA191 within the AoI of ATS C is: GEO02 REF12 FR8 MIRIX.

12:41 ATS A instructs the flight AZA191 to contact ATS B by sending a COF message.

-TITLE **COF**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **579**
-ARCID **AZA191**

12:41 ATS B indicates the establishment of radio contact with the flight AZA191 by sending a MAS message.

-TITLE **MAS**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **476**
-ARCID **AZA191**

12:42 ATS A terminates AZA191 flight.

3.5.4 Scenario 2 - FRA Intermediate Point

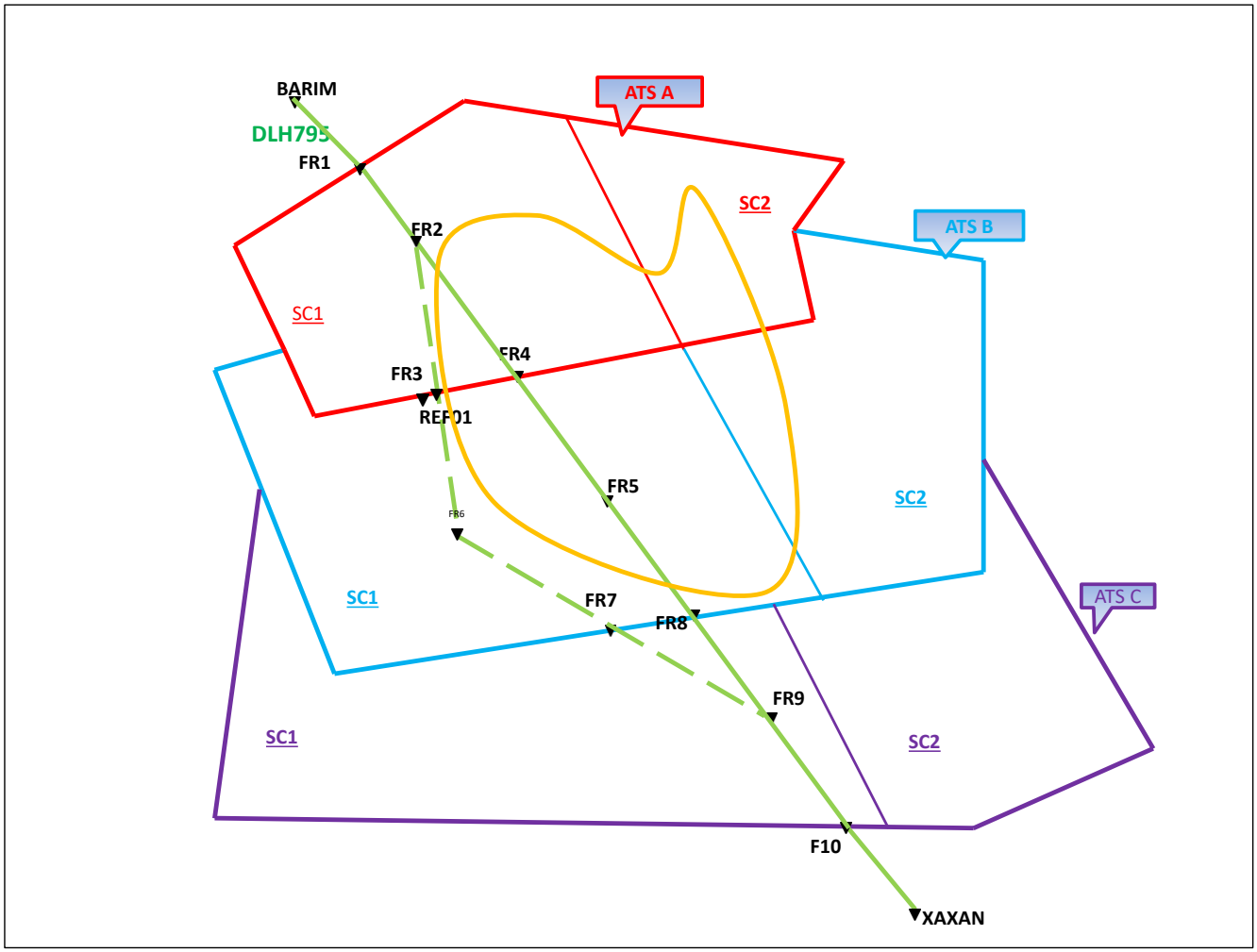


Figure 4- FRA Intermediate Point Scenario

This scenario covers the cases of coordination data exchanges with COP, the offset from COP is provided by range and bearing.

The airspace and flight elements used for this scenario illustrated by

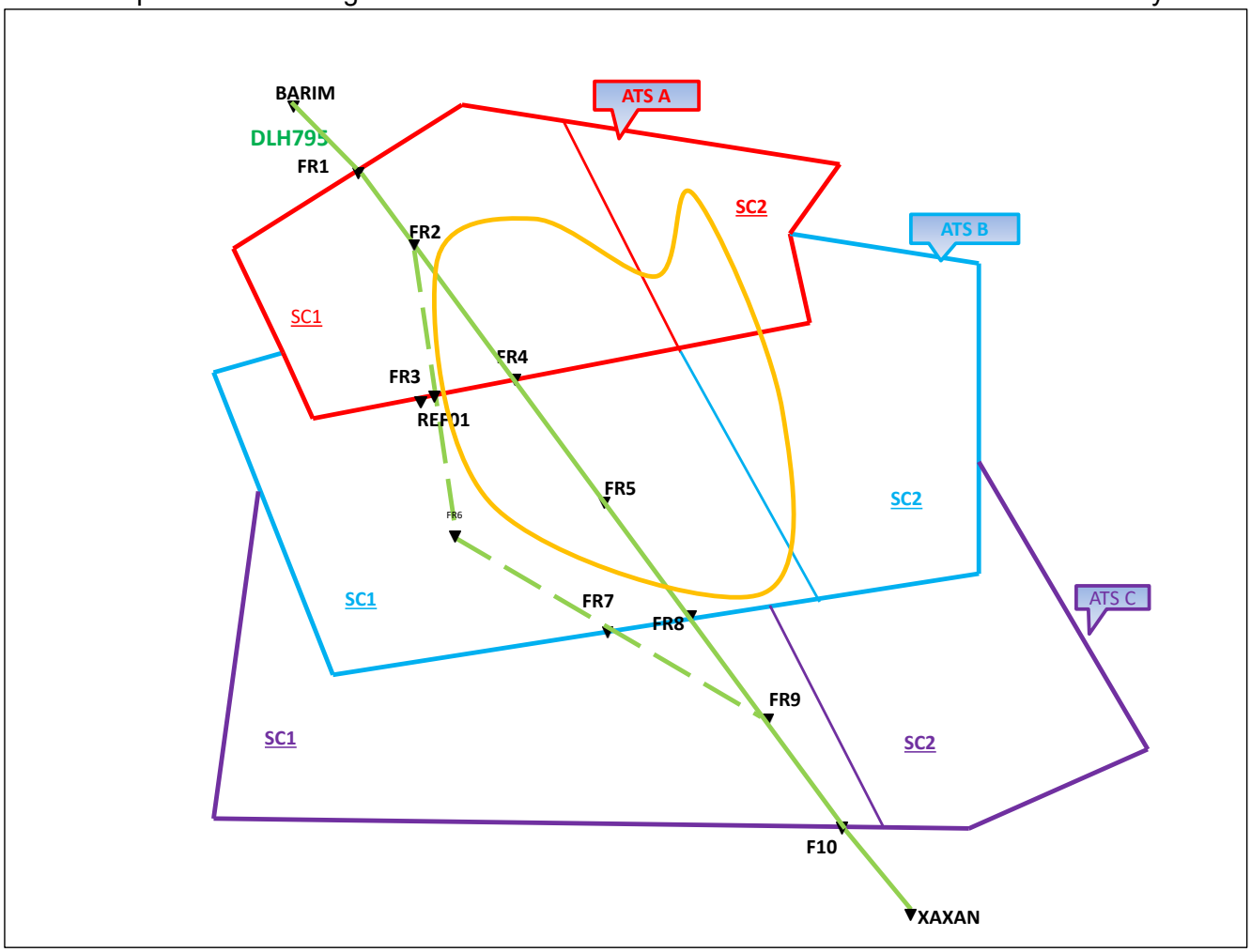


Figure 4- FRA Intermediate Point Scenario

are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

- ATS A in red with two sectors SC1 and SC2
- ATS B in blue with two sectors SC1 and SC2
- ATS C in purple with two sectors SC1 and SC2

The flight trajectories are depicted in green and the FRA Exit/Entry points in black. All ATS units deployed FRA with intermediate points, and the fixed route network has been withdrawn. The ATS units retain some static airspace data of the neighbouring FRA.

The IFPS distributed the original FPL (FPL-DLH795-IS –A320/M-SRWY/C –EDDM0730 -N0420F370 BARIM LG818 FR1 DCT FR2 DCT FR4 DCT FR5 DCT FR8 DCT FR9 DCT F10 UG671 XAXAN UM337 –LWSK0210) to ATS A, ATS B and ATS C.

Severe weather has developed a few hours before the DLH795 departure within the airspace of ATS A and ATS B, the weather contours are indicated in orange.

07:25 DLH795 overflies point BARIM.

- ATS A extracts the following 2-D trajectory for flight DLH795 within its AoI as: BARIM FR1 FR2 FR4 FR5

- ATS B calculates the following 2-D trajectory for flight DLH795 within its AoI as: FR2 FR4 FR5 FR8 FR9
- ATS C calculates the following 2-D trajectory for flight DLH795 within its AoI as: FR5 FR8 FR9 F10 XAXAN

07:28 ATS A sends an ABI message to ATS B. The route elements contained in the ABI message are:

- Route segment start - Last overflown fix (BARIM);
- Points between segment start /end - FR1, FR2 and FR4 (coordination point);
- Route segment end - The first intermediate point in the downstream ATS (FR5), the remaining portion of the route is unknown.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **009**
-ARCID **DLH795**
-SSRCODE **A1165**
-ADEP **EDDM**
-COORDATA
    -PTID **FR4**
    -TO **0748**
    -TFL **F370**
-ADES **LWSK**
-ARCTYP **A320**
-ROUTE **N0420F370 BARIM DCT FR1 DCT FR2 DCT FR4 DCT FR5**

07:28 ATS B sends a LAM message to ATS A, correlates the received ABI with its corresponding flight plan data and attempts to align the DLH795 trajectory with the ABI message route information. The BARIM and FR1 points are disregarded due to their distance from the inbound COP, the remaining part of trajectory (FR2 FR4 FR5) is identical with the portion of previously extracted from the FPL and the ABI message data is used for the timing recalculation over the points.

07:30 ATS A assumes flight DLH795.

07:31: As severe weather develops in south-east part of ATS A SC1, the pilot requests weather avoidance re-routing.

07:32 ATS A clears the flight DLH795 from the FRA intermediate point (FR2) direct to FR6. By clearing the flight direct to FR6, the ATS A exit point changes to dynamic COP (REF01). The new trajectory for flight DLH795 within the AoI of ATS A is: BARIM FR1 FR2 REF01 FR6.

07:32 ATS A sends a revised ABI message to ATS B. The route elements contained in the ABI message are:

- Route segment start - Last overflown point (FR2).
- Route segment end - The first intermediate point in the downstream ATS (FR6). The route after FR6 is not known and therefore is not provided.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**

-RECVR -FAC **ATSB**
-SEQNUM **021**
-ARCID **DLH795**
-SSRCODE **A1165**
-ADEP **EDDM**
-COORDATA
-PTID **REF01**
-TO **0748**
-TFL **F370**
-ADES **LWSK**
-ARCTYP **A320**
-REF
-REFID **REF01**
-PTID **FR3**
-BRNG **011**
-DISTNC **007**
-ROUTE **N0420F370 FR2 DCT FR6**

07:32 ATS B returns a LAM message and attempts to update the SFPL with the revised ABI message data. The co-ordination point is changed from FR4 to REF01 (reference to FR3 with range and bearing). ATS B keeps the first trajectory point FR2 according to its distance, inserts the FRA entry point (REF01) and intermediate FRA point (F6) as provided by the ABI message. The ATS B FDP calculates the re-joining point of the received route information with the original route (FR9). The ATS B FDP calculates the FRA exit to be FR7. The new trajectory for flight DLH795 within the AoI of ATS B is: FR2 REF01 FR6 FR7 FR9.

07:38 ATS A sends an ACT message to ATS B.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **035**
-ARCID **DLH795**
-SSRCODE **A1165**
-ADEP **EDDM**
-COORDATA
-PTID **REF01**
-TO **0748**
-TFL **F370**
-ADES **LWSK**
-ARCTYP **A320**
-REF
-REFID **REF01**
-PTID **FR3**
-BRNG **011**
-DISTNC **007**
-ROUTE **N0420F370 FR2 DCT FR6**

07:38 ATS B returns a LAM message and the SFPL for flight DLH795 changes to a coordinated status. There is no update of the SFPL trajectory, as the route information was not provided by the ACT message. The coordination point REF01 with a reference to FR3 is confirmed.

07:41 ATS B sends an ABI message to ATS C. The route elements contained in the ABI message are:

- Route segment start - Last overflown fix (FR2);
- Points between segment start /end - FR6 and FR7;
- Route segment end - The first intermediate point in the downstream ATS (FR9), the remaining portion of route is not known to ATS B.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **753**
-ARCID **DLH795**
-SSRCODE **A1165**
-ADEP **EDDM**
-COORDATA
    -PTID **FR7**
    -TO **0801**
    -TFL **F370**
-ADES **LWSK**
-ARCTYP **A320**
-ROUTE **N0420F370 FR2 DCT FR6 DCT FR7 DCT FR9**

07:41 ATS C returns a LAM message and attempts to update the SFPL with the revised ABI message data. The co-ordination point is changed from FR8 to FR7. The points before the COP (FR2) are disregarded according to the distance criteria, while another point before the COP is kept (FR6). The FRA entry point is provided by the ABI message as well as the point where the route re-joins the previously calculated route (FR9). The new trajectory for flight DLH795 within the AoI of ATS C is: FR6 FR7 FR9 F10 XAXAN.

3.5.5 Scenario 3 - Fixed route

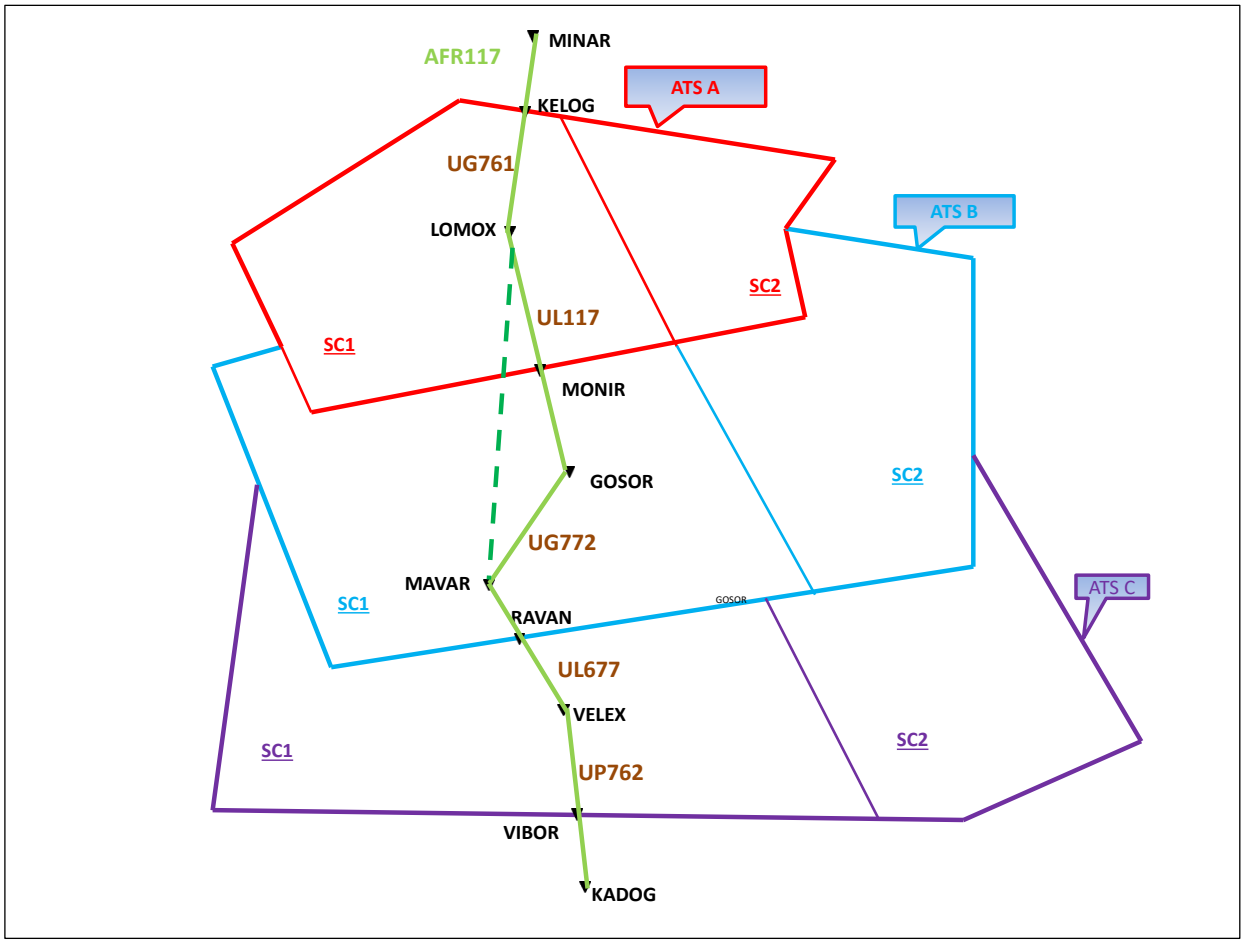


Figure 5 - FRA Fixed Route Scenario

This scenario covers the cases of coordination data exchanges with COP and trajectory exchanges together route exchanges.

The airspace and flight elements used for this scenario illustrated by

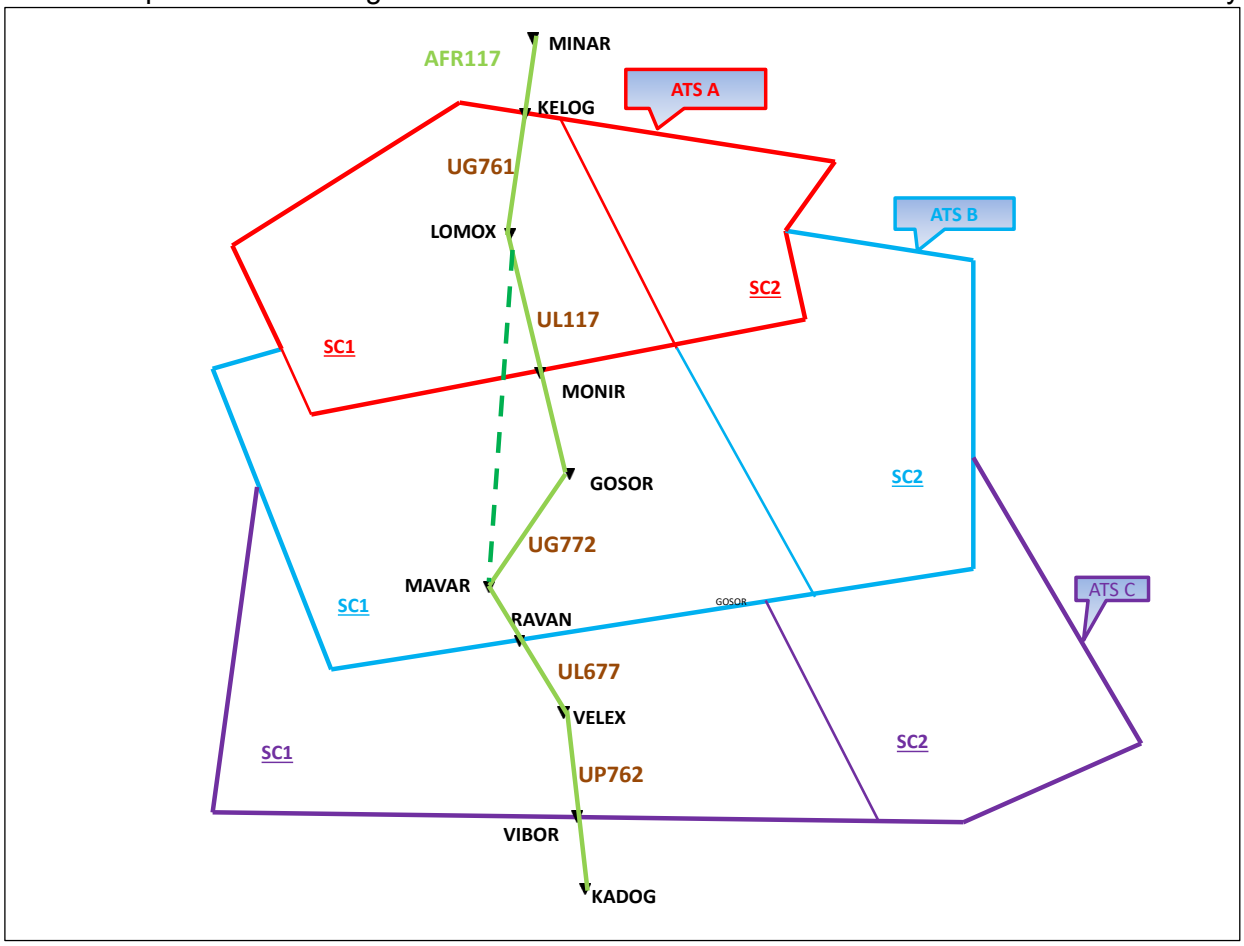


Figure 5 - FRA Fixed Route Scenario

are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

ATS A in red with two sectors SC1 and SC2

ATS B in blue with two sectors SC1 and SC2

ATS C in purple with two sectors SC1 and SC2

The flight trajectories are depicted in green and the route crossing and ATS Exit/Entry points in black. The ATS units retain limited static airspace data of the neighbouring FRA.

The IFPS distributed the original FPL (FPL-AFR117-IS –A319/M-SRWY/C –EDDF0930 - N0420F350 LOGOS UP117 MINAR UG761 LOMAX UL117 GOSOR UG772 MAVAR UL677 VELEX UP762 KAGOG UP761 ZAZAN –LBSF0200) to ATS A, ATS B and ATS C.

09:45 AFR117 overflies point MINAR.

- ATS A extracts the following 2-D trajectory for flight AFR117 within its AoI as: MINAR KELOG LOMAX MONIR GOSOR
- ATS B calculates the following 2-D trajectory for flight AFR117 within its AoI as: LOMAX MONIR GOSOR MAVAR RAVAN VELEX
- ATS C calculates the following 2-D trajectory for flight AFR117 within its AoI as: MAVAR RAVAN VELEX VIBOR KADOG

09:48 ATS A sends an ABI message to ATS B. The route elements contained in the ABI message are:

- Trajectory segment start – Last overflown fix (MINAR);
- Trajectory Points between segment start /end – KELOG, LOMAX and MONIR;
- Trajectory segment end - The point after the COP (GOSOR), the remaining portion of the route is unknown.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **786**
-ARCID **AFR117**
-SSRCODE **A2007**
-ADEP **EDDF**
-COORDATA
-PTID **MONIR**
-TO **1008**
-TFL **F350**
-ADES **LBSF**
-ARCTYP **A319**
-BEGIN RTEPTS
-PT
-PTID **MINAR**
-TO **0952**
-FL **F350**

-PT
-PTID **KELOG**
-TO **0955**
-FL **F350**

-PT
-PTID **LOMAX**
-TO **1001**
-FL **F350**

-PT

-PTID **MONIR**
-TO **1008**
-FL **F350**

-PT
-PTID **GOSOR**
-TO **1014**
-FL **F350**
-END RTEPTS
-ROUTE **N0420F350 MINAR DCT KELOG DCT LOMAX DCT MONIR DCT GOSOR**

09:48 ATS B sends a LAM message to ATS A, correlates the received ABI with its corresponding flight plan data and attempts to align the AFR117 trajectory with the ABI message route information. The MINAR and KELOG points are disregarded due to their distance from the inbound COP, the remaining part of trajectory (LOMAX MONIR GOSOR) is identical with the

portion of previously extracted from the FPL and the ABI message data is used for the timing recalculation over the points.

09:50 ATS A assumes flight AFR117.

09:54 AFR117 overflies point LOMAX.

09:55 AFR117 requests a direct route to MAVAR.

09:56 ATS A clears the flight AFR117 after LOMAX direct to MAVAR. By clearing the flight direct to MAVAR, the ATS A exit point changes to dynamic COP (REF01). The new trajectory for flight AFR117 within the AoI of ATS A is: MINAR KELOG LOMAX REF01 MAVAR.

09:56 ATS A sends a revised ABI message to ATS B. The route elements contained in the ABI message are:

- Trajectory segment start - Last overflown point (LOMAX);
- Trajectory Point between segment start /end - Dynamic co-ordination point (REF01), which can be omitted as it is the calculated point, and it is contained in “coordata” field;
- Trajectory segment end - The point after the COP (MAVAR). The route after MAVAR is not known and therefore is not provided.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **797**
-ARCID **AFR117**
-SSRCODE **A2007**
-ADEP **EDDF**
-COORDATA
    -PTID **REF01**
    -TO **1007**
    -TFL **F350**
-ADES **LBSF**
-ARCTYP **A319**
-REF
    -REFID **REF01**
    -PTID **MONIR**
    -BRNG **265**
    -DISTNC **006**
-BEGIN RTEPTS
    -PT
        -PTID **MINAR**
        -TO **0953**
        -FL **F350**
    -PT
        -PTID **KELOG**
        -TO **0957**
        -FL **F350**
    -PT
        -PTID **LOMAX**
        -TO **1003**
        -FL **F350**
    -PT

-PTID **REF01**
-TO **1007**
-FL **F350**
-PT
-PTID **MAVAR**
-TO **1016**
-FL **F350**
-END RTEPTS
-ROUTE **N0420F350 LOMAX DCT MAVAR**

09:56 ATS B returns a LAM message and attempts to update the SFPL with the revised ABI message data. The co-ordination point is changed from MONIR to REF01 (reference to MONIR with range and bearing). ATS B keeps the first trajectory point LOMAX according to its distance, inserts the entry point (REF01) and the point after the COP (MAVAR) as provided by ABI message. The ATS B FDP calculates the re-joining point of the received route information with the original route (MAVAR). The remaining route portion is unaltered. The new trajectory for flight AFR117 within the AoI of ATS B is LOMAX REF01 MAVAR RAVAN VELEX.

09:57 ATS A sends ACT to ATS B with trajectory points and route.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **812**
-ARCID **AFR117**
-SSRCODE **A2007**
-ADEP **EDDF**
-COORDATA
-PTID **REF01**
-TO **1007**
-TFL **F350**
-ADES **LBSF**
-ARCTYP **A319**
-BEGIN RTEPTS
-PT
-PTID **MINAR**
-TO **0953**
-FL **F350**
-PT
-PTID **KELOG**
-TO **0957**
-FL **F350**
-PT
-PTID **LOMAX**
-TO **1003**
-FL **F350**
-PT
-PTID **REF01**
-TO **1007**
-FL **F350**
-PT
-PTID **MAVAR**
-TO **1012**

-FL **F350**
-END RTEPTS
-REF
-REFID **REF01**
-PTID **MONIR**
-BRNG **265**
-DISTNC **006**
-ROUTE **N0420F350 LOMAX DCT MAVAR**

09:57 ATS B returns a LAM message and the SFPL for flight AFR117 changes to a coordinated status. There is no update of the SFPL trajectory, as the trajectory points are already received with ABI. The coordination point REF01 is confirmed.

10:00 ATS B sends an ABI message to ATS C. The trajectory elements contained in the ABI message are:

- Route segment start - Last overflown fix (LOMAX);
- Point between segment start /end - MAVAR, RAVAN (which can be omitted as it is contained in “coordata” field);
- Route segment end - The point after the COP (VELEX). The route after VELEX is unknown and therefore is not provided.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **455**
-ARCID **AFR117**
-SSRCODE **A2007**
-ADEP **EDDF**
-COORDATA
-PTID **RAVAN**
-TO **1012**
-TFL **F350**
-ADES **LBSF**
-ARCTYP **A319**
-BEGIN RTEPTS
-PT
-PTID **LOMAX**
-TO **1004**
-FL **F350**
-PT
-PTID **RAVAN**
-TO **1012**
-FL **F350**
-PT
-PTID **MAVAR**
-TO **1015**
-FL **F350**
-PT
-PTID **VELBA**
-TO **1020**
-FL **F350**
-END RTEPTS

-ROUTE **N0420F370 LOMAX DCT MAVAR DCT VELEX**

10:00 ATS C returns a LAM message and attempts to update the SFPL with the revised ABI message data. The co-ordination point remains the same (RAVAN). The point before the COP (LOMAX) is disregarded according to the distance criteria, while another point before the COP is kept (MAVAR). The entry point is provided by ABI message (“coordata” field), and the remaining trajectory portion is unaltered. The ABI message does not cause a change to the ATS C 2-D trajectory for flight AFR117, and the ABI message data is used for the timing recalculation over the points.

3.5.6 Scenario 4 – Cross border Free Route

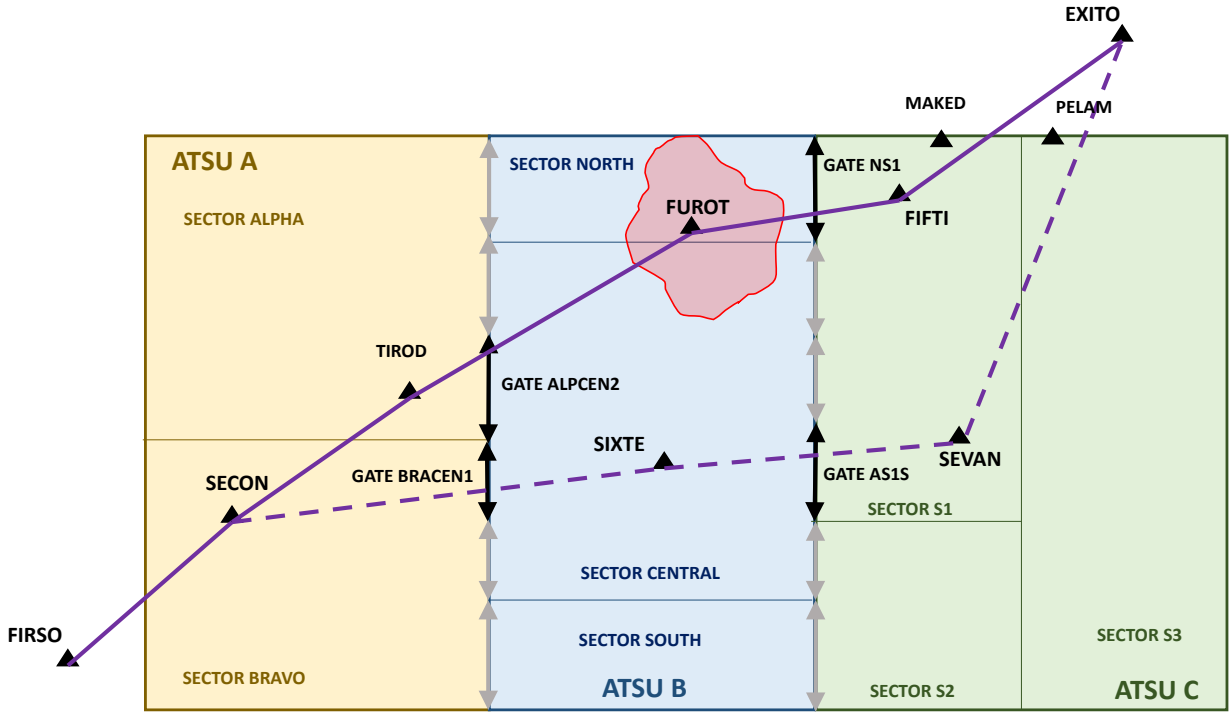


Figure 6 - Cross border Free Route Scenario

The airspace and flight elements used for this scenario illustrated by Figure 6 are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

- ATSU A in beige with two sectors: ALPHA and BRAVO.
- ATSU B in light blue with three sectors: NORTH, CENTRAL and SOUTH.
- ATSU C in light green with three sectors: S1, S2 and S3.

These three ATSUs are part of a cross-border FRA with FRA entry points, FRA intermediate points and FRA exit points. This scenario covers the cases of coordination data exchanges within cross-border FRA with gates. The flight trajectory is depicted in purple, while the FRA Exit/Intermediate/Entry points in black. The weather contours are indicated in red. All ATS units retain the relevant static airspace data of the full cross-border FRA and adjacent ATS unit.

As bilaterally agreed, the coordination data contained in ABI, ACT and REV messages sent between the concerned ATS units within cross-border FRA make a reference to gates, while the coordination element for cross-border FRA entry and exit point refers to published FRA coordination point. The ATSU entry/exit point are calculated as intersection of route and boundary (gate).

The IFPS distributed the original FPL (FPL-DLH886-IS –A320/M-SRWY/C –EDDM 1730 - N0460F330 MIRIJ UM761 FIRSO DCT SECON DCT TIROD DCT FUROT DCT FIFTI DCT EXITO UL908 MIRIX UM231 –LCLK0240) to ATS A, ATS B and ATS C.

18:20 DLH886 overflies point FIRSO.

- FDPS of ATSU A calculates the following 2-D trajectory for flight DLH886 within its Area of Interest (AoI) as: FIRSO SECON TIROD GEO01 FUROT;
- ATSU B calculates the following 2-D trajectory for flight DLH886 within its AoI as: SECON TIROD GEO01 FUROT GEO02 FIFTI;

- ATSU C calculates the following 2-D trajectory for flight DLH886 within its AoI as: FUROT GEO02 FIFTI REF01 EXITO

GEO01 is the boundary point between ATSU A and ATSU B, GEO02 is the boundary point between ATSU B and ATSU C and REF01(reference to MAKED) is the ATSU C exit point. These are internal points calculated by the FDPSs of the respective ATSUs and they are not part of OLDI exchanges. The estimated data within the OLDI messages includes only gates.

18:22 ATSU A sends an ABI message to ATSU B. The notification message is sent for the gate ALPCEN2.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **365**
-ARCID **DLH886**
-SSRCODE **A5123**
-ADEP **EDDM**
-COORDATA
    -GID **ALPCEN2**
    -TO **1842**
    -TFL **F330**
-ADES **LCLK**
-ARCTYP **A320**
-ROUTE **N0460F330 FIRSO DCT SECON DCT TIROD DCT FUROT**

18:22 ATSU B sends a LAM message to ATSU A, correlates the received ABI with its corresponding flight plan data and attempts to align the DLH886 trajectory with the ABI message route information. The FIRSO point is disregarded due to its distance from the boundary, the remaining part of trajectory (SECON TIROD FUROT) is identical with the previously extracted from the FPL and the ABI message data is used for the timing recalculation over the boundary.

18:25 ATSU A assumes flight DLH886.

18:28 Due to the short flying distance within ATSU B, ATSU B sends ABI to ATSU C.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **256**
-ARCID **DLH886**
-SSRCODE **A5123**
-ADEP **EDDM**
-COORDATA
    -GID **NS1**
    -TO **1848**
    -TFL **F330**
-ADES **LCLK**
-ARCTYP **A320**
-ROUTE **N0460F330 SECON DCT TIROD DCT FUROT DCT FIFTI**

18:28 ATSU C returns a LAM message and attempts to update the SFPL with the ABI message data. The SECON and TIROD points are disregarded due to their distance from the

ATSU C AoR. The remaining part of the trajectory (FUROT FIFTI) is identical to the previously extracted route from the FPL, and the ABI message data is used for the timing recalculation over the boundary.

18:31 ATSU A sends an ACT message to ATSU B. The coordination message is sent for the gate ALPCEN2.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **398**
-ARCID **DLH886**
-SSRCODE **A5123**
-ADEP **EDDM**
-COORDATA
    -GID **ALPCEN2**
    -TO **1841**
    -TFL **F330**
-ADES **LCLK**
-ARCTYP **A320**
-ROUTE **N0460F330 FIRSO DCT SECON DCT TIROD DCT FUROT**

18:31 ATSU B returns a LAM message and the SFPL for flight DLH886 moves to a coordinated status. There is no update of the SFPL route, as the route information provided by the ACT message was identical with route received by ABI message. The gate ALPCEN2 is confirmed. Timing over the boundary is updated.

18:33 The weather conditions in the north sector of ATSU B severely deteriorate earlier than forecasted. To avoid severe weather in the north sector of ATSU B, ATSU B sends a route change request through an unsolicited CDN message to ATSU A.

-TITLE **CDN**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **015**
-ARCID **DLH886**

-ADEP **EDDM**
-ROUTE **SECON DCT SIXTE DCT SEVAN DCT EXITO**
-ADES **LCLK**

18:33 The ATSU A FDP receives the CDN message, returns a SBY message and refers the CDN message to the ATCO of sector BRAVO.

-TITLE **SBY**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **421**
-MSGREF

-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **015**

18:34 The proposed trajectory change is graphically presented at sector BRAVO. The ATCO manning BRAVO reviews the ATSU B proposal for the route change, tests for MTCD's conflict with "what-if" tool and identifies no issue if accepting it. ATSU A accepts the proposed route modifications by sending an ACP message.

-TITLE **ACP**
-REFDATA
-SENDER –FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **443**
-MSGREF
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **015**

18:34 After the reception of ACP, ATSU B FDPS updates the route with the content of CDN message and calculates the ATSU B entry/exit points (GEO03 and GEO04 respectively). The amended route of ATSU B is SECON GEO03 SIXTE GEO04 SEVAN EXITO.

18:34 ATSU A FDPS calculates a new gate (BRACEN1) and exit point (GEO03) with the new route SECON SIXTE SEVAN EXITO. The EXITO point is disregarded as it is outside AoI, the remaining part of trajectory (SECON SIXTE SEVAN) is kept as tentative route until the clearance is issued.

18:34 ATSU A clears the flight to proceed with the new route (SECON SIXTE SEVAN). The ATSU A FDPS updates the route within the AoI of ATSU A.

18:34 As the boundary conditions between ATSU A and ATSU B have changed (gate BRACEN1 instead gate ALPCEN2), a REV message is triggered with new estimated data.

18:34 ATSU A sends an REV message to ATSU B. The coordination message is sent for the gate BRACEN1.

-TITLE **REV**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **451**
-MSGREF
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **398**
-ARCID **DLH886**
-ADEP **EDDM**
-COORDATA
-GID **BRACEN1**
-TO **1840**
-TFL **F330**
-ADES **LCLK**

-ARCTYP **A320**
-ROUTE **N0460F330 FIRSO DCT SECON DCT SIXTE DCT SEVAN**

18:35 ATSU B returns a LAM message and attempts to update the DLH886 SFPL with the content of REV message data. The gate is changed from ALPCEN2 to BRACEN1, but the route is identical to outcome of CDN dialogue therefore there is no route update. The ATSU B FDPS identifies that the new route establishes new boundary conditions towards ATSU C, the gate is changed from gate NS1 to gate AS1S.

18:35 ATSU B sends a revised ABI message to ATSU C with new route and new boundary conditions.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **289**
- MSGREF
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **256**
-ARCID **DLH886**
-SSRCODE **A5123**
-ADEP **EDDM**
-COORDATA
    -GID **AS1S**
    -TO **1847**
    -TFL **F330**
-ADES **LCLK**
-ARCTYP **A320**
-ROUTE **N0460F330 SECON DCT SIXTE DCT SEVAN DCT EXITO**

18:35 ATSU C returns a LAM message and attempts to update the SFPL with the revised ABI message data. The entry gate is changed from NS1 to AS1S. The route is updated as well, point SECON is ignored as it is outside of ATSU C AoI, while the remaining portion of received route is used to completely amend the route segment within the FDPS of ATSU C. The FDPS of ATSU C calculates the entry/exit conditions, entry point is intersection of new route with gate AS1S (GEO04) while exit point (REF02) is calculated in relation to published COP PELAM. The new route segment is SIXTE GEO04 SEVAN REF02 EXITO.

18:38 ATSU B sends an ACT message to ATSU C. The coordination message is sent for the gate AS1S.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **301**
-ARCID **DLH886**
-SSRCODE **A5123**
-ADEP **EDDM**
-COORDATA
    -GID **AS1S**
    -TO **1848**

-TFL **F330**
-ADES **LCLK**
-ARCTYP **A320**
-ROUTE **N0460F330 SECON DCT SIXTE DCT SEVAN DCT EXITO**

18:37 ATSU C returns a LAM message and the SFPL for flight DLH886 moves to a coordinated status. There is no update of the SFPL route, as the route information provided by the ACT message was identical with route received by revised ABI message. The gate ALPCEN2 is confirmed. Timing over the boundary is updated.

18:40 ATSU A instructs the flight DLH886 to contact ATS B by sending a COF message.

-TITLE **COF**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **479**
-ARCID **DLH886**

18:41 ATSU B indicates the establishment of radio contact with the flight DLH886 by sending a MAS message.

-TITLE **MAS**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **075**
-ARCID **DLH886**

3.5.7 Scenario 5 - Route change initiated by the downstream unit

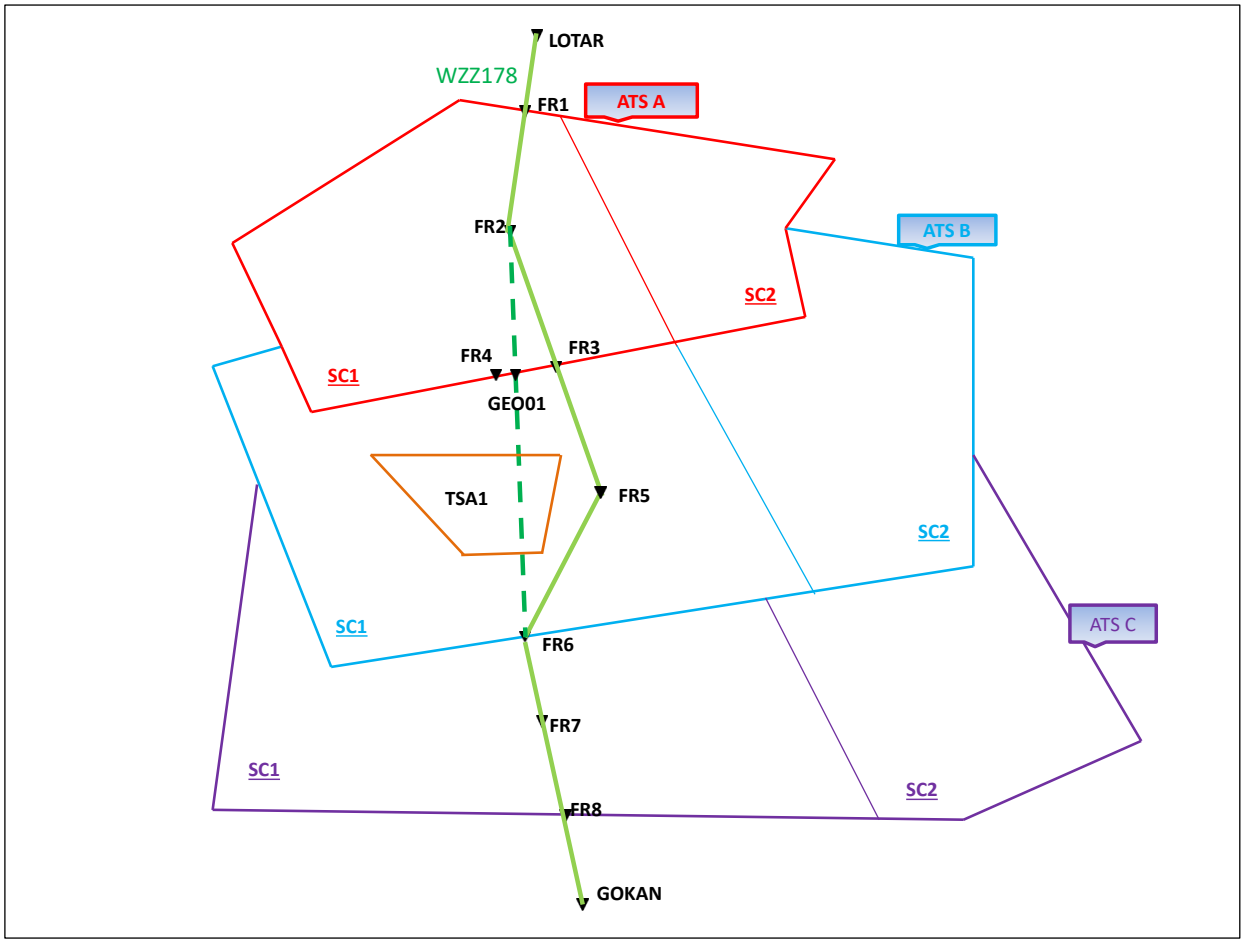


Figure 7 - FRA Route Change Scenario

In this scenario, the reference points are provided with LAT/LONG coordinates

The airspace and flight elements used for this scenario illustrated by Figure 7 are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

- ATS A in red with two sectors SC1 and SC2
- ATS B in blue with two sectors SC1 and SC2
- ATS C in purple with two sectors SC1 and SC2

The flight trajectories are depicted in green and the route crossing and ATS Exit/Entry points in black. The ATS units retain limited static airspace data of the neighbouring FRA.

There is an active Temporarily Segregated Area (TSA1) within AoR of ATS B depicted in brown.

The IFPS distributed the original FPL (FPL-WZZ178-IS –A320/M-SRWY/C –LWSK0930 -N0420F350 XEROX UL761 MINIM UG912 LOTAR DCT FR1 DCT FR2 DCT FR3 DCT FR5 DCT FR6 DCT FR 7 DCT FR8 DCT GOKAN UP118 MILAR UG782 LOMAG –EDDM0220) to ATS A, ATS B and ATS C.

10:15 WZZ178 overflies point LOTAR.

- ATS A extracts the following 2-D trajectory for flight WZZ178 within its AoI as: LOTAR FR1 FR2 FR3 FR5 FR6

- ATS B calculates the following 2-D trajectory for flight WZZ178 within its AoI as: FR1 FR2 FR3 FR5 FR6 FR7 FR8
- ATS C calculates the following 2-D trajectory for flight WZZ178 within its AoI as: FR3 FR5 FR6 FR7 FR8 GOKAN

10:18 ATS A sends an ABI message to ATS B. The route elements contained in the ABI message are:

- Route segment start - Last overflown fix (LOTAR);
- Point between segment start /end - FR1, FR2 and FR3 (coordination points);
- Route segment end - The first intermediate point in the downstream ATS (FR5) and the remaining portion of the route (FR6).

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **023**
-ARCID **WZZ178**
-SSRCODE **A3064**
-ADEP **LWSK**
-COORDATA
    -PTID **FR3**
    -TO **1038**
    -TFL **F350**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0420F350 LOTAR DCT FR1 DCT FR2 DCT FR3 DCT FR5 DCT FR6**

10:18 ATS B sends a LAM message to ATS A, correlates the received ABI with its corresponding flight plan data and attempts to align the WZZ178 trajectory with the ABI message route information. The LOTAR point is disregarded due to its distance from the inbound COP, the remaining part of trajectory (FR1 FR2 FR3 FR5 FR6) identical with the portion previously extracted from the FPL is kept and the ABI message data is used for the timing recalculation over the points.

10:20 ATS A assumes WZZ178.

10:28 ATS A sends an ACT message to ATS B. The ACT message contain the same boundary conditions and route data as per ABI.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **055**
-ARCID **WZZ178**
-SSRCODE **A3064**
-ADEP **LWSK**
-COORDATA
    -PTID **FR3**
    -TO **1038**
    -TFL **F350**
-ADES **EDDM**

-ARCTYP **A320**
-ROUTE **N0420F350 LOTAR DCT FR1 DCT FR2 DCT FR3 DCT FR5 DCT FR6**

10:28 ATS B returns a LAM message and the SPFL for flight WZZ178 moves to a coordinated status. There is no update of the SFPL trajectory, as the route information is the same as provided by ABI message. The coordination point FR3 is confirmed.

10:29: The Temporarily Segregated Area (TSA1) is released earlier than planned. ATS B was notified via the real time ASM exchanges that this TRA is available for GAT traffic, but ATS A is unaware that TSA1 has been released.

10:29: ATS A and ATS B have bilaterally agreed that in the case of an early release of segregated airspace within the AoR of ATS B, ATS B should propose a re-routing to make use of such opportunities. In that respect, ATS B creates a direct tentative trajectory FR2 DCT FR6. The ATS B system trajectory is not updated as ATS B SC1 only composes a proposal that ATS A may accept or reject.

10:29 ATS B sends the direct routing request with unsolicited CDN message to ATS A.

-TITLE **CDN**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **776**
-ARCID **WZZ178**
-SSRCODE **A3064**
-ADEP **LWSK**
-DCT **FR2 FR6**
-ADES **EDDM**

10:30 The ATS A FDP receives the CDN message, returns a SBY message and refers the CDN message to the ATCO of sector SC1.

-TITLE **SBY**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **035**
-MSGREF
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **776**

10:31 The proposed trajectory change is graphically presented on ATS A SC1, ATS A SC1 reviews the ATS B proposal for direct routing and change of coordination conditions, tests for MTCD's conflict with "what-if" tool and identifies no issue in accepting it. ATS A SC1 accepts the proposed route modifications by sending an ACP message.

-TITLE **ACP**
-REFDATA
    -SENDER –FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **043**
-MSGREF
    -SENDER -FAC **ATSB**

-RECVR -FAC **ATSA**
-SEQNUM **776**
-ARCID **WZZ178**
-ADEP **LWSK**
-ADES **EDDM**

10:31 By accepting the CDN message, ATS A FDPS updates the system trajectory using the CDN message data (DCT FR2 FR6) after the clearance to FR6. ATS A FDPS identifies that the FR2 point as the start of route change and the FR6 point as the end of route. The points before FR2 are kept, the segment between FR2 and FR6 is updated (FR4 and FR5 are removed). The new trajectory for flight WZZ178 within the AoI of ATS A is LOTAR FR1 FR2 FR6.

10:31 ATS A clears the flight WZZ178 to proceed direct from the FRA intermediate point (FR2) to FR6.

10:31 ATS A sends a REV message to ATS B with new boundary estimates. The route elements contained in the REV message are:

- Route Segment start – Last overflown point (FR1);
- Route Segment end - the point to which the flight is cleared (FR6). The route after FR6 is unknown and therefore is not provided.

-TITLE **REV**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **076**
-ARCID **WZZ178**
-ADEP **LWSK**
-ADES **EDDM**
-COORDATA
-PTID **GEO01**
-TO **1038**
-TFL **F350**
GEO
-GEOID **GEO01**
-LATTD **422743N**
-LONGTD **250166W**
-ROUTE **N0420F370 FR1 DCT FR2 DCT FR6**

10:32 ATS B returns a LAM message and attempts to update the WZZ178 SFPL with the REV message data. The co-ordination point is changed from FR3 to GEO1. ATS B keeps the first two trajectory points FR1 and FR2 according to their distance, inserts the entry point (GEO01), identifies FR6 as the re-joining point with the original FPL route. The new trajectory for flight WZZ178 within the AoI of ATS B is: FR1 FR2 FR6 FR7 FR8.

10:34 ATS B sends an ABI message to ATS C. The route elements contained in the ABI message are:

- Route segment start - Last overflown fix (FR2);
- Route segment end - The first intermediate point in the downstream ATS (FR7) and the remaining portion of route FR8.

For the purpose of this scenario, the calculated and coordination points are included in the route field of the ABI message.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **558**
-ARCID **WZZ178**
-SSRCODE **A3064**
-ADEP **LWSK**
-COORDATA
    -PTID **FR6**
    -TO **1054**
    -TFL **F350**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0420F370 FR2 DCT FR6 DCT FR7 DCT FR8**

10:34 ATS C returns a LAM message and attempts to update the SFPL with the revised ABI message data. The co-ordination point is not changed (FR6). The point before the COP (FR2) is disregarded according to the distance criteria. The FRA entry/intermediate/exit points within the AoR as provided by the ABI message are considered and the segment after FR8 remains unaltered. The new trajectory for flight WZZ178 within the AoI of ATS C is: FR6 FR7 FR8 GOKAN.

3.5.8 Scenario 6 - Vertical route change (XFL application)

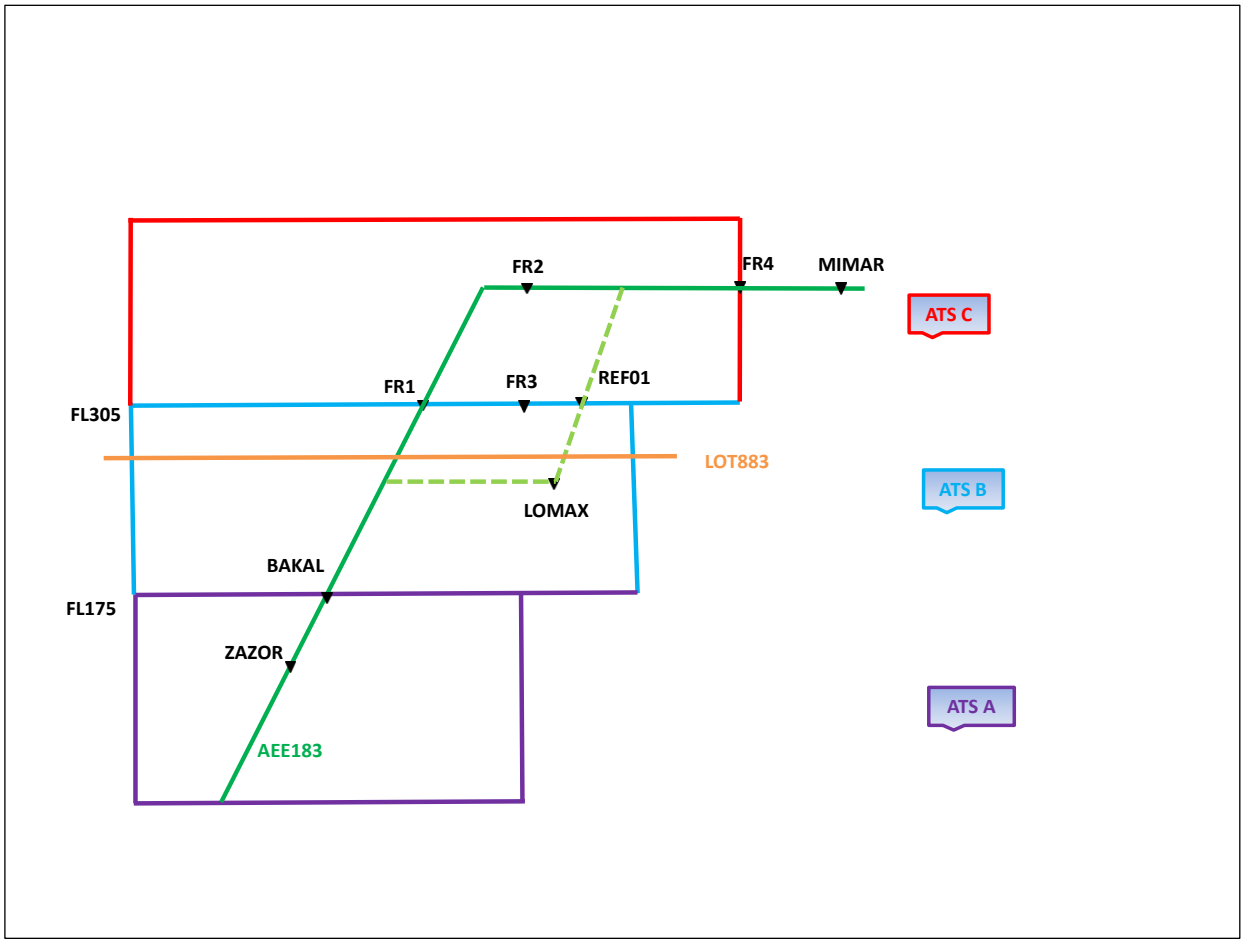


Figure 8 - FRA Vertical Route Change Scenario (XFL)

As per bilateral agreements, ATS A and ATS B exchanged the trajectory points and route as well as the coordination point.

As per bilateral agreements, ATS B and ATS C exchanged the only route info and gates info instead of coordination points.

The airspace and flight elements used for this scenario illustrated by Figure 8 are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

- ATS C in red
- ATS B in blue
- ATS A in purple

The flight trajectories are depicted in green and the route crossing and ATS Exit/Entry points in black. All depicted ATS units retain full static airspace data of the neighbouring airspaces. However, they apply different trajectory prediction algorithms and different default rates of climb.

This scenario is applicable in cases that the downstream ATS unit can coordinate flight levels (FLs) and issue clearances outside the vertical boundaries assigned to the concerned ATS units.

Athens (LGAV) TWR unit and ATS A use the same FDPS, the OLDI messages concerning LGAV departures are provided by ATS A.

The IFPS distributed the original FPL (FPL-AEE183-IS –CRJ7/M-SRWY/C –LGAV0930 -N0420F350 ZAZOR LM178 BAKAL UM981 FR1 DCT FR2 DCT FR4 UR091 MIMAR UL762 GOROZ UL881 NAZAR LG761 KOBIL –EPWA0230) to ATS A, ATS B and ATS C.

ATS A extracts the following 4-D trajectory for flight AEE183 within its AoI as:

Horizontal position	LGAV	ZAZOR	BAKAL
FL	00	130	180
Time	0930	0937	0939

ATS B calculates the following 4-D trajectory for flight AEE183 within its AoI as:

Horizontal position	ZAZOR	BAKAL	FR1	FR2	FR4
FL	130	180	310	350	350
Time	0937	0939	0947	0953	0959

ATS C calculates the following 4-D trajectory for flight AEE183 within its AoI as:

Horizontal position	BAKAL	FR1	FR2	FR4	MIMAR
FL	180	300	350	350	350
Time	0940	0948	0954	1000	1006

09:25 ATS A sends a PAC message to ATS B with the estimated take-off time (ETOT). ATS A and ATS B bilaterally agreed to exchange trajectory points and route info.

-TITLE **PAC**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **135**
-ARCID **AEE183**
-ADEP **LGAV**
-ETOT **0931**
-SSRCODE **A3065**
-ARCTYP **CRJ7**
-ADES **EPWA**
-BEGIN EQCST
    -EQPT **W/EQ**
    -EQPT **Y/NO**
    -EQPT **R/NO**
    -SUREQPT **S/UN**
-END EQCST
-RWYDEP **18**
-SID **9**
-CFL
    -FL **F220**
-BEGIN RTEPTS
     -PT
          -PTID **LGAV**

-TO **0931**
-FL **F000**

-PT
-PTID **ZAZOR**
-TO **0938**
-FL **F130**

-PT
-PTID **BAKAL**
-TO **0940**
-FL **F180**
-END RTEPTS
-ROUTE **N0420F350 ZAZOR LM178 BAKAL**

09:25 ATS B sends a LAM message to ATS A, updates the AEE183 SFPL with the PAC message data. The ETOT and trajectory points are used to update the SFPL of ATS B and the SSR code is linked to AEE183. The ETOT provided within PAC is different from the one contained in the FPL provided by IFPS. The trajectory points of PAC message will trigger an update of AEE183 SFPL as (the changes are indicated in purple):

Horizontal position	ZAZOR	BAKAL	FR1	FR2	FR4
FL	130	180	310	350	350
Time	**0938**	**0940**	**0948**	**0954**	**1000**

09:27 ATS A sends an updated PAC message to ATS B with the estimated time at the COP.

-TITLE **PAC**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **145**
-ARCID **AEE183**
-SSRCODE **A3065**
-ADEP **LGAV**
-COORDATA
-PTID **BAKAL**
-TO **0941**
-TFL **F220**
-SFL **F170A**
-ARCTYP **CRJ7**
-ADES **EPWA**

-BEGIN RTEPTS
-PT
-PTID **LGAV**
-TO **0932**
-FL **F000**

-PT
-PTID **ZAZOR**
-TO **0939**
-FL **F130**

-PT
-PTID **BAKAL**
-TO **0941**
-FL **F220**

-SFL **F170A**

-END RTEPTS
-ROUTE **N0420F350 ZAZOR LM178 BAKAL**

09:27 ATS B sends a LAM message to ATS A, updates the AEE183 SFPL with the PAC message data. The Trajectory points and the supplementary flight level (SFL) will be used for the SFPL update as the most accurate estimates for the crossing conditions. This will cause a time shift of ATS B AEE183 trajectory as follows (the changes are indicated in purple):

Horizontal position	ZAZOR	BAKAL	FR1	FR2	FR4
FL	130	**170**	310	350	350
Time	**0939**	**0941**	**0949**	**0955**	**1001**

09:32 AEE183 takes-off. The SFPL changes to a live status and the SSR code A3065 is squawked. ATS A clears AEE183 to climb to FL220.

09:32 ATS A sends an ACT message to ATS B

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **176**
-ARCID **AEE183**
-SSRCODE **A3065**
-ADEP **LGAV**
-COORDATA
-PTID **BAKAL**
-TO **0941**
-TFL **F220**
-SFL **F170A**
-ADES **EPWA**
-ARCTYP **CRJ7**
-BEGIN RTEPTS
-PT
-PTID **LGAV**
-TO **0932**
-FL **F000**

-PT
-PTID **ZAZOR**
-TO **0939**
-FL **F130**

-PT
-PTID **BAKAL**
-TO **0941**
-FL **F220**
-SFL **F170A**

-END RTEPTS
-ROUTE **N0420F350 ZAZOR LM178 BAKAL**

09:32 ATS B returns a LAM and the SFPL for flight AEE183 moves to a coordinated status. There is no update of the SFPL trajectory, as the data provided by updated PAC message were confirmed and no new route information is provided by the ACT message.

09:33 ATS B sends an ABI message to ATS C. The route elements contained in the ABI message are:

- Route segment start - Last overflown point is not applicable in this case as no point was overflown. In this case ATS B provides the first point in the trajectory (ZAZOR);
- Points between the segment start /end - BAKAL and FR1 (also contained in “coordata” field) as well as the corresponding route indicators connecting these points;
- Route segment end - The point after the gate (FR2) and the remaining known route part FR4.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **366**
-ARCID **AEE183**
-SSRCODE **A3065**
-ADEP **LGAW**
-COORDATA
    -GID **FR1**
    -TO **0949**
    -TFL **F350**
    -SFL **F310A**
-ADES **EPWA**
-ARCTYP **CRJ7**
-ROUTE **N0420F350 ZAZOR LM178 BAKAL UM981 FR1 DCT FR2 DCT FR4**

09:33 ATS C sends a LAM message to ATS B, correlates the received ABI with its corresponding flight plan data and attempts to align the AEE183 trajectory with the ABI message route information. The ZAZOR point is disregarded due to its distance from the inbound COP, the remaining part of trajectory (BAKAL UM981 FR1 DCT FR2 DCT FR4) identical with the portion previously extracted from the FPL is kept and the ABI message data is used for the timing recalculation of over the points. This will cause ATS C AEE183 trajectory update as follows (the changes are indicated in purple):

Horizontal position	BAKAL	FR1	FR2	FR4	MIMAR
FL	180	**310**	350	350	350
Time	**0940**	**0949**	**0955**	**1001**	**1007**

09:39 AEE183 overflies point ZAZOR.

09:40 ATS A transfers AEE183 to ATS B and ATS B assumes the flight.

09:41 AEE183 overflies a point near to BAKAL.

09:42 Due to the conflicting traffic (LOT883), ATS B clears the flight AEE183 till FL 270, instructs the pilot to maintain FL 270 and to continue the climb to FL 350 (RFL) after LOMAX. By clearing

the flight via LOMAX, the ATS B exit point changes to a dynamic point (REF01) that is part of gate FR3. The new trajectory for flight AEE183 within the AoI of ATS B is as follows (the changes are indicated in purple):

Horizontal position	ZAZOR	BAKAL	LOMAX	REF01	FR4
FL	130	170	**270**	**310**	350
Time	0939	0941	**0953**	**0955**	**1003**

09:42 ATS B sends a revised ABI to ATS C. The route elements contained in the ABI message are:

- Route segment start - Last overflown point (BAKAL);
- Route segment end - The point after the gate (FR4). The route after FR4 is unknown and therefore is not provided.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **389**
-ARCID **AEE183**
-SSRCODE **A3065**
-ADEP **LGAV**
-COORDATA
    -GID **FR3**
    -TO **0955**
    -TFL **F350**
    -SFL **F310A**
-ADES **EPWA**
-ARCTYP **CRJ7**
-ROUTE **N0420F350 BAKAL DCT LOMAX DCT FR4**

09:42 ATS C returns a LAM message and attempts to update the AEE183 SFPL with the revised ABI message data. The gate is changed from FR1 to FR3. ATS C FDPS keeps the first trajectory point BAKAL according to its distance, inserts the next point LOMAX, calculate the boundary crossing point using route info (REF01) and re-joins the original route at FR4. The remaining route portion is unaltered. The new trajectory for flight AEE183 within the AoI of ATS C is as follows (the changes are indicated in purple):

Horizontal position	BAKAL	**LOMAX**	**REF01**	FR4	MIMAR
FL	180	**270**	**310**	350	350
Time	0941	**0953**	**0955**	**1003**	**1009**

09:45 ATS B sends an ACT message to ATS C.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **398**
-ARCID **AEE183**

-SSRCODE **A3065**
-ADEP **LGAV**
-COORDATA
-GID FR**3**
-TO **0955**
-TFL **F350**
-SFL **F310A**
-ADES **EPWA**
-ARCTYP **CRJ7**
-ROUTE **N0420F350 BAKAL DCT LOMAX DCT FR4**

09:45 ATS C returns a LAM message and the SPFL for flight AEE183 moves to a coordinated status. There is no update of the SFPL trajectory, as ACT contain the same info as ABI. The gate FR3 is confirmed.

3.5.9 Scenario 7 - Vertical route change (RFL application)

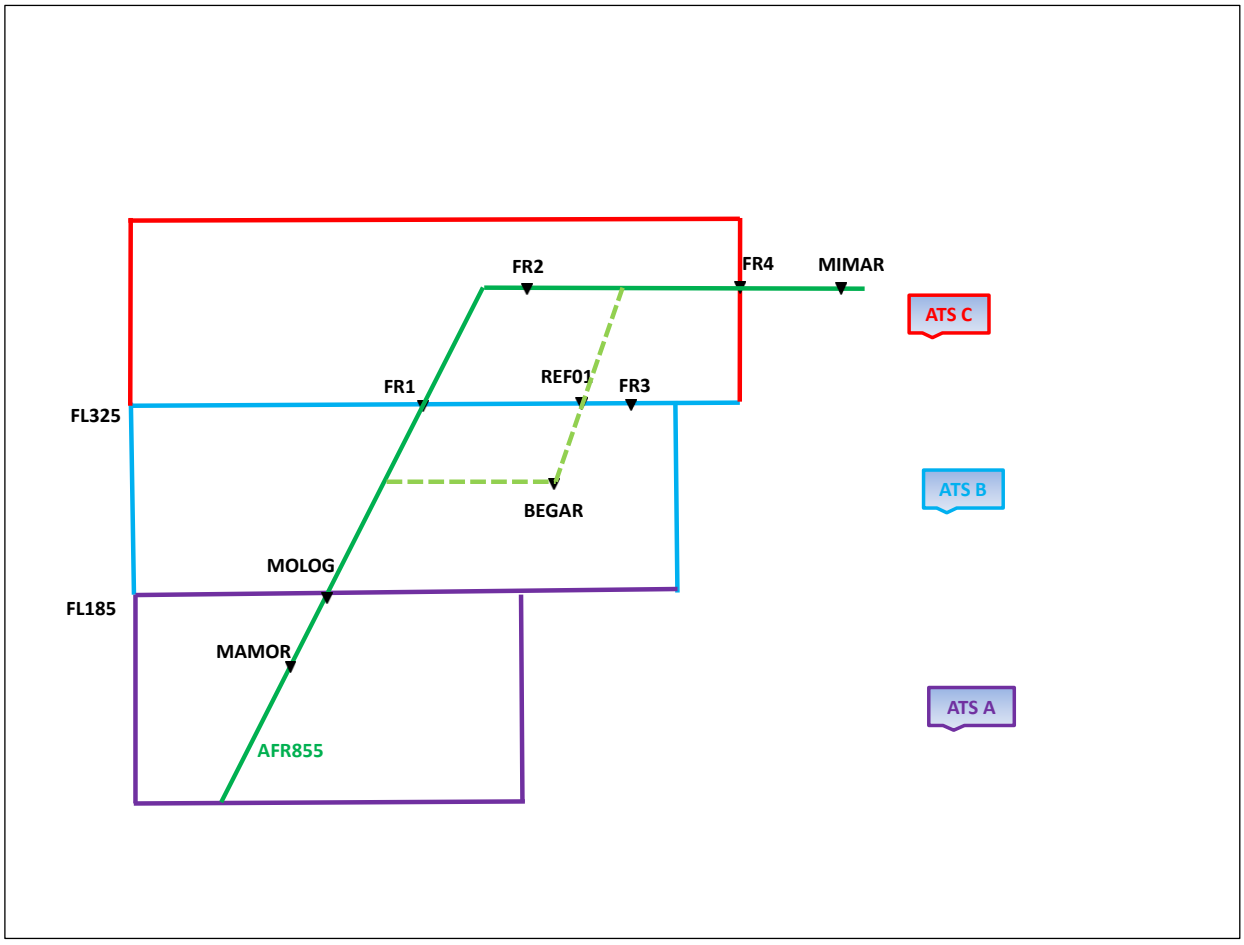


Figure 9 - FRA Vertical Route Change Scenario (RFL)

In this scenario, the reference point is provided with LAT/LONG coordinates.

The airspace and flight elements used for this scenario illustrated by Figure 9 are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

- ATS C in red

- ATS B in blue
- ATS A in purple

The flight trajectories are depicted in green and the route crossing and ATS Exit/Entry points in black. All depicted ATS units retain full static airspace data of the neighbouring airspaces. However, they apply different trajectory prediction algorithms and different default rates of climb.

This scenario is applicable in cases that the downstream ATS unit can clear the flight within the vertical limits of the concerned ATS units using the last useable FL.

Nantes (LFRS) TWR unit and ATS A use the same FDPS, the OLDI messages concerning LFRS departures are provided by ATS A.

The IFPS distributed the original FPL (FPL-AFR855-IS –CRJ7/M-SRWY/C –LFRS1030 -N0420F370 MAMOR LM185 MOLOG UM971 FR1 DCT FR2 DCT FR4 UR071 MIMAR UL762 GOROZ UL881 NAZAR LG761 KOBIL –EPWA0230) to ATS A, ATS B and ATS C.

ATS A extracts the following 4-D trajectory for flight AFR855 within its AoI as:

Horizontal position	LFRS	MAMOR	MOLOG
FL	00	120	180
Time	1040	1047	1049

ATS B calculates the following 4-D trajectory for flight AFR855 within its AoI as:

Horizontal position	MAMOR	MOLOG	FR1	FR2	FR4
FL	130	180	320	370	370
Time	1047	1049	1057	1103	1109

ATS C calculates the following 4-D trajectory for flight AFR855 within its AoI as:

Horizontal position	MOLOG	FR1	FR2	FR4	MIMAR
FL	190	330	370	370	370
Time	1050	1058	1104	1110	1116

10:36 ATS A sends a PAC message to ATS B with the estimated take-off time (ETOT).

-TITLE **PAC**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **558**
-ARCID **AFR855**
-ADEP **LFRS**
-ETOT **1041**
-SSRCODE **A4055**
-ARCTYP **CRJ7**
-ADES **EPWA**
-BEGIN EQCST
    -EQPT **W/EQ**
    -EQPT **Y/NO**

-EQPT **R/NO**
-SUREQPT **S/UN**
-END EQCST
-RWYDEP **18**
-ROUTE **N0420F370 MAMOR LIM185 MOLOG**
-SID **9**
-CFL
-FL **F220**

10:36 ATS B sends a LAM message to ATS A, updates the AFR855 SFPL with the PAC message data. As the route information contained within ABI confirmed the route (no updates), only ETOT will be used for SFPL update and the SSR code is linked to AFR855. The ETOT provided within the PAC message is different from the one contained in the FPL provided by IFPS. This will cause a time shift of ATS B AFR855 trajectory as follows (the changes are indicated in purple):

Horizontal position	MAMOR	MOLOG	FR1	FR2	FR4
FL	130	180	320	370	370
Time	**1048**	**1050**	**1058**	**1104**	**1110**

10:37 ATS A sends an updated PAC message to ATS B with the estimated time at the COP.

-TITLE **PAC**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **598**
-ARCID **AFR855**
-SSRCODE **A4055**
-ADEP **LFRS**
-COORDATA
-PTID **MOLOG**
-TO **1051**
-TFL **F180**
-ARCTYP **CRJ7**
-ADES **EPWA**
-ROUTE **N0420F370 MAMOR LIM185 MOLOG**

10:37 ATS B sends a LAM message to ATS A, updates the AFR855 SFPL with the PAC message data. The route information does not contain any additional, the confirmation of RFL370 indicates the intention to enter ATS B whilst climbing, and the updated time over MOLOG will be used to update the SFPL. This will cause a time shift of ATS B AFR855 trajectory as follows (the changes are indicated in purple):

Horizontal position	MAMOR	MOLOG	FR1	FR2	FR4
FL	130	180	320	370	370
Time	**1049**	**1051**	**1059**	**1105**	**1111**

10:42 AFR855 takes-off. The SFPL is turned to a live status and the SSR code A4055 is squawked. ATS A clears AFR855 to climb to FL180.

10:42 ATS A sends an ACT message to ATS B.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **638**
-ARCID **AFR855**
-SSRCODE **A4055**
-ADEP **LFRS**
-COORDATA
    -PTID **MAMOR**
    -TO **1051**
    -TFL **F180**
-ADES **EPWA**
-ARCTYP **CRJ7**
-ROUTE **N0420F370 MAMOR LIM185 MOLOG**

10:42 ATS B returns a LAM message and the SFPL for flight AFR855 moves to a coordinated status. There is no update of the SFPL trajectory, as the data provided by the ACT message were confirmed.

10:43 ATS B sends an ABI message to ATS C. The route elements contained in the ABI message are:

- Route segment start - Last overflown point is not applicable in this case as no point was overflown. In this case ATS B provides the first point in the trajectory (MAMOR);
- Points between segment start /end – MOLOG and FR1 (also contained in “coordata” field) as well as the corresponding route indicators connecting these points;
- Route segment end - The point after COP (FR2) and the remaining known route part FR4.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **125**
-ARCID **AFR855**
-SSRCODE **A4055**
-ADEP **LFRS**
-COORDATA
    -PTID **FR1**
    -TO **1059**
    -TFL **F320**
-ADES **EPWA**
-ARCTYP **CRJ7**
-ROUTE **N0420F370 MAMOR LM185 MOLOG UM971 FR1 DCT FR2 DCT FR4**

10:43 ATS C sends a LAM message to ATS B, correlates the received ABI with its corresponding flight plan data and attempts to align the AFR855 trajectory with ABI message route information. The MAMOR point is disregarded due to its distance from the inbound COP, the remaining part

of trajectory (MOLOG UM971 FR1 DCT FR2 DCT FR4) identical with the portion previously extracted from the FPL is kept and the ABI message data is used for the timing recalculation of the over points. The difference between TFL and RFL indicates that the flight is entering the ATS B airspace in a climbing condition. This will cause ATS C AFR855 trajectory update as follows (the changes are indicated in purple):

Horizontal position	MOLOG	FR1	FR2	FR4	MIMAR
FL	190	330	370	370	370
Time	**1050**	**1059**	**1105**	**1111**	**1117**

10:49 AFR855 overflies point MAMOR.

10:50 ATS A transfers AFR855 to ATS B and ATS B assumes the flight. AFR855 is cleared to climb to FL 320 (the last useable ATS B FL).

10:51 AFR855 overflies a point near to MOLOG.

10:52 Due to the conflicting traffic (DLH115), ATS B re-clears the flight AFR855 till FL 280, instructs the pilot to maintain FL 280 and to continue the climb to FL 320 (ATS B last useable FL) after BEGAR. By clearing the flight via BEGAR, the ATS B exit point changes to a dynamic COP (GEO01). The new trajectory for flight AFR855 within the AoI of ATS B is as follows (the changes are indicated in purple):

Horizontal position	MAMOR	MOLOG	BEGAR	GEO01	FR4
FL	130	180	**280**	**320**	370
Time	1049	1051	**1103**	**1105**	**1113**

10:52 ATS B sends a revised ABI message to ATS C. The route elements contained in the ABI message are:

- Route segment start - Last overflown point (BEGAR);
- Route segment end - The point after the COP (FR4). The route after FR4 is unknown and therefore is not provided.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **152**
-ARCID **AFR855**
-SSRCODE **A4055**
-ADEP **LFRS**
-COORDATA
    -PTID **GEO01**
    -TO **1105**
    -TFL **F320**
-ADES **EPWA**
-ARCTYP **CRJ7**
- -GEO
    -GEOID **GEO01**

-LATTD **375428N**
-LONGTD **422257W**
-ROUTE **N0420F370 MOLOG DCT BEGAR DCT FR4**

10:52 ATS C returns a LAM message and attempts to update the AFR855 SFPL with the revised ABI message data. The co-ordination point is changed from FR1 to GEO01 (with LAT and LONG coordinates. ATS C FDPS keeps the first trajectory point MOLOG according to its distance, inserts the next point BEGAR and the co-ordination point GEO01 and re-joins the original route at FR4. The remaining route portion is unaltered. The difference between RFL within route field and TFL indicates that the flight will enter ATS C in climbing conditions. The new trajectory for flight AFR855 within the AoI of ATS C is as follows (the changes are indicated in purple):

Horizontal position	MOLOG	**BEGAR**	**GEO01**	FR4	MIMAR
FL	190	**280**	**320**	370	370
Time	1051	**1103**	**1105**	**1113**	**1119**

10:55 ATS B sends an ACT message to ATS C.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **172**
-ARCID **AFR855**
-SSRCODE **A4055**
-ADEP **LFRS**
-COORDATA
-PTID **GEO1**
-TO **1105**
-TFL **F320**
-ADES **EPWA**
-ROUTE **N0420F370 MOLOG DCT BEGAR DCT FR4**
-ARCTYP **CRJ7**
-GEO
-GEOID **GEO01**
-LATTD **375428N**
-LONGTD **422257W**

10:55 ATS C returns a LAM message and the SFPL for flight AFR855 moves to a coordinated status. There is no update of the SFPL trajectory as the data contained in the ACT message confirms the revised ABI message data. The co-ordination point GEO01 is confirmed as well as the climbing entry conditions.

3.5.10 Scenario 8 - Vertical route change initiated by the downstream unit

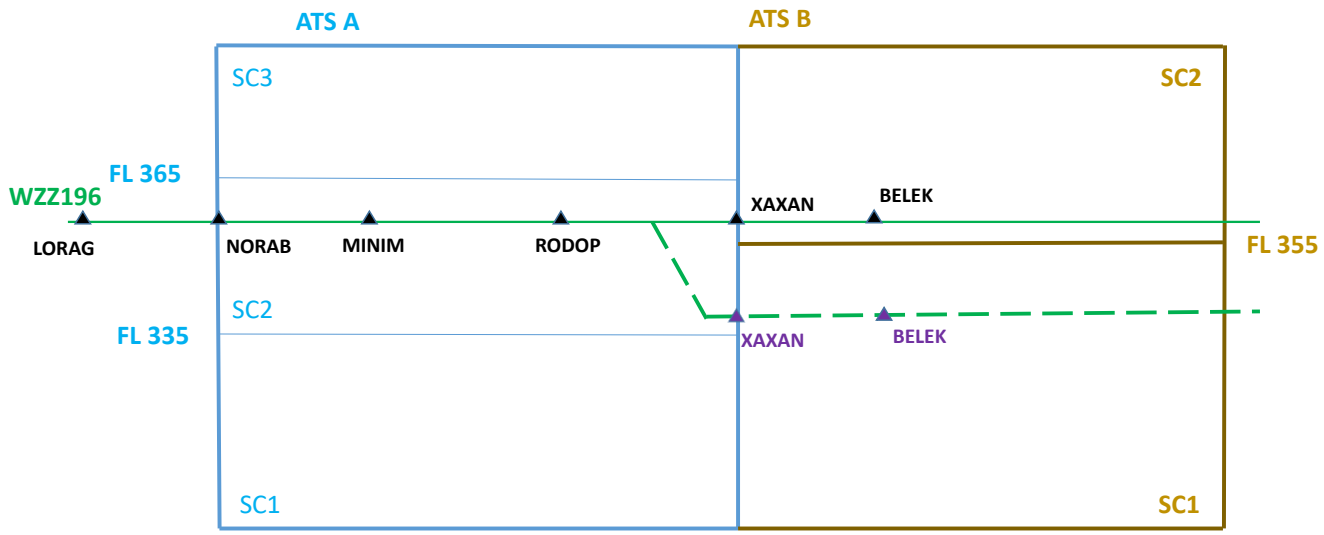


Figure 10 - FRA Vertical Route Change by D-ATSU Scenario

The airspace and flight elements used for this scenario illustrated by Figure 10 are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

- ATS A in blue
- ATS B in orange

ATS A is vertical divided into three sectors as:

- SC1 (FL 245-FL335)
- SC2 (FL 335-FL365)
- SC3 (FL 365-FL410)

ATS B is vertical divided into sectors as:

- SC1 (FL 175-FL355)
- SC2 (FL 355-UNL)

The flight trajectories are depicted in green and the route crossing and ATS Exit/Entry points in black. The ATS units retain limited static airspace data of the neighbouring FRA.

The IFPS distributed the original FPL (FPL-WZZ196-IS –B737/M-SRWY/C –LIRF1010 -N0420F360 MILON UL881 GOROK UG175 LORAG UM188 RODOP UL765 PERAM DCT MIMAR –EGAV0120) to ATS A and ATS B.

10:35 WZZ196 overflies point LORAG.

ATS A extracts the following 4-D trajectory for flight WZZ196 within its AoI:

Horizontal position	LORAG	NORAB	MINIM	RODOP	XAXAN	BELEK
FL	360	360	360	360	360	360
Time	1035	1040	1045	1050	1058	1106

ATS B calculates the following 4-D trajectory for flight WZZ196 within its AoI:

Horizontal position	RODOP	XAXAN	BELEK
FL	360	360	360
Time	1052	1100	1109

10:38 ATS A sends an ABI message to ATS B. The route elements contained in the ABI message are:

- Route segment start - Last overflown fix (LORAG);
- Point between segment start /end - NORAB MINIM RODOP XAXAN (coordination point);
- Route segment end - The first intermediate point in the downstream ATS (BELEK) and the remaining portion of the route is unknown.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **557**
-ARCID **WZZ196**
-SSRCODE **A2455**
-ADEP **LIRF**
-COORDATA
    -PTID **XAXAN**
    -TO **1058**
    -TFL **F360**
-ADES **LGAV**
-ARCTYP **B737**
-ROUTE **N0420F360 LORAG UM188RODOP UL765**

10:38 ATS B sends a LAM message to ATS A, correlates the received ABI with its corresponding flight plan data and attempts to align the WZZ196 trajectory with the ABI message route information. Due to their distance from the inbound COP, some points are disregarded (LORAG, NORAB and MINIM), the remaining part of trajectory (RODOP XAXAN BELEK) identical with the portion previously extracted from the FPL is kept and the ABI message data is used for the timing recalculation over the points. This will cause ATS WZZ196 trajectory update as follows (the changes are indicated in purple):

Horizontal position	RODOP	XAXAN	BELEK
FL	360	360	360
Time	**1050**	**1058**	**1106**

10:40 ATS A assumes WZZ196.

10:45 WZZ196 overflies point MINIM.

10:48 ATS A sends an ACT message to ATS B. The route elements contained in the ACT message are:

- Route segment start - Last overflown fix (MINIM);
- Points between segment start /end - RODOP XAXAN (coordination points);

- Route Segment end - The first intermediate point in the downstream ATS (BELEK) and the remaining portion of the route is unknown.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **569**
-ARCID **WZZ196**
-SSRCODE **A2455**
-ADEP **LIRF**
-COORDATA
    -PTID **XAXAN**
    -TO **1058**
    -TFL **F360**
-ADES **LGAV**
-ARCTYP **B737**
-ROUTE **N0420F360 UM188 RODOP UL765**

10:48 ATS B returns a LAM message and the SPFL for flight WZZ196 moves to a coordinated status. The coordination point XAXAN is confirmed. The MINIM point is disregarded due to its distance from the inbound COP, the remaining part of trajectory (RODOP XAXAN BELEK) identical with the portion previously extracted from the FPL is kept and the ACT message data could be used for the timing recalculation of over the points.

10:50 WZZ196 overflies point RODOP.

10:51 For de-complexion of traffic situation within ATS B SC2, ATS B intends to apply the level cap for the flight WZZ196, to force it the lower sector. To achieve the level cap for WZZ196 and force the entry into the lower sector (ATS B SC1), ATS B SC2 proposes to ATS A change of Planned Entry Level from FL360 to FL340. The ATS B system trajectory is not updated, as ATS B SC2 only composes a proposal that ATS A may accept or reject.

10:51 ATS B sends a CDN message to ATS A.

-TITLE **CDN**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **056**
-ARCID **WZZ196**
-SSRCODE **A2455**
-ADEP **LIRF**
-PROPFL
    -TFL **F340**
-ADES **LGAV**

10:51 The ATS A FDP receives the CDN message, returns a SBY message and refers the CDN message to the ATCO of sector SC2.

-TITLE **SBY**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **580**

-MSGREF
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **056**

10:52 The proposed FL change is graphically presented to ATS A SC2, ATS A SC2 reviews the ATS B proposal for the change of coordination conditions, tests for MTCD's conflict with "what-if" tool and identifies no issue in accepting it. ATS A SC2 accepts the proposed route modifications by sending an ACP message.

-TITLE **ACP**
-REFDATA
-SENDER –FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **589**
-MSGREF
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **056**
-ARCID **WZZ196**
-ADEP **LIRF**
-ADES **LGAV**

10:52 With the acceptance of the CDN message, ATS A FDPS automatically updates the system trajectory using the CDN message data (ATS A Exit Flight Level 340). The lateral trajectory is not changed, but the vertical profile adheres to the tactical constraint and the timing over fixes is adapted as follows (the changes are indicated in purple).

Horizontal position	LORAG	NORAB	MINIM	RODOP	XAXAN	BELEK
FL	360	360	360	360	**340**	**340**
Time	1035	1040	1045	1050	**1100**	**1108**

10:52 After the reception of the ACP message, ATS B returns a LAM message and updates the entry conditions for flight WZZ196. The new trajectory for flight WZZ196 within the AoI of ATS B is (the changes are indicated in purple):

Horizontal position	RODOP	XAXAN	BELEK
FL	360	**340**	**340**
Time	1050	1058	1106

10:53 ATS A clears flight WZZ196 to FL 340.

10:53 As the WZZ196 vertical re-routing triggered the update of time over the XAXAN point by 2 minutes (which exceeds the threshold bilaterally agreed between ATS A and ATS B), a REV message is sent from ATS A to ATS B. The route elements contained in the REV message are:

- Route segment start - Last overflown point (RODOP);
- Point between segment start /end - XAXAN (coordination point);
- Route segment end - The first intermediate point in the downstream ATS (BELEK) and the remaining portion of the route is unknown.

-TITLE **REV**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **625**
-ARCID **WZZ196**

-ADEP **LIRF**
-ADES **LGAV**

-COORDATA
-PTID **XAXAN**
-TO **1100**
-TFL **F340**

10:53 ATS B returns a LAM message and tries to update the WZZ196 SFPL with the REV message data. The co-ordination point and TFL are confirmed, but the time over the COP has changed. The horizontal component of the trajectory and its vertical profile were not changed, only the timing over the fixes are updated. The new trajectory for flight WZZ196 within the AoI of ATS B is as follows (the changes are indicated in purple):

Horizontal position	RODOP	XAXAN	BELEK
FL	360	**340**	**340**
Time	1050	**1100**	**1108**

3.5.11 DCT handling

The DCT field is used to indicate a direct route between two points. The point might be a published point, a geographical point, or a reference point. Within the OLDI specification, the DCT field is used by the following data items:

- Route ADEXP field “route”), used by majority of OLDI messages mandatory data item
- Direct Clearance (ADEXP field “DCT”), used by, SDM, COF and CFD as mandatory item if available
- Direct Routing Request (ADEXP field “DCT”), is used by RAP, RRV and CDN, messages if available.

The DCT indicator needs to be used in the OLDI message route field to connect FRA entry/intermediate and exit points. If these points are published points or reference to published points, the DCT indicator needs to be used to interconnect the FRA significant points as:

- UL761 FRA01 DCT FRA02 DCT REF01 DCT FRA03 UL117

Within the OLDI message route field, the DCT indicator also needs to interconnect GEO points with published/reference points as:

- UL761 FRA01 DCT 4620N007806E DCT DUB190040 DCT FRA03 UL117

Within the OLDI message route field, the DCT indicator is not needed only in case of linkage between two GEO points as:

- UL761 FRA01 DCT 4620N007806E 4629N007810E DCT FRA03 UL117

These guidelines recommend the usage of Direct Clearance and Direct Routing Request with DCT indicator to be continued within the FRA environment, to support the tactical re-routing especially in cases of large cross-border FRA.

3.6. Utilisation of En-route Cruising Level (ECL)

3.6.1 Introduction

DSNA presented to the OLDI group members the utilisation of en-route cruising level (ECL) for management of “up-down” transitions. For this purpose, a specific ECL field is used for exchanges of OLDI messages between French ACCs. Many ANSPs apply similar practices for internal data exchanges to indicate the flight intent, but this is not used for inter-ANSP exchanges. Moreover, there is no specific ADEXP field for en-route cruising level. The ADEXP field EFL is included in different OLDI message for illustration of ECL use cases.

3.6.2 Scenarios for ECL field (Simple configuration)

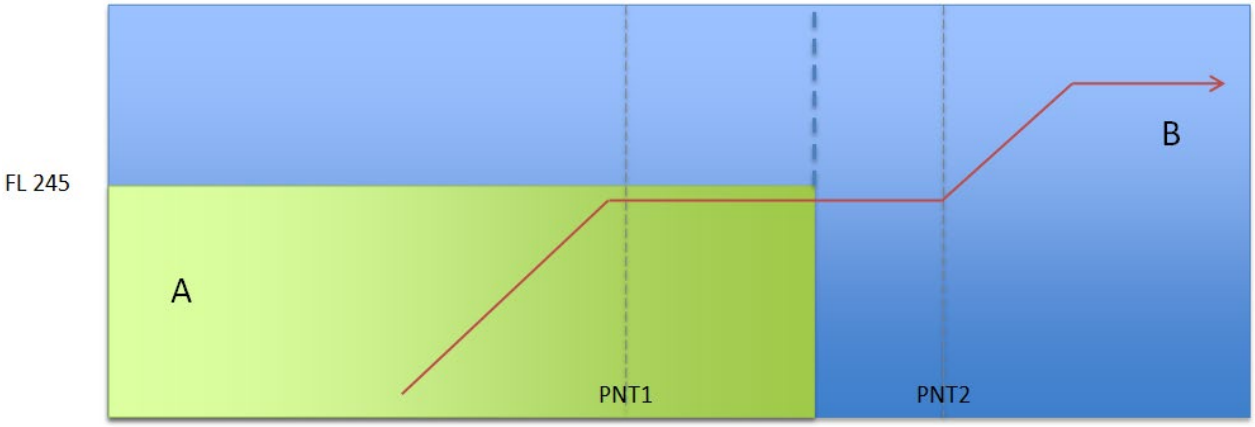


Figure 11 - Scenario for ECL field usage 1

The airspace and flight elements used for this scenario are fictitious.

The airspace data is depicted as:

- ATS A in green
- ATS B in blue

ATS B is divided into two sectors as:

- SC1 on top of ATS A (FL 245-660)
- SC2 on the side of ATS A (FL 000-660)

The boundary between these sectors is depicted in dotted blue. The flight trajectories are depicted in red.

The IFPS distributed the original FPL (FPL –FPL0001-IS –B737/M-SRWY/C –ADEP1010 -N0420F240 PNT1 DCT PNT2/N0420F300 AIRWAY PNTX –ADES0120) to ATS A and ATS B. The transition between ATS A and ATS B is initially through a wall, at level F240, toward SC2.

10:35: ATS A sends an ABI to ATS B. The ECL is not present as the transition is through the wall.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**

-SEQNUM **001**
-ARCID **FPL0001**
-SSRCODE **A1234**
-ADEP **LFRN**
-COORDATA
-PTID **PNT1**
-TO **1058**
-TFL **F240**
-ADES **LFMD**
-ARCTYP **B737**
-ROUTE **N0420F240 PNT1 DCT PNT2**

10:40: Following coordination between ATS A and ATS B, it is decided that the flight will be sent to B through the ceiling, toward another sector (SC 2). During the coordination, it is also decided that the flight will directly climb toward its next RFL.

ATS A sends an ACT to ATS B. The ECL is now present as the transition is through the ceiling. (In this example, we consider that the coordination point is not modified by the change of typology)

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **002**
-ARCID **FPL0001**
-SSRCODE **A1234**
-ADEP **LFRN**
-COORDATA
-PTID **PNT1**
-TO **1054**
-TFL **F240**
-ADES **LFMD**
-ARCTYP **B737**
-EFL
-FL **F300**
-ROUTE **N0420F240 PNT1 DCT PNT2**

The reception of this message allows ATS B system to automatically update its view.

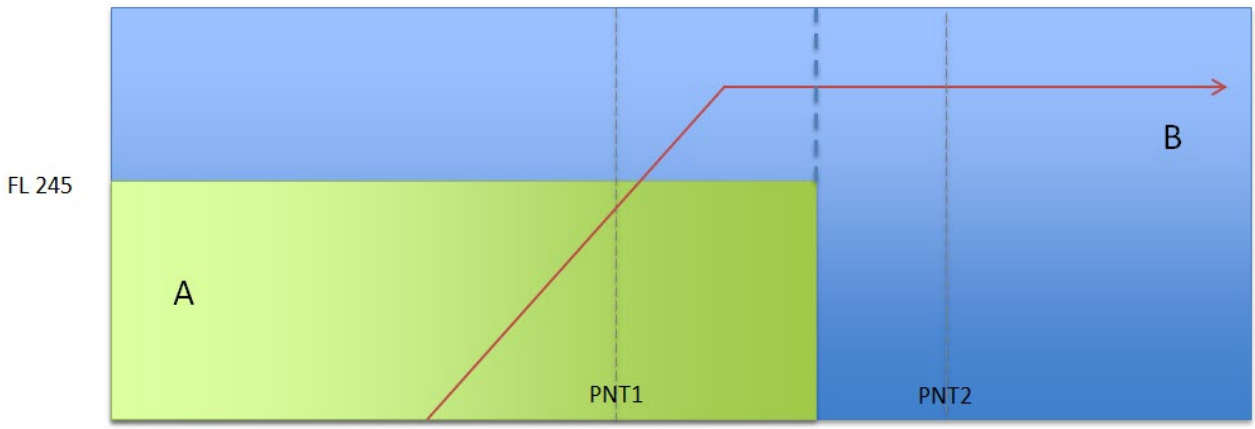


Figure 12 - Scenario for ECL field usage 2

10:43: Following a verbal coordination, ATCO from B SC 1 informs ATCO from ATS A that finally, the flight will not climb directly toward its next RFL, but toward FL 260.

ATS A sends a REV to ATS B. The ECL is still present but changed with the new objective of the flight. The coordination level is unchanged

-TITLE **REV**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **003**
-ARCID **FPL0001**
    -ADEP **LFRN**
-COORDATA
    -PTID **PNT1**
    -TO **1054**
    -TFL **F240**
-ADES **LFMD**
    -EFL
    -FL **F260**

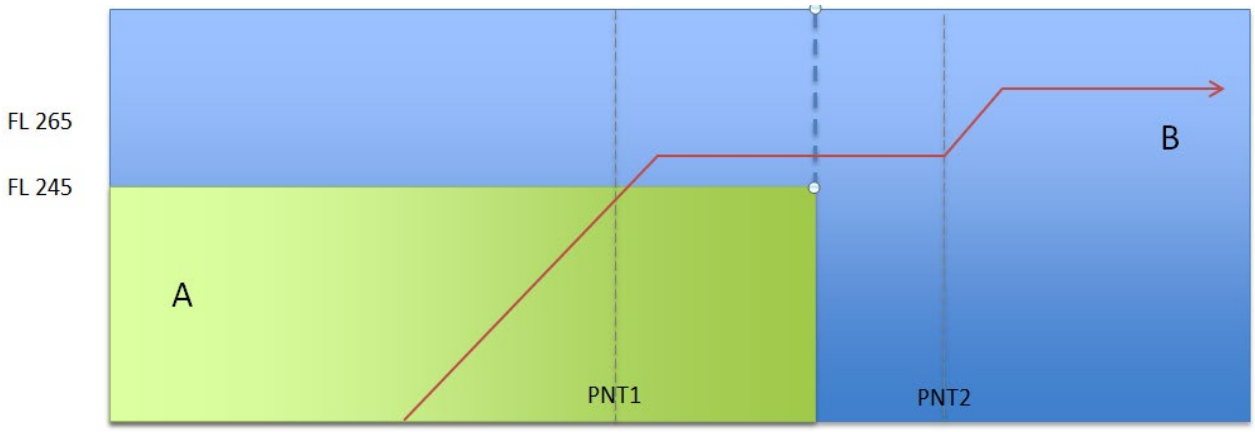


Figure 13 - Scenario for ECL field usage 3

The reception of this message allows B system to automatically update its view.

In this situation, with another ATSU configuration, this change of ECL could induce re-entrances (alternative next scenario).

3.6.3 Scenarios for ECL field (Complex configuration)

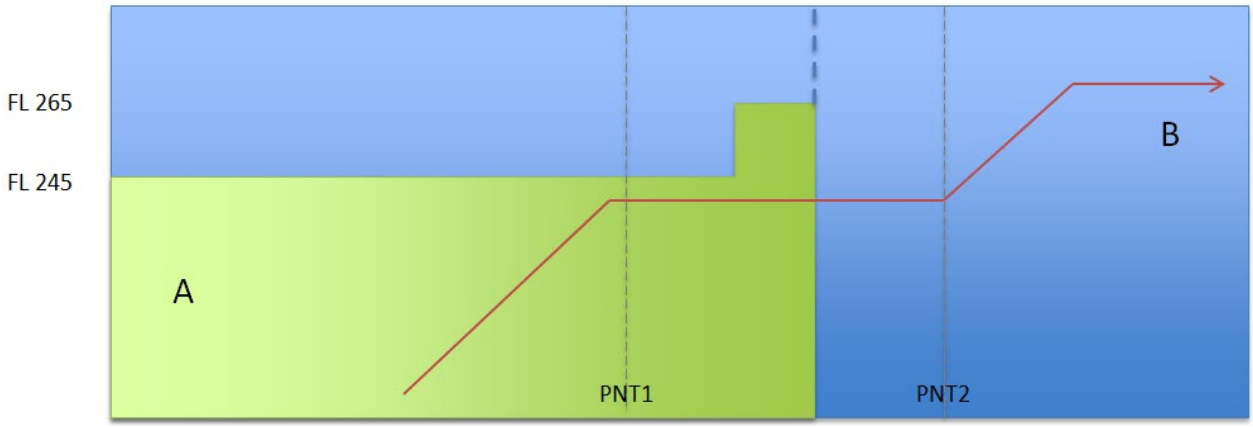


Figure 14 - Scenario for ECL field usage 4

The airspace and flight elements used for this scenario are fictitious.

The airspace data is depicted as:

- ATS A in green
- ATS B in blue

ATS B is divided into two sectors as:

- SC1 on top of ATS A (FL 245/265-660)
- SC2 on the side of ATS A (FL 000-660)

The boundary between these sectors is depicted in dotted blue. The flight trajectories are depicted in red.

The IFPS distributed the original FPL (FPL –FPL0002-IS –B737/M-SRWY/C –ADEP1010 - N0420F240 PNT1 DCT PNT2/N0420F300 AIRWAY PNTX –ADES0120) to ATS A and ATS B. The transition between ATS A and ATS B is initially through a wall, at level F240, toward SC2.

10:35: ATS A sends an ABI to ATS B. The ECL is not present as the transition is through the wall.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **001**
-ARCID **FPL0002**
-SSRCODE **A1234**
-ADEP **LFRN**
-COORDATA
    -PTID **PNT1**
    -TO **1058**
    -TFL **F240**
-ADES **LFMD**

-ARCTYP **B737**
-ROUTE **N0420F240 PNT1 DCT PNT2**

10:40: Following coordination between ATS A and ATS B, it is decided that the flight will be sent to B through the ceiling, toward another sector (SC 2). During the coordination, it is also decided that the flight will directly climb toward its next RFL.

ATS A sends an ACT to ATS B. The ECL is now present as the transition is through the ceiling. (In this example, we consider that the coordination point is not modified by the change of typology)

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **002**
-ARCID **FPL0002**
-SSRCODE **A1234**
-ADEP **LFRN**
-COORDATA
    -PTID **PNT1**
    -TO **1054**
    -TFL **F240**
-ADES **LFMD**
-ARCTYP **B737**
-EFL
    -FL **F300**
-ROUTE **N0420F240 PNT1 DCT PNT2**

The reception of this message allows ATS B system to automatically update its view.

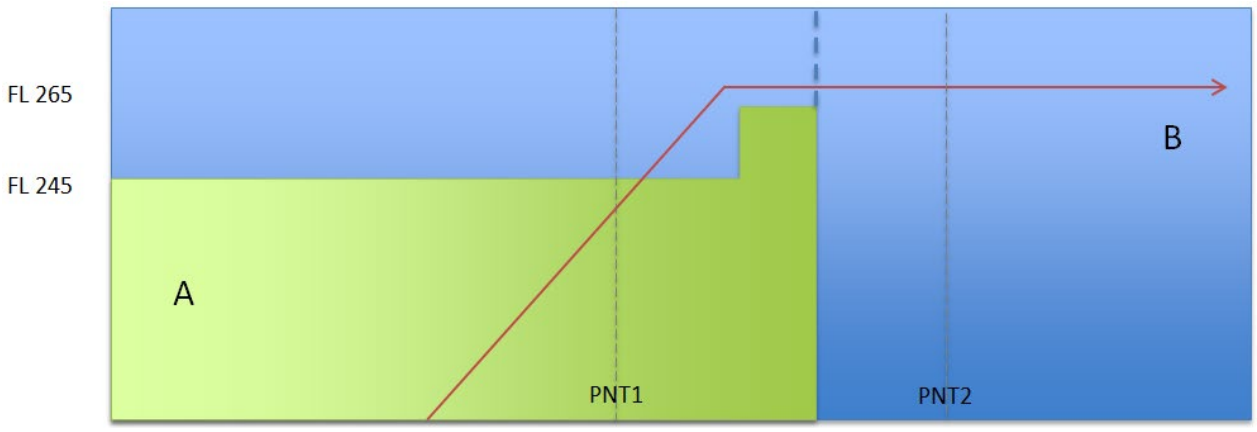


Figure 15 - Scenario for ECL field usage 5

10:43: Following a verbal coordination, ATCO from B SC 1 informs ATCO from ATS A that finally, the flight will not climb directly toward its next RFL, but toward FL 260.

ATS A sends a REV to ATS B. The ECL is still present but changed with the new objective of the flight. The coordination level is unchanged

-TITLE **REV**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **003**
-ARCID **FPL0002**
-ADEP **LFRN**
-COORDATA
    -PTID **PNT1**
    -TO **1054**
    -TFL **F240**
-ADES **LFMD**
-EFL
    -FL **F260**

The reception of this message allows B system to automatically update its view. The value of ECL allows ATS A and ATS B systems to be aware of the re-entrance

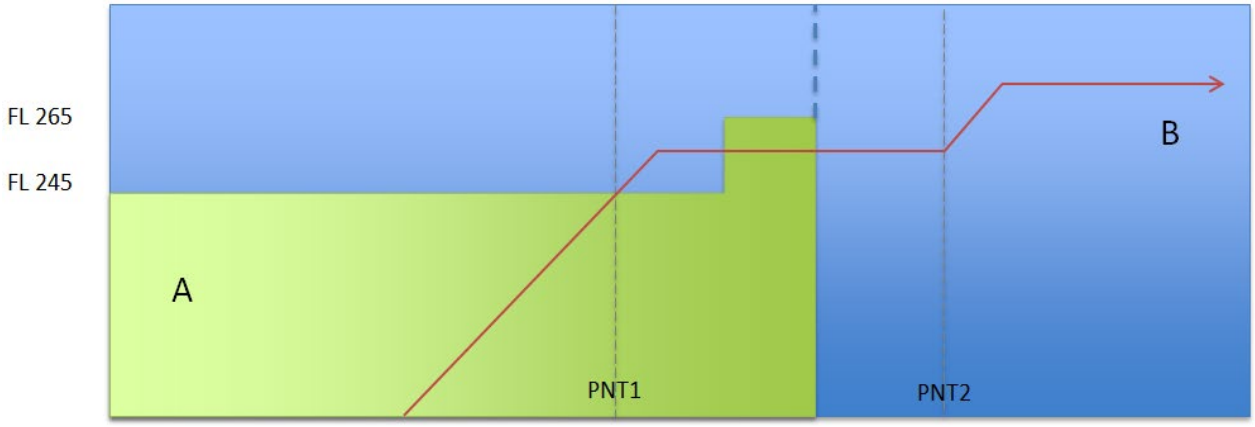


Figure 16 - Scenario for ECL field usage 5

3.6.4 Scenarios for ECL field (Particular case of the last descent)

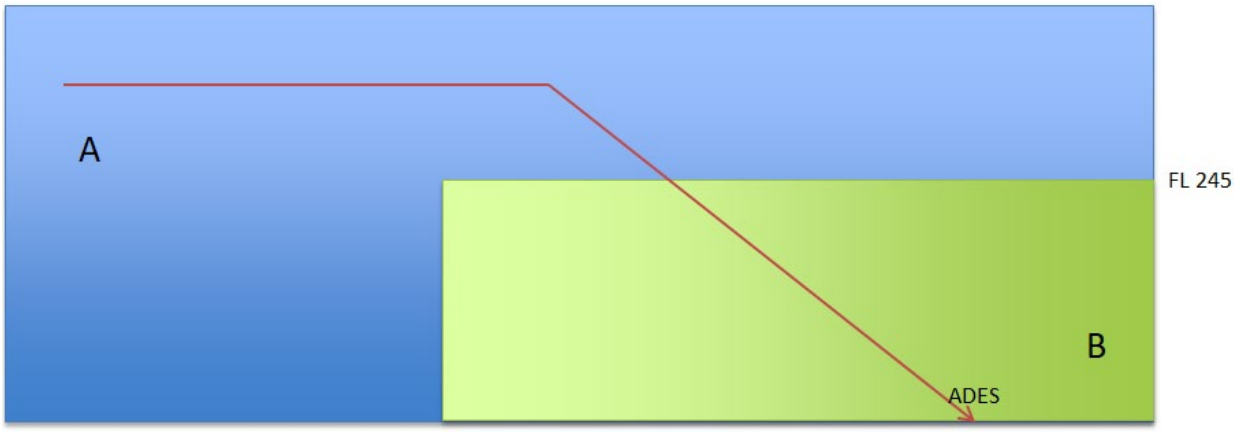


Figure 17 - Scenario for ECL field usage 6

The airspace and flight elements used for this scenario are fictitious.

The airspace data is depicted as:

- ATS A in blue
- ATS B in green

The flight trajectory is depicted in red.

The IFPS distributed the original FPL (FPL –FPL0003-IS –B737/M-SRWY/C –ADEP1010 -N0420F350 PNT1 AIRWAY PNTX –ADES0120) to ATS A and ATS B. The transition between ATS A and ATS B is through the floor, at level F250.

10:35: ATS A sends an ACT to ATS B. The ECL is Equal to 0 as the only remaining objective of the flight is the landing

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **001**
-ARCID **FPL0003**
-SSRCODE **A1234**
-ADEP **LFRN**
-COORDATA
    -PTID **PNT1**
    -TO **1058**
    -TFL **F250**
-ADES **LFMD**
-ARCTYP **B737**
-EFL
    -FL **F000**
-ROUTE N**0420F350 PNT1 AIRWAY PNTX**

4 Clarifications of Operational Use and Purposes of Some OLDI Messages

4.1. MAC message

4.1.1 Introduction

The implementation of the MAC message requires some guidance to avoid that the strict interpretation of the OLDI Specification requirements does not negatively affect the (system) coordination.

A few use cases have been identified in areas where the interface is complex, with incoming and outgoing coordination being effected almost simultaneously (e.g. when the crossing time in one unit is short).

4.1.2 General

As clearly stated in Section 5.4.1 of the OLDI Specification **Error! Reference source not found.**, the reception of a MAC message shall not erase basic flight plan data.

4.1.3 Re-entry flights

In Figure 18, the aircraft is transferred first from ACC A to UAC B when climbing to its RFL, and then back from UAC B to ACC A when in the descent to its destination. Those flights have two "legs".

The crossing time in UAC B is pretty short, meaning that UAC B sends the ACT#2 message to ACC A quite quickly after receiving the ACT#1 message from the same ACC A.

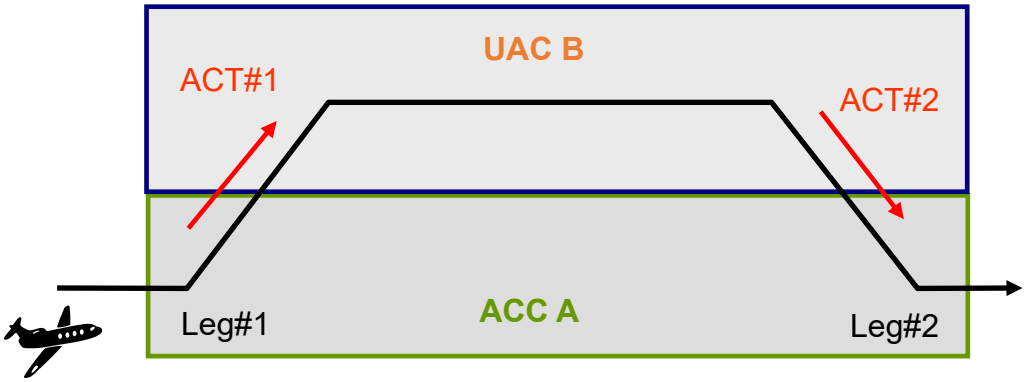


Figure 18 - Re-entry Flight

In case a MAC message is sent from ACC A to UAC B (e.g. because of level cap below the division flight level), UAC B will send a MAC message "back" to ACC A.

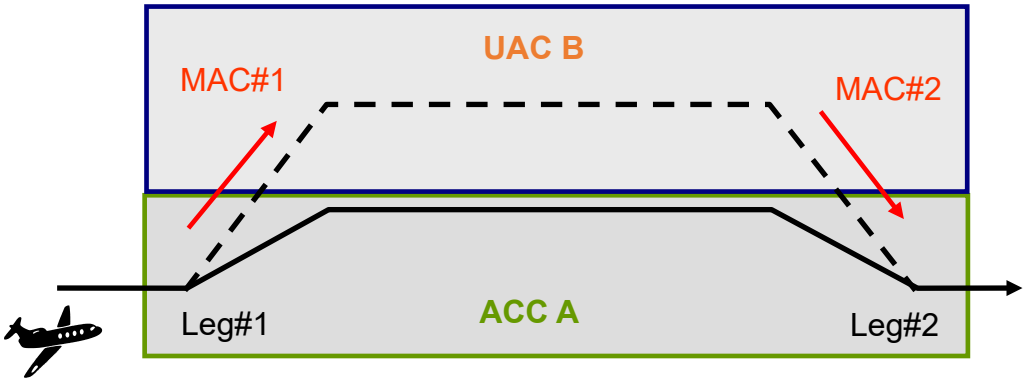


Figure 19 - Abrogation of Re-entry Fight

It is important that this MAC#2 message correctly abrogates the ACT#2 message only and not the whole coordination within ACC A. Using the message reference will help in this (OLDI-MAC-10-M and OLDI-MAC-80-M).

4.1.4 Triangle case

Some problems may appear when more than two partners are involved in the coordination process, all of them having specific bilateral conditions in place.

In Figure 20, the standard coordination is ACC A → UAC B. Once the ACT#1 message is received by UAC B and considering the short crossing time, the ACT#2 message is quickly sent from UAC B to UAC C.

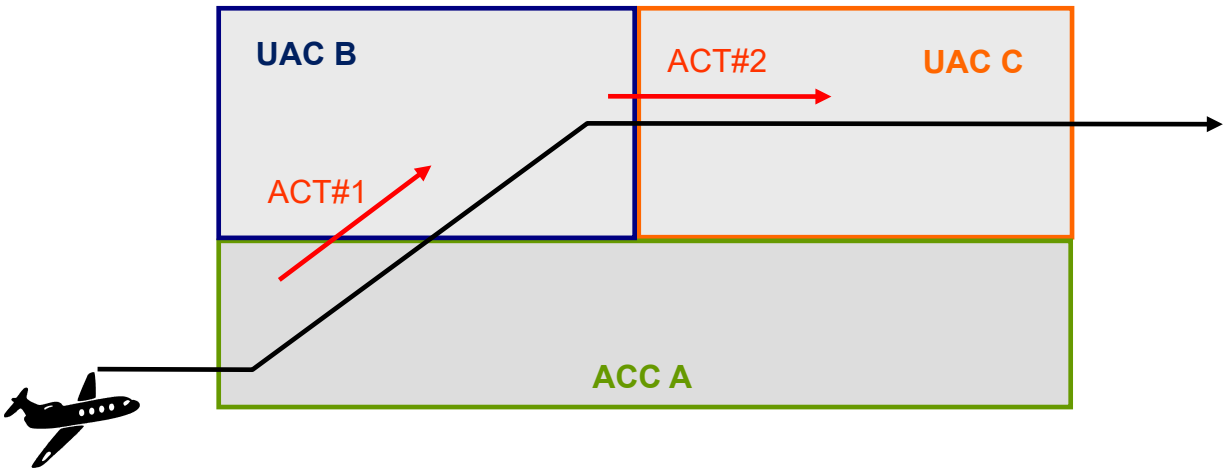


Figure 20 - Coordination Triangular Case

The aircraft cannot climb as initially expected and is re-coordinated directly ACC A → UAC C.

The MAC#1 message is sent from ACC A to UAC B, leading to an immediate transmission of the MAC#2 message from UAC B to UAC C. At the same time, ACC A has to coordinate the aircraft with UAC C. This is performed by means of the ACT#3 message.

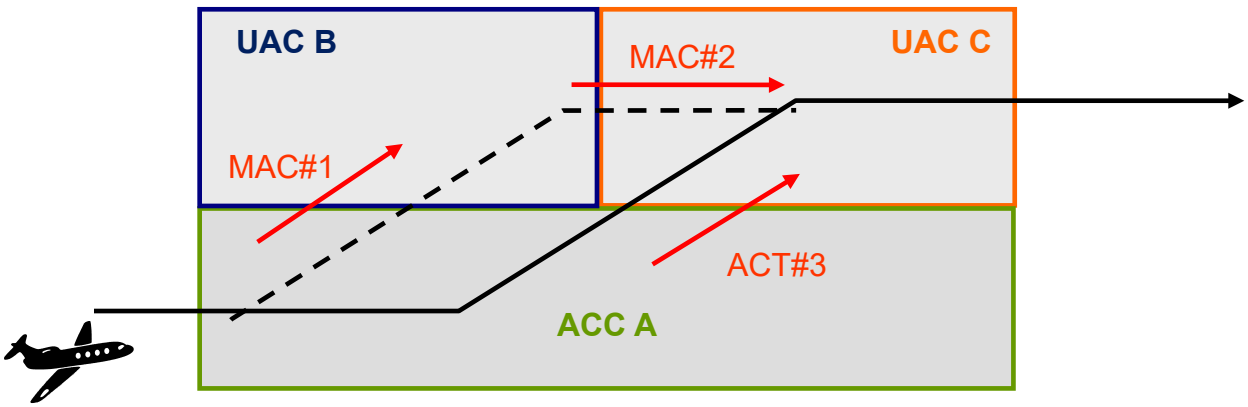


Figure 21 - Abrogation Triangular Case

To have a smooth coordination, it is important that the ACT#3 message arrives after the MAC#2 message, so that UAC C is ready for an incoming coordination, otherwise UAC C could consider the ACT#3 message as a "second ACT" for the same flight.

To allow this, a delay of a few seconds can be implemented by ACC A between the transmission of MAC#1 and the transmission of ACT#3 messages, allowing enough time for abrogation of the coordination between UAC B and UAC C (by means of the MAC#2 message). To do so, the transmission of the ACT#3 message could be withheld until at least the LAM message corresponding to MAC#1 is received. To increase the likelihood that abrogation has been fully processed by UAC C, an additional small delay (of e.g. 2 seconds) could be applied, i.e. "LAM back + 2 seconds". The OLDI specification includes this feature in the recommended requirement OLDI-ACT-260-R.

Such an implementation may result in the ACT#3 message to be sent a little bit later than in normal circumstances, but it really increases the likelihood of a smooth processing of the "triangle case". With the speed at which data is exchanged, and under normal circumstances, all this can be achieved within seconds. Note that the message reference in the MAC#2 and different coordination partner should also bring clarity as to which coordination data is being abrogated (ACT#2).

Note: Another use case is where the initial coordination takes place from ACC A to UAC C, and then the flight is re-coordinated directly from ACC A to UAC B (e.g. if climbing is better than expected). UAC C is still in the sequence and receives the traffic from UAC B. Should the ACT UAC B → UAC C be received before the MAC ACC A → UAC C, then UAC C might have an issue in processing the "second ACT".

These guidelines recommend that operational stakeholders confronted by such triangle cases consider reviewing the timing parameters when re-initiating coordination following abrogation.

4.1.5 MAC In – MAC Out

Requirement OLDI-MAC-30-M mandates that a MAC message is to be transmitted to a downstream unit with which co-ordination for a flight has been established when a MAC is received from the upstream unit in respect to that flight. This requirement is aligned with the provisions of EC Regulation No 2023/1771

[RD 8] .

In Figure 22, there is a sequence of ATC units, all controlling the aircraft for a short period of time during the climb to UAC D. Applying the requirement would mean that if UAC C receives a MAC from ACC A it has to transmit a MAC message to UAC D. This use case can occur if the aircraft climbs better than expected and is re-coordinated directly ACC A → UAC B).

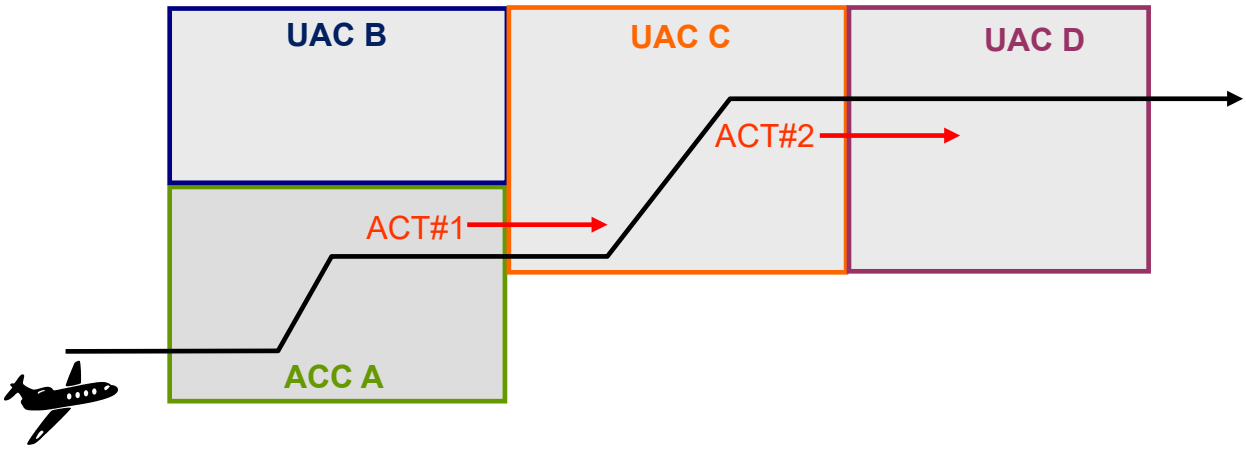


Figure 22 - MAC In - MAC Out Case

However, the reception of such a MAC message by UAC C could have absolutely no impact on the coordination between UAC C and UAC D, meaning that the new ACT#X message (shown in Figure 23) from UAC C to UAC D will have exactly the same parameters as the previously sent ACT#2 message (shown in Figure 22), abrogated by the MAC#2 message.

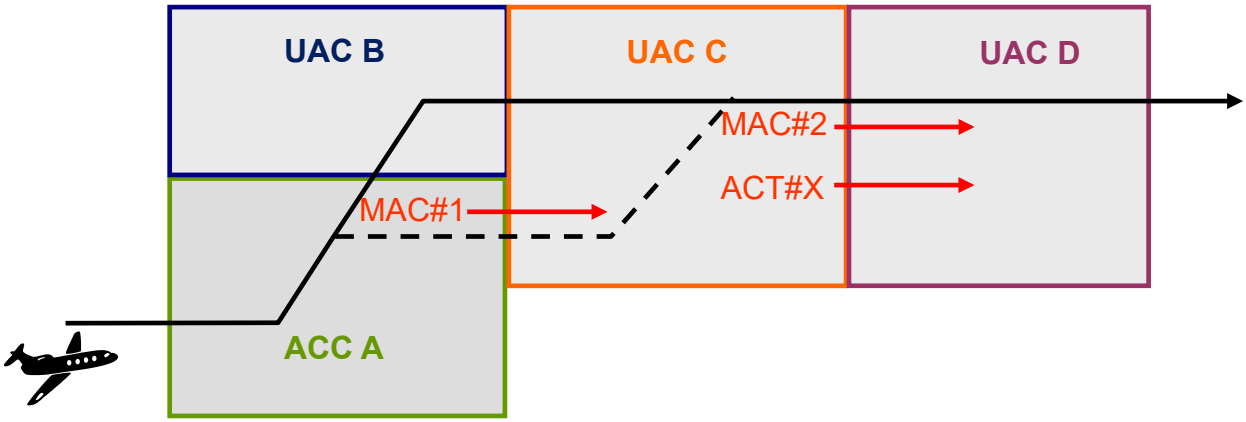


Figure 23 - Abrogation of the MAC IN - MAC OUT Case

The recurrent “ACT-MAC-ACT” situation might create confusion within UAC D, observing coordination data being received, then disappearing, before being received again with the same entry level and COP (the ETO on the COP might be slightly different).

As a result, it might be wise to not automatically send the MAC#2 if the local/bilateral methods of operations would be such that this situation would occur on a frequent basis. One condition to send the MAC message could be a manual input from the ATCO, e.g. cancelling the flight plan in the system.

4.2. CDN message intent, purpose and operational use

4.2.1 Introduction

This section provides guidance on the use of CDN messages. In particular the use of CDN to negotiate a direct route.

4.2.2 Guidance

The CDN message intent and purpose is to satisfy the following operational requirements:

- to forward a counter proposal from the accepting controller to the transferring controller as a reply to a RAP or RRV message;
- to initiate a proposed modification to agreed transfer conditions by the accepting controller to the transferring controller.

4.2.3 Example scenario

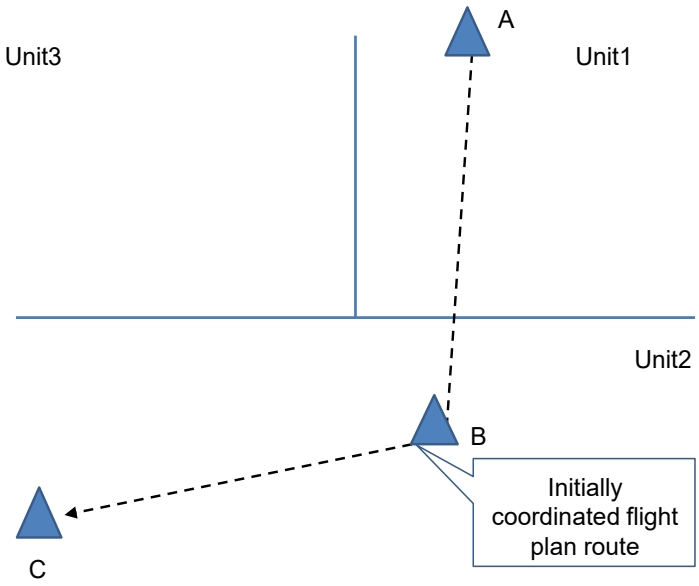


Figure 24 - CDN utilisation scenario 1

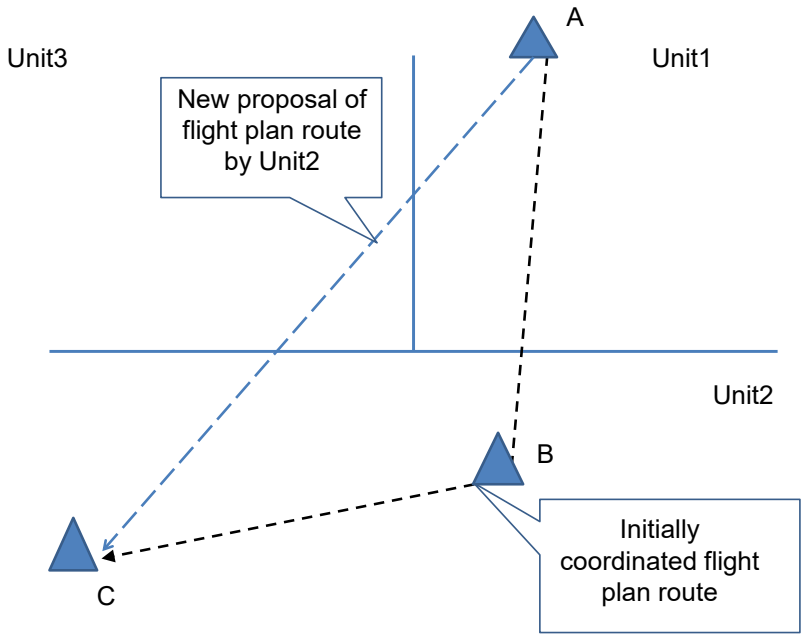


Figure 25 - CDN utilisation scenario 2

The example scenario is expected to develop as follows:

- Initial state: Flight is under the control of Unit1
- Unit1 sends an ACT message to Unit2 with initial flight plan route (Point A, Point B and Point C).

-TITLE ACT
-ADEP ESSB
-ADES EBBR
-ARCID BEL74T
-ARCTYP A319
-COORDATA -PTID CXYHW -TO 1236 -TFL F380
-ROUTE N0424F380 5607N01210E DCT A DCT B
-BEGIN EQCST -EQPT W/EQ -EQPT Y/EQ -END EQCST
-FLTTYP S
-REFDATA -SENDER -FAC ATC1 -RECVR -FAC ATC2 -SEQNUM 120
-SSRCODE A0730
-WKTRC M

- Unit2 sends a CDN message to Unit1, proposing new flight plan route, direct from Point A to Point C.

Several format can be used to request the flight direct to C:
Option 1:

-TITLE CDN
-REFDATA -SENDER -FAC ATC2 -RECVR -FAC ATC1 -SEQNUM 170
-ARCID BEL74T
-ADEP ESSB
-ADES EBBR
-DCT ZZZ C

Option 2:

-TITLE CDN
-REFDATA -SENDER -FAC ATC2 -RECVR -FAC ATC1 -SEQNUM 170
-ARCID BEL74T
-ADEP ESSB
-ADES EBBR
-DCT GEO1 C
-GEO -GEOID GEO01 -LATTD 554100N -LONGTD 0112100E

In option 2, GEO1 corresponds to the current position of the flight because the direct request is expected to be executed ASAP.

In both cases, the CDN is automatically answered with a SBY message.
-TITLE SBY
-MSGREF
    -SENDER -FAC ATC2
    -RECVR -FAC ATC1
    -SEQNUM 170
-REFDATA
    -SENDER
    -FAC ATC1 -RECVR
    -FAC ATC2
    -SEQNUM 130

Unit1 sends an ACP message to Unit2, to accept the proposal.
-TITLE ACP
-MSGREF
    -SENDER -FAC ATC2
    -RECVR -FAC ATC1
    -SEQNUM 170
-REFDATA
    -SENDER -FAC ATC1
    -RECVR -FAC ATC2
    -SEQNUM 131

Unit1 sends a MAC message to Unit2, to abrogate the coordination.
Unit1 sends an ACT message to Unit3, to coordinate the flight entry.
Unit3 sends an ACT message to Unit2, to coordinate the flight entry.

4.3. SDM message intent, purpose and operational use

4.3.1 Purpose

The OLDI Supplementary Data Message (SDM) is a very simple message that can efficiently support Operational Concepts being currently developed / implemented throughout Europe (mainly extended AMAN and FRA).

It is part of the “Dialogue Procedure – Transfer of Communication in the OLDI Specification **Error! Reference source not found.**, with the following purpose:

> “The primary purpose of the SDM is to transmit control data and changes thereto from the transferring unit to the accepting unit.”

To provide the downstream unit with the most up to date data, the COF message can also be used to transmit the Assigned Speed.

Some modern concepts will benefit from the implementation of the SDM by increasing situational awareness, the quality of the data in the ATM systems and by reducing verbal coordination as described hereunder.

4.3.2 Extended AMAN

From an ATC perspective, the local methods of operations often require that ATCOs in the downstream unit be provided in real time with the (planned) speed constraint imposed by upstream units.

This can be true between two UACs (for planning reasons and also to avoid that the receiving ATCO tries to further reduce an aircraft already close to the minimum clean speed), or from a UAC to the local ACC, where it may be interesting to know if a speed constraint “on conversion” has been given by the UAC. Because of the impact on the workload, it is not realistic to ask ATCOs to provide verbal feedback on extended AMAN actions that have or have not been performed.

The SDM is beneficial for situational awareness as:

- It contains the speed constraint assigned by the ATCO in control of the flight.

  Note: should the speed be assigned before ACT transmission, there could be no need to send an SDM message with that speed. It is recommended to also use the COF message, so that the latest Assigned Speed, if any, is sent at transfer.

- When bi-laterally agreed, it may also contain Route information, which may be interesting in case the Arrival Management process is also based on Route Advisory.
- It can be sent until transfer of communications and automatically updates the ATM system of the receiving unit, decreasing the need for verbal coordination.
- Route information in SDM message will significantly help to give a more accurate calculated arrival sequence

4.3.3 FRA

Together with the implementation of dynamic COPs, the use of the SDM provides operational benefits for the implementation of the Free Route Airspace regarding the automatic exchange of tactical route updates, hence reducing the workload for the Planner Controller while increasing situational awareness.

The SDM complements the mechanisms of ACT and REV message exchanges. It can be used to provide the route changes that do not require coordination since it can be sent up to the transfer of communications (while the transmission of the REV is often limited to the 5 minutes before the transfer).

Not specifically linked to FRA, the FDM also supports concepts linked to dynamic sectorisation and/or tactical assignment of flights to a specific sector since it allows the accepting unit to automatically provide the transferring unit with the frequency and the identification of the entry sector that will be in charge of the flight. In case of re-sectorisation of accepting unit, the FDM may provide the transferring unit with the new sector identifier and relevant frequency.

4.4. PNT message intent, purpose and operational use

4.4.1 Context

The OLDI PNT message intends to mimic the behaviour of inter-console marker and inter-console messages (including the verbal coordination elements) extending it and allowing notification of flights to sectors outside the upstream ATS unit. Usually, the upstream ATS unit that controls the flight has more information about the flight intents. It can send the PNT message to notify the downstream ATS unit for the concerned flight. However, the downstream ATS unit can also send a PNT message to notify the upstream ATC unit of the need for more information. Both upstream and downstream generated PNT messages are expected to be followed up by verbal coordination. The PNT message (and highlight/notification on the interface) is a supplementary tool facilitating verbal coordination between ATC.

The PNT message is always manually triggered and the CWP needs to be equipped with pop-windows and menus to select the flight and the target sector where the PNT messages is intended to be sent. The Track label and/or flight list should include an appropriate indication that the PNT message was sent out for the concerned flight. The transferring CWP should have the capability to automatically remove the PNT indication (upon the reception of LAM) or manually acknowledge and remove the PNT indication depending on HMI customisation.

Upon the successful reception of the PNT message by the receiving sector (a returned LAM message), the system will attempt to link the message content with the track label or electronic flight strips and highlight with a predefined font-colour, back-ground colour or other visible indication to notify the ATCO. As this message mimics the behaviour of inter-console marker, there is no need for an operational response to this message. If the concerned flight is not yet correlated or the track is out of the display range, an appropriate display warning might be considered. The system should provide the capability to remove the highlight triggered by PNT message.

The events eligible for the exchange of the PNT message need to be bilaterally agreed and prescribed in the LoA.

4.4.2 Example

The airspace and flight elements used for this example illustrated by Figure 26 are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

ATS A in red with two sectors SC1 and SC2

ATS B in blue with two sectors SC1 and SC2

The flight trajectories are depicted in green and significant points in black.

Problem and Assumptions: PNT message intends to facilitate verbal co-ordination by highlighting AZA191 and AEE175 flights, which are in risk of conflict that occurs within ATS B airspace volume.

ATS A deploys an advanced MTCD that calculates the MTCD conflict and risks within its AoI. The ATS A AoI boundaries are 60 to 70 NM beyond its AoR boundaries depending on the direction and identified operational needs.

ATS B deploys basic MTCD that starts the conflict calculation only for flights that are being co-ordinated. The MTCD algorithm does not consider the notified flight (an ABI message was received).

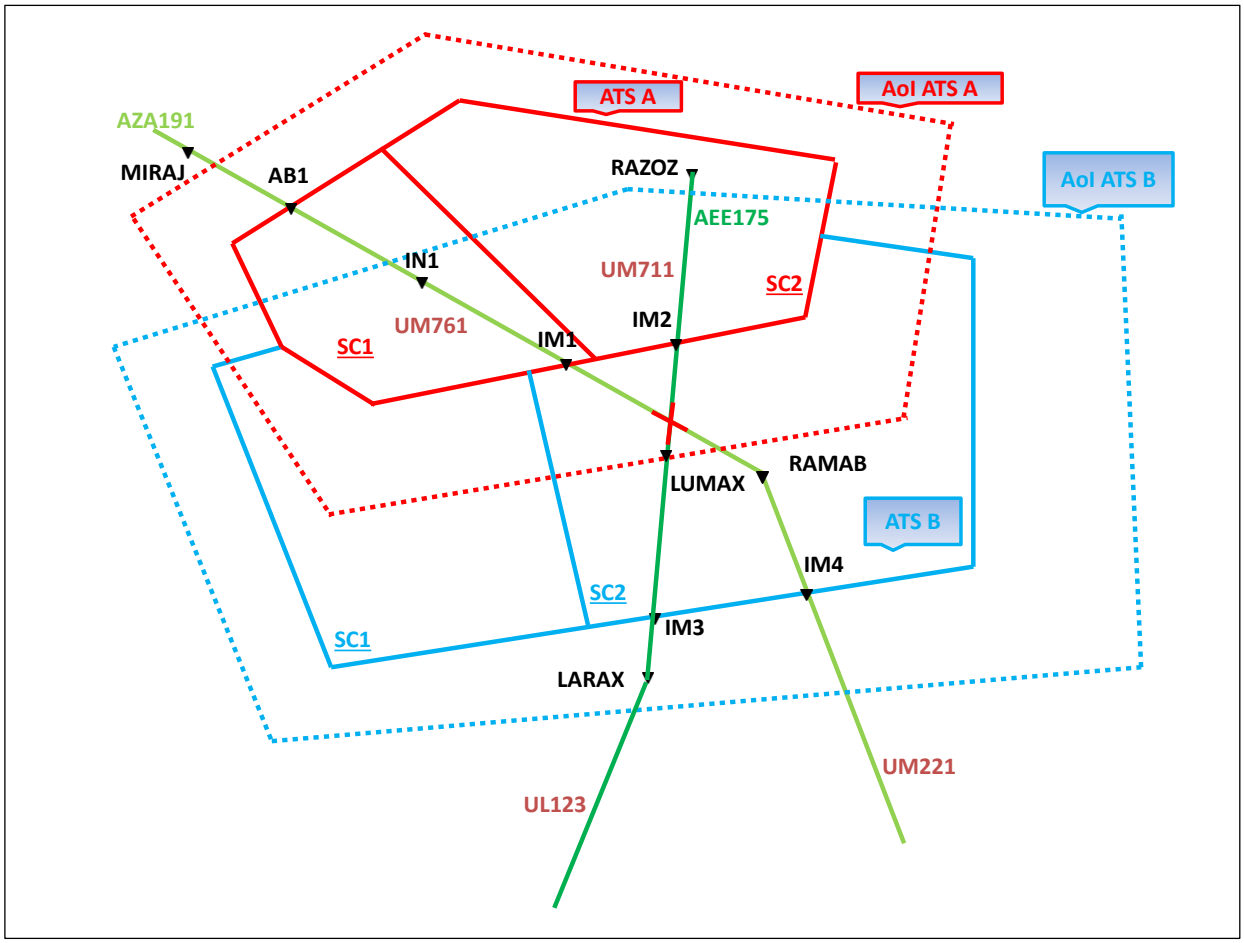


Figure 26 26 - Example Use of the PNT Message

The flight AZA191 departed from Rome (LIRF) at 11:30 and it is planned to land at Larnaca (LCLK). IFPS distributed the original FPL (FPL-AZA191-IS –A320/M-SRWY/C –LIRF1130 -N0420F350 MIRIJ UM761 RAMAB UM221 MILIX UM231 –LCLK0240) to ATC A and ATS B.

The flight AEE175 departed from Thessaloniki (LGTS) at 12:00 and it is planned to land at Cairo (HECA). IFPS distributed the original FPL (FPL-AEE175-IS –B737/M-SRWY/C –LGTS1200 -N0420F370 RAZOZ UM711 LARAX UL123 MINOG UB231 –HECA 0215) to ATC A and ATS B.

Flight AZA191 is controlled by ATS A SC1 maintaining FL 350 and exiting ATS A at 12:50 at point IM1.

12:25 AEE175 departs from LGTS.

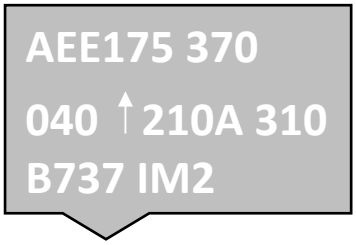
12:25 The downstream unit sends an ABI message to ATC A.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATCX**
    -RECVR -FAC **ATCA**
    -SEQNUM **015**
-ARCID **AEE175**
-SSRCODE **A1755**
-ADEP **LGTS**
-COORDATA

-PTID **RAZOZ**
-TO **1240**
-TFL **F310**
-SFL **F210A**
-ADES **HECA**
-ARCTYP **B737**
-ROUTE **N0420F370 RAZOZ UM711 LARAX**

12:25 ATS A returns a LAM message and associates the received ABI with its corresponding flight plan data. After the receipt of the ABI message, the track and FP correlation is established.

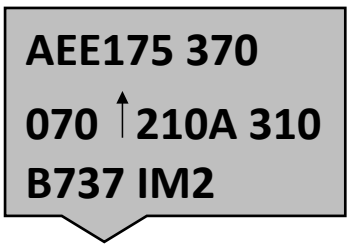
12:26 After the correlation process, the following track label is presented at ATS A SC2 for the flight AEE175 which is in the notified state.



12:29 The upstream unit sends an ACT message to ATC A.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATCX**
-RECVR -FAC **ATCA**
-SEQNUM **028**
-ARCID **AEE175**
-SSRCODE **A1755**
-ADEP **LGTS**
-COORDATA
-PTID **RAZOZ**
-TO **1239**
-TFL **F310**
-SFL **F210A**
-ADES **HECA**
-ARCTYP **B737**
-ROUTE **N0420F370 RAZOZ UM711 LARAX**

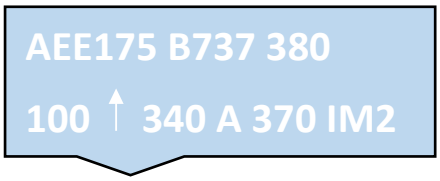
12:29 ATS A returns a LAM message and the SFPL for flight AEE175 changes to a coordinated status. The following track label is presented at ATS A SC2 for the flight AEE175 in the coordinated state.



12:32 ATC A sends an ABI message to ATC B.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATCA**
-RECVR -FAC **ATCB**
-SEQNUM **227**
-ARCID **AEE175**
-SSRCODE **A1755**
-ADEP **LGTS**
-COORDATA
-PTID **IM2**
-TO **1252**
-TFL **F370**
-SFL **F340A**
-ADES **HECA**
-ARCTYP **B737**
-ROUTE **N0420F370 RAZOZ UM711 LARAX**

12:32 ATS B returns a LAM message and associates the received ABI with its corresponding flight plan data. After the receipt of the ABI message, the track and FP correlation is established. The following track label is presented at ATS B SC2 for the flight AZA191 that is in the notified state.



12:39 Flight AEE175 is transferred to ATC A and the system flight plan becomes live. The track label at ATS A SC2 is changed to the presentation corresponding to an assumed flight (green).

12:40 ATC A sends an ACT message to ATC B for flight AZA191. Upon the reception of coordination message, ATS B turns the flight AZA191 into active state making it eligible for MTCD calculation.

12:40 ATC A MTCD detects risk of conflict between AZA191 and AEE175 that will occur within the ATS B AoR. As the ATCO controlling the airspace volume of ATC A SC2 is not responsible to resolve this conflict, he decides to highlight the flight AEE175 to ATS B SC2 to facilitate verbal coordination. For that purpose, he manually triggers a PNT message to flight AEE175 selecting the ATS B SC2 as a recipient of the PNT message.

-TITLE **PNT**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **423**
-ARCID **AEE175**

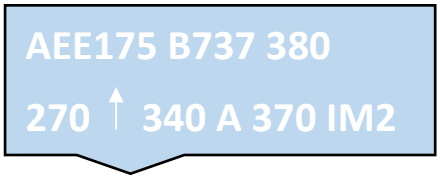
-SSRCODE **A1755**
-ADEP **LGTS**
-ADES **HECA**
-ARCTYP **B737**
-ROUTE **N0420F370 RAZOZ UM711 LARAX**
-POSITION **REF01**
-REF
    -REFID **REF01**
    -PTID **RAZOZ**
    -BRNG **190**
    -DISTNC **24**
-SECTOR **ATSB SC2**
-PNTSECTOR **ATSA SC2**

12:40 After sending the PNT message, the track label of flight AEE175 on ATC A SC2 is updated with a blue PNT indicator (highlighting that a PNT message has been sent on AEE175).

12:41 ATS B receives the PNT message and returns a LAM message. It changes the track label of AEE175 to a magenta background, as an indicator that AEE175 deserves special attention and that verbal coordination will be initiated by ATS A SC2.

12:41 ATS B SC2 examines flight AEE175 and manually identifies the risk of conflict with AZA191. ATS B MTCD could not yet detect the conflict because AEE175 is still in a notified state.

12:41 ATS B SC2 acknowledges the highlight, and the background colour of the track label is restored.



12:41 ATS B SC2 identified that the AEE175 climbing path caused the risk of conflict with AZA191 and he decides to restrict the climb of AEE175 to CFL 340 until the LUMAX point.

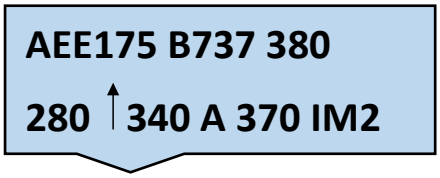
12:41 ATS B SC2 phones ATS A SC2 notifying that flight AEE175 risk of conflict is identified and CFL FL340 restriction will be applied to this flight upon the transfer to ATS B SC2.

12:42 ATS A SC2 acknowledges the resolution action decided by ATS B and removes the highlighted PNT indicator on the AEE175 track label. The track label is restored to its previous state.

12:43 ATC A sends an ACT message to ATC B.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATCA**
    -RECVR -FAC **ATCB**
    -SEQNUM **323**
-SEQNUM **227**
-ARCID **AEE175**
-SSRCODE **A1755**
-ADEP **LGTS**
-COORDATA
    -PTID **IM2**
    -TO **1253**
    -TFL **F370**
    -SFL **F340A**
-ADES **HECA**
-ARCTYP **B737**
-ROUTE **N0420F370 RAZOZ UM711 LARAX**

12:43 ATS B returns a LAM message and the SFPL for flight AEE175 changes to a coordinated status. The following track label is presented at ATS B SC2 for the flight AZA191 in the coordinated state. AAE175 is cleared to FL 340 until LUMAX and to continue its climb to FL370 afterwards



4.4.3 Conclusions

The PNT was designed to mimic the operational behaviour of inter-console marker and inter console messages. This message is used to support verbal coordination in case of special conditions of a given flight (risk, conflict, non-conformance, special events). As such, this message does not require any operational response, the acknowledgment that the message is received (LAM) is deemed sufficient.

The most important aspects when implementing the PNT message are HMI related: presentation, acknowledgement and removal the PNT highlight.

4.5. AMA message clarifications

4.5.1 Background

The European Union Common Project One (CP1) Regulation [RD 7] requires the extension of Arrival Management in the en-route airspace. The extended AMAN en-route needs to be implemented by the en-route ATS units feeding the traffic to the 18 of the busiest airports in Europe. As a result, the AMAN horizon needs to be extended to 180 NM from the arrival airport. This extension of the AMAN horizon means that more than 40 en-route ATS units need to deploy some form of extended AMAN advisor. The CP1 Regulation does not specify how the extended AMAN should be implemented. One way to implement the extended AMAN is through the exchange of the OLDI AMA message, which is suitable for exchanging AMAN constraints (e.g. Time to Lose or Gain and Speed Advice). Another method is via SWIM Yellow Profile exchanges of extended AMAN data.
Only OLDI AMA message exchanges in the context of an extended AMAN horizon are addressed by this document. The SWIM based arrival sequencing services is addressed by EUROCAE standard ED-254.

4.5.2 Arrival sequence number

Requirement OLDI-AMA-20-M states that 'Arrival sequence number' can be used in AMA messages based on bilateral agreement; however, there are no requirements, notes, or recommendations for their use. Section 9.7.3.3 of the OLDI Specification [RD 1] contains the 'Criteria for Message Transmission' but in fact only covers the criteria for the transmission of the initial AMA message and does not include any requirements relating to the transmission of subsequent AMA messages. In particular, OLDI-AMA-90-M states that additional AMA messages shall be sent when the time over the metering fix has changed by a value greater than that agreed in the LoA.

A flights arrival sequence number will necessarily change, every time a preceding flight lands at the airport or diverts to another airport. If the arrival sequence number field is used in AMA messages this must be considered, however the current OLDI Specification text does not allow for this. The result is an incorrect (and possibly misleading) display of the arrival sequence numbers for ATCOs.

Another issue that has been seen with the use of the arrival sequence numbers is where a busy airport has multiple different ACCs / sectors all feeding traffic into it. If we consider Amsterdam Airport (EHAM) for example, there are two different MUAC sectors, along with other ACCs, all feeding traffic into the EHAM APP; so the use of arrival sequence numbers in these feeder ACCs / sectors is pointless as none of them have the complete traffic picture of EHAM arrivals. The result is seemingly random sequence numbers that may not have an apparent link to each other.

AMAN implementation experience has shown that even if arrival sequence numbers are permitted in OLDI AMA messages, there is currently no operational use case covering the use of arrival sequence numbers.

4.5.3 AMA message sending cut-off time

Arrival management systems are not always fully integrated with the main FDP systems. Therefore, this can lead to different system states in the Arrival Manager and FDP systems, which may not be compatible when the Arrival Manager is calculating the sequences and delays, and the FDP is responsible for OLDI message sending.

Operational experience has shown that there can be a mismatch between 'Arrival Management States' (used to generate AMA messages to upstream AORs) and 'Flight Plan States' used to generate and process most other OLDI messages. This is understandable as the arrival management states can be based on metering fixes or time to run to touchdown rather than COPs, whereas almost all other OLDI messages are triggered based on a time/distance prior to a COP.

A consequence of this is that sometimes AMA messages are sent too late to the upstream AoR to be processed and used. For example, when the upstream AoR is in the process of transferring the flight, the received AMA message would be rejected to the flight data queue for deletion.

Currently there are no provisions in the OLDI Specification regarding a cut-off time/distance for AMA message transmission. Different options such as adding new recommended (or even optional) requirements to OLDI (stating that AMA messages should no longer be sent once the flight has reached a time or distance prior to the COP), a note to the OLDI requirements, or information in the OLDI Guidelines can be envisaged. However, the appropriate option is subject to further analysis.

It should be noted that any AMA message sending cut-off parameter(s) implemented should be tuned with bilateral agreement per AMAN airport taking the Concept of Operations for that airport into account. For example, if the AMA message triggers tactical speed inputs in cruise or descent, then it might be appropriate to receive them right up until the transfer phase or perhaps 1 minute prior to it. If the AMA message is for an en-route, Mach Number speed change then there may be no point processing a message received less than 10 minutes before the transfer point.

4.5.4 AMA triggering events

The OLDI specification clearly specifies (requirements OLDI-AMA-50-M and OLDI-AMA-140-M) that AMA messages do not need to be sent for all flights that are part of an arrival management process, but only for the flights which are eligible for delay absorption or time adjustment.

An AMA message needs to be sent out if:

- The arrival management function calculates the updated time over the metering fix for a specific flight, which leads to an updated time over the COP (AMAN time) and/or Total Time to Gain/Loose (TTG/TTG);
- The ATS unit operating arrival management at a specific airport manually requests speed adjustment for a specific flight;

If the time over the metering fix is not changed, an AMA message is not sent out to the upstream unit.

If for specific reasons, the arrival management function provides AMA messages for all flights arriving at the specific airport, the sending or receiving unit should filter these messages, permitting only those with real operational content to be presented to the relevant controller of the upstream ATS unit.

4.5.5 AMA updates

The OLDI specification clearly specifies (requirement OLDI-AMA-90-M) that an updated AMA message should be sent if the time at the metering fix is changed by a value greater than a system parameter threshold (as agreed in the LoA). The AMAN optimised sequence is volatile

as many events (manual insertion, flight swapping, change of landing rate, removal from sequence, rerouting) trigger the automatic sequence calculation and change of time over metering fix for certain flights.

To avoid further propagation of AMAN sequence volatility, it is advisable not to provide an updated AMA message if the delta between the time contained in already exchanged AMAN messages and the new recalculation is below an agreed threshold. This filter is recommended to avoid a continuous change of extended AMAN data presentation in the upstream sectors. In case of extended AMAN involving several upstream ATS units, the necessity of a proper update by AMA message is even more important, to avoid the recalculation of delay apportionment and volatility of data presented in the track label/electronic flight strips of upstream ATS units.

4.5.6 AMA forward function

Requirement OLDI-AMA-80-M specifies that if bilaterally agreed the received AMA message is forwarded to the upstream ATS unit. In the context of the CP1 Regulation [RD 7] and extended AMAN horizon of 180 NM, this requirement might be considered as the required tool for the propagation of delay further up-stream, as in some cases 3-4 ATS units might be involved in the extended AMAN operations. Furthermore, it does not specify whether the AMA forward function should be automatic or manual. In the context of several ATS units involved the arrival sequencing; more sophisticated method for forwarding of received AMA message from the unit operating the arrival sequencing might be needed.

Therefore, a slight adaptation of the AMA specification might be considered as:

- AMA messages could be sent to the upstream ATS units if bilaterally agreed.
- AMA messages, if bilateral agreed, may be automatic forwarded to the upstream ATS units.
- The forwarded AMA messages could contain the total time to lose/gain by all ATS units and AMAN time/COP for the concerned ATS unit.
- The apportionment of delay between the ATS units involved in the extended AMAN for a particular airport should be defined the Letter of Agreement and further elaborated as the OLDI adaptation data parameters.

4.5.6.1 Apportionment of Delay (examples for LTBA)

The arrival flights to LTBA are governing the application of the arrival management procedure. The arrival management is extended further en-route and besides the ATC unit providing the arrival management service for LTBA (ATS A), it involves three additional ATS en-route units (ATS B, ATS C, ATS D) that are used for the following examples. The Letters of Agreement between the extended AMAN participating units indicate that:

- If the requested arrival management delay contained in AMA messages (TTL) is less than 2 minutes, the delay will be solely absorbed by the first upstream ATS unit.
- If the requested arrival management delay contained in AMA messages (TTL) is more than 2 minutes, the requested delay will be apportioned as:
    - ATS B will absorb 25% of TTL
    - ATS C will absorb 25% of TTL
    - ATS D will absorb 50% of TTL
- The provisions of LoAs between these ATS units concerning the extended arrival management for LTBA are translated into the OLDI adaptation data parameters.

ATS B and ATS C support an automatic forwarding of received AMA messages.

In Figure 27 27 the airspace data is depicted as:

- ATS A in purple;
- ATS B in blue;
- ATS C in red;
- ATS D in orange.

The flight trajectories are depicted in green and coordination points in black.

4.5.6.2 Apportionment of Delay - Example 1

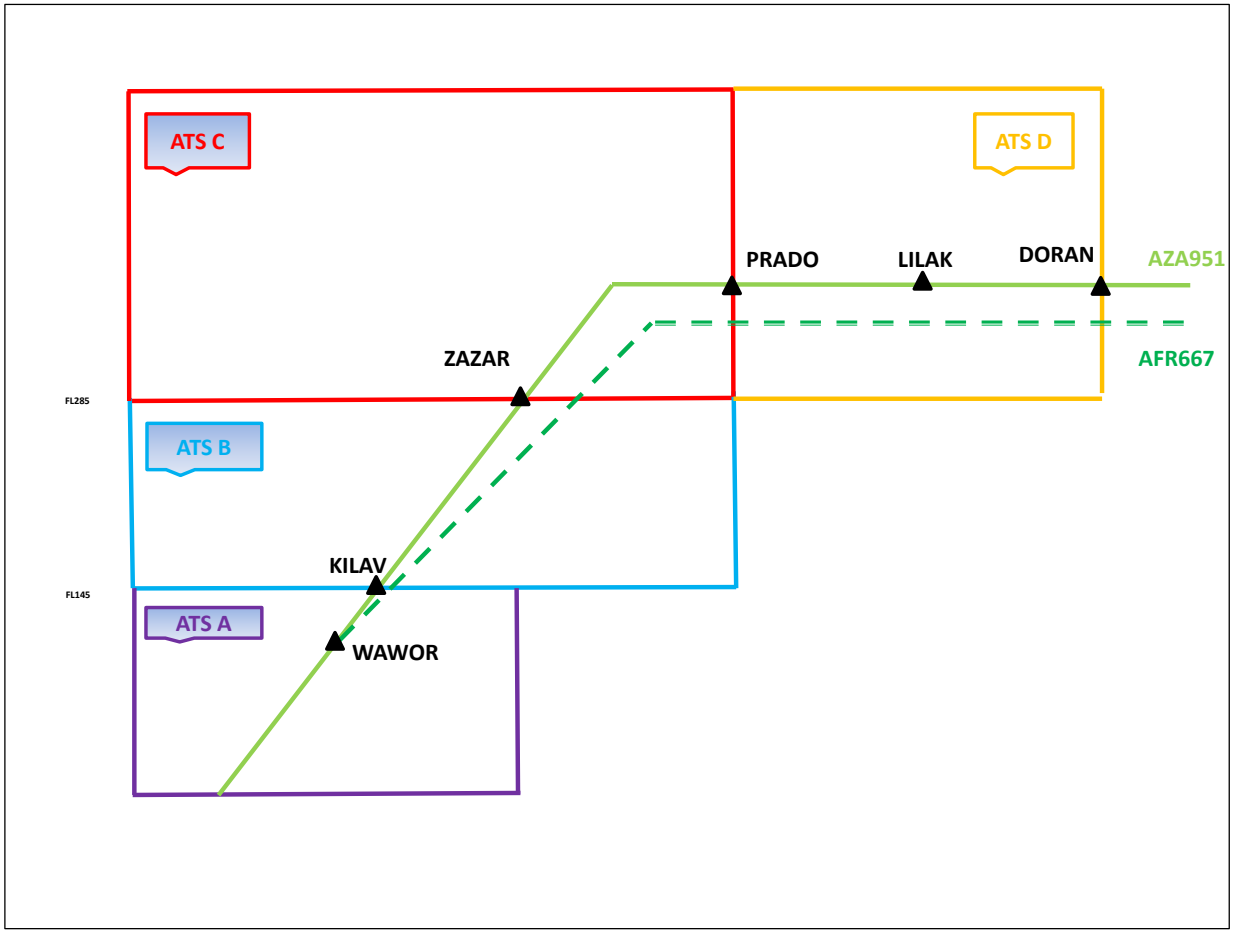


Figure 27 27 - Apportionment of Delay - Example 1

The IFPS distributed the original FPL (FPL-AZA951-IS –B737/M-SRWY/C –LIRF1000 -N0420F340 RAXAD UM761 LIRIM UG333 PRADO UL908 KILAV DCT WAWOR –LTBA0130) to ATS A, ATS B, ATC C and ATS D.

ATS A extracts the following 4-D trajectory for flight AZA951 within its AoI as:

Horizontal position	PRADO	ZAZAR	KILAV	WAWOR	LTBA
FL	340	285	145	115	000
Time	1035	1041	1047	1049	1055

ATS B calculates the following 4-D trajectory for flight AZA951 within its AoI as:

Horizontal position	PRADO	ZAZAR	KILAV	WAWOR

FL	340	285	145	115
Time	1035	1041	1047	1049

ATS C calculates the following 4-D trajectory for flight AZA951 within its AoI as:

Horizontal position	LILAK	PRADO	ZAZAR	KILAV
FL	340	340	285	145
Time	1031	1035	1041	1047

ATS D calculates the following 4-D trajectory for flight AZA951 within its AoI as:

Horizontal position	…	DORAN	LILAK	PRADO	ZAZAR
FL	…	340	340	340	285
Time	…	1027	1031	1035	1041

10:15 ATS D sends an ABI message to ATS C for the flight AZA951.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSD**
    -RECVR -FAC **ATSC**
    -SEQNUM **021**
-ARCID **AZA951**
-SSRCODE **A1165**
-ADEP **LIRF**
-COORDATA
    -PTID **PRADO**
    -TO **1035**
    -TFL **F340**
-ADES **LTBA**
-ARCTYP **B737**
-ROUTE **N0420F340 …. DORAN DCT LILAK DCT PRADO DCT ZAZAR**

Flight AZA951 is subject to the arrival management process at Istanbul (LTBA), which calculates that an optimum time for the flight to leave the metering fix (WAWOR) within the vertical limits of ATS A is 10:57 (8 minutes delay). As ATS A cannot absorb any delay for this flight, the total delay is passed further upstream with a resulting time at KILAV of 10:55.

10:18 ATS A sends an AMA message to ATS B.

-TITLE **AMA**
-REFDATA
    -SENDER –FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **722**
-ARCID **AZA951**
-ADEP **LIRF**
-COP **KILAV**
-AMANTIME **105500**

-ADES **LTBA**
-MFX **WAWOR**
-TOM **105700**
-TTL **0800**

ATS B receives the AMA message and returns a LAM message. In accordance with Letter of Agreement, concerning the arrivals to LTBA subject to the arrival management process, if the delay is more than 2 minutes the AMA message is forwarded to the next upstream unit. ATS B can absorb 25 % of the delay (2 minutes). ATS B automatically composes a new AMA message to be sent to ATS C shifting the time at point ZAZAR for the delay to be absorbed further upstream (6 minutes delay at ZAZAR as 2 minutes of delay will be absorbed by ATS B). Therefore, the AMA message to be sent by ATS B proposes a 6-minute delay within ATS C lateral and vertical limits with a resulting time at ZAZAR of 10:47. The reception of AMA message by ATS B does not change the flight status for AZA951. The flight AZA951 is not correlated as the reception of ABI from the upstream unit remains as correlation trigger.

The updated time at the COP (KILAV 10:55) is presented in the relevant flight list with a specific indication, while the TTL is not presented as the total delay will be absorbed by ATS units further upstream. As the flight is still not yet correlated, there is no presentation of AMAN delay in the track label. The trajectory is not updated.

10:18 ATS B sends an AMA message to ATS C.

-TITLE **AMA**
-REFDATA
    -SENDER –FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **036**
-ARCID **AZA951**
-ADEP **LIRF**
-COP **ZAZAR**
-AMANTIME **104700**
-ADES **LTBA**
-MFX **WAWOR**
-TOM **105900**
-TTL **0800**

ATS C receives the AMA message and returns a LAM message. In accordance with the Letter of Agreement concerning the arrivals to LTBA subject to the arrival management process, if the delay is more than 2 minutes the AMA message is forwarded to the next upstream unit. ATS C can absorb 25 % of the delay (2 minutes). ATS C automatically composes a new AMA message to be sent to ATS D shifting the time at PRADO point for the delay to be absorbed further upstream (4 minutes delay at PRADO as 4 minutes of delay will be absorbed by ATS B and ATS C). Therefore, the AMA message to be sent by ATS D proposes 4-minute delay within ATS D with a resulting time at PRADO of 10:39. As ATC C already received an ABI message for AZA951 from the ATS D, the flight will remain in pre-activation state, correlated with the track.

The updated time at the COP (ZAZAR 10:47) is presented in the track label and relevant flight list with a specific indication, while the TTL is not presented as the total delay will be absorbed by ATS units further upstream. The trajectory is not updated.

10:19 ATS C sends an AMA message to ATS D.

-TITLE **AMA**
-REFDATA
    -SENDER –FAC **ATSC**
    -RECVR -FAC **ATSD**
    -SEQNUM **688**
-ARCID **AZA951**
-ADEP **LIRF**
-COP **PRADO**
-AMANTIME **103900**
-ADES **LTBA**
-MFX **WAWOR**
-TOM **105900**
-TTL **0800**

ATS D receives the AMA message and returns a LAM message. The updated time at the COP (PRADO 10:39) is presented in the track label and relevant flight lists with a specific indication, while the TTL is not presented as the total delay as it does not correspond to the delay to be absorbed by ATS D. The trajectory is not updated.

The Flight AZA951 is handed over to ATS D by the preceding ATS unit in the trajectory, ATS D intends to apply vectoring to AZA951 (closed heading re-joining the original trajectory at PRADO). After the application of the closed heading instruction, the trajectory is updated and a revised ABI message with a new time over PRADO is sent.

10:21 ATS D sends revised ABI to ATS C.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSD**
    -RECVR -FAC **ATSC**
    -SEQNUM **035**
-ARCID **AZA951**
-SSRCODE **A1165**
-ADEP **LIRF**
-COORDATA
    -PTID **PRADO**
    -TO **1039**
    -TFL **F340**
-ADES **LTBA**
-ARCTYP **B737**
-ROUTE **N0420F340…. DORAN DCT 4207N02278E DCT PRADO**

10:22 ATS C sends a LAM message to ATS D, correlates the received ABI with its corresponding flight plan data and attempts to align the AZA951 trajectory with the ABI message route information. The DORAN point is disregarded due to its distance from the inbound COP, the LILAK point is deleted as it is no longer part of the trajectory, the GEO1 point is inserted and the new time over PRADO is applied, the remaining part of the trajectory is not altered but it is shifted in time. The updated trajectory is:

Horizontal position	GEO1 (4207N02278E**)**	PRADO	ZAZAR	KILAV
FL	340	340	285	145
Time	1033	1039	1045	1051

10:25 ATS C sends ABI to ATS B.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSC**
    -RECVR -FAC **ATSB**
    -SEQNUM **723**
-ARCID **AZA951**
-SSRCODE **A1165**
-ADEP **LIRF**
-COORDATA
    -PTID **ZAZAR**
    -TO **1045**
    -TFL **F285**
-ADES **LTBA**
-ARCTYP **B737**
-ROUTE **N0420F340 …. 4207N02278E DCT 4207N02278E DCT PRADO DCT ZAZAR DCT KILAV**

10:25 ATS B sends a LAM message to ATS C, correlates the received ABI with its corresponding flight plan data. As the flight is correlated, the AMAN delay (the updated time at the COP KILAV 10:55) is presented in the track label and relevant flight list with a specific indication, while the TTL is not presented. ATS C attempts to align the AZA951 trajectory with the ABI message route information. The GEO1 point is disregarded due to its distance from the inbound COP, PRADO point is kept, the new time over ZAZAR is applied, the remaining part of the trajectory is not altered but it is shifted in time. The updated trajectory is:

Horizontal position	PRADO	ZAZAR	KILAV	WAWOR
FL	340	285	145	115
Time	1039	1045	1051	1053

The subsequent ABI and ACT message exchanges will update the AZA951 trajectory within ATS B and ATS A.

4.5.6.3 Apportionment of Delay - Example 2

The IFPS distributed the original FPL (FPL-AFR667-IS –B737/M-SRWY/C –LFPO1900 -N0410F330 MILOR UG166 MOMAG UG887 PRADO UL908 KILAV DCT WAWOR –LTBA0300) to ATS A, ATS B, ATC C and ATS D.

ATS A extracted the following 4-D trajectory for flight AFR667 within its AoI as:

Horizontal position	PRADO	ZAZAR	KILAV	WAWOR	LTBA
FL	330	285	145	115	000
Time	2146	2151	2157	2159	2205

The flight AFR667 is subject to the arrival management process at LTBA that calculates a 90 seconds delay at the metering fix (WAWOR). As ATS A cannot absorb any delay for this flight, the total delay is passed further upstream.

ATS A sends the AMA message to ATS B.

-TITLE **AMA**
-REFDATA
    -SENDER –FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **075**
-ARCID **AFR667**
-ADEP **LFPO**
-COP **KILAV**
-AMANTIME **215830**
-ADES **LTBA**
-MFX **WAWOR**
-TOM **220030**
-TTL **0130**

ATS B receives the AMA message and returns a LAM message. In accordance with the Letter of Agreement concerning arrivals to LTBA subject to the arrival management process, if the delay is less than 2 minutes, the delay is solely absorbed by ATS B and an AMA message is not forwarded upstream.

The updated time at the COP (KILAV 21:58) is presented in the track label with a specific indication and the TTL is also appropriately presented in the track label/electronic flight strip. The trajectory is not updated.

4.5.7 Use of data item “Assigned Speed”

Arrival Management can be performed using speed requests. In case of bunching to e.g. the Initial Approach Fix (IAF), the local APP or ACC unit may request the upstream unit to put (some) aircraft on a certain speed (e.g. “speed 260”) to absorb time and/or ensure (pre) sequencing.

ATCOs in the local APP or ACC units often initiate this kind of request by phone, hence causing additional workload in both the accepting and the transferring units. By implementing the item of data “Assigned Speed” of the AMA message, it is possible to alleviate the workload of the ATCOs since the speed request can be triggered by an input from the local ATCO and be displayed on the HMI of the upstream ATCO. When several aircraft converge to the IAF or COP, it may also provide the transferring ATCO with an idea of the sequence that is aimed for by the accepting ATCO (e.g. three different aircraft receiving “speed 270”, “speed 260” and “speed 250” gives a very good idea of which one has to go first).

For the cases where the aircraft is flying above the conversion altitude at the time of reception of an assigned speed in knots (e.g. still with the upstream UAC), the working method would be that the UAC ATCO will instruct the aircrew to fly that assigned speed “upon conversion”. Communicating this information even prior to the top of descent allows them planning for it hence meeting the restriction more effectively).

As for other cases of Arrival Management, the application of speed constraint for the purpose of Arrival Management must remain based on “best effort”. When there is a need to coordinate tactical requests using speed, the RTI message shall be used since it allows accepting or rejecting the request.

The use of assigned speed by the units handling the traffic towards the IAF might be a useful tool to complement (Extended) Arrival Management concepts using TTL/TTG or Time over COP.

4.5.8 AMA operational reply

The OLDI specification does not require an operational reply to a received AMA message. It is assumed that the upstream ATS unit would make best effort to accommodate the constraints contained in the AMA message, but without a guarantee of full compliance, as no ACP message or similar type of response is required.

It seems that for TTL/TTG and AMAN time this logic is appropriate based on the assumption of best effort to meet the AMAN constraint. However, in the case of an AMA message that contains assigned speed and the application point from which the speed reduction applies, a complete absence of operational reply might be deemed inappropriate. The ATS unit that operates arrival sequencing for the concerned airport should be aware whether the required speed reduction would be applied to conceive the remedial actions when the upstream ATS unit is unable to comply. In this particular case, a provision of ACP/RJC messages or other operational response mechanism (SDM) needs to be considered. This will also require the update of OLDI Specification, which does not address this issue.

4.5.9 Example AMA presentation in the receiving unit

The AMA message does not need to be presented to the relevant working position, but the AMA message content (notifications and advisories) needs to be presented in the track label, electronic flight strips or relevant flight list, depending on the AMA operational content and operational needs for the follow-up action.

The below picture shows how AMA message content can be presented. The display of GS (Ground Speed) in red indicates that there is an AMA message for this flight.

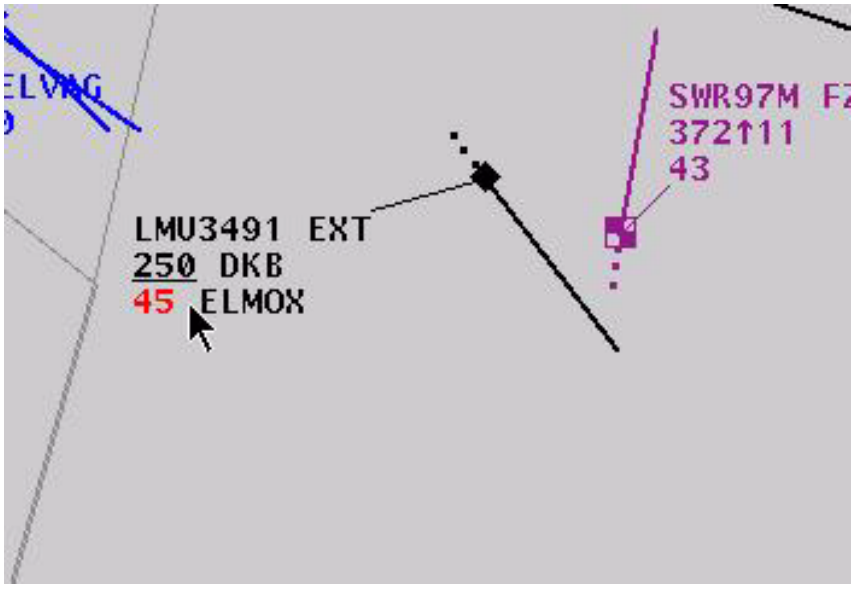


Figure 28 - AMA message content 1

The AMAN time constraint and relevant coordination point should be presented in the track label/electronic strip (preferable as an updated route info) with a clear indication (specific symbol or colour change) that the time over COP was received via AMA message. If an AMA message contains TTL/TTG, the advisory needs to be included in the track label/electronic strips, preferably in relation with the received AMAN/COP, only in the case where the total delay will be absorbed by one ATS unit.

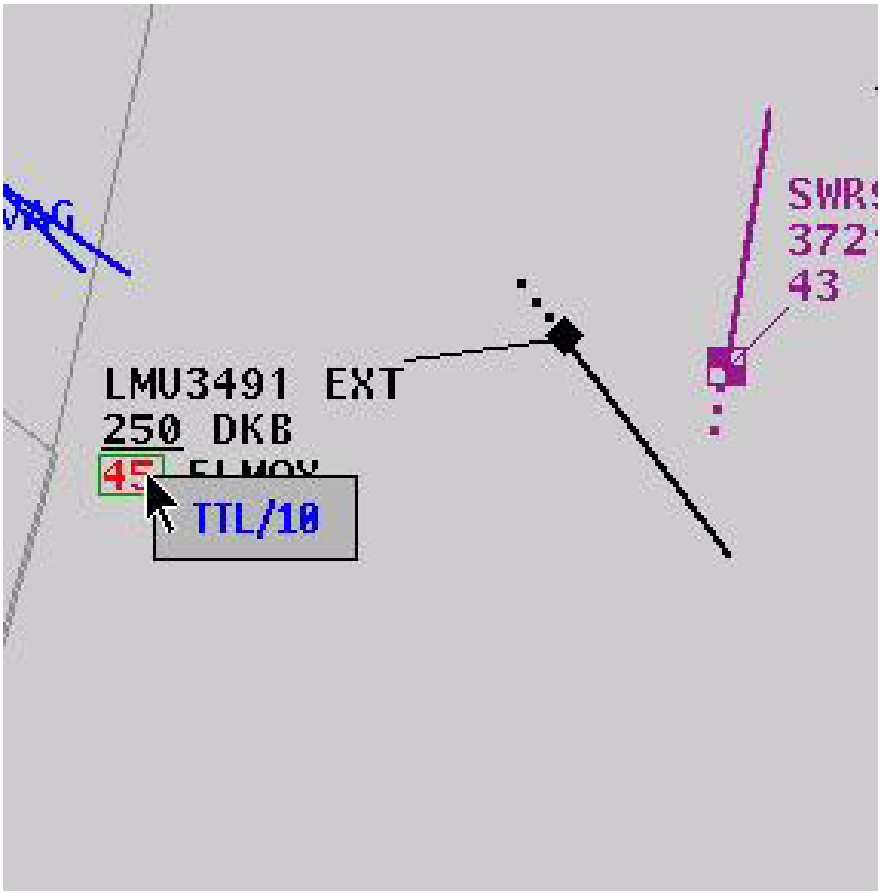


Figure 29 - AMA message content 2

This particular HMI presentation of TTL is done by moving the mouse over the Ground Speed (GS) display. The mouse click on GS field triggers the ACK button. An additional click on the ACK button acknowledges the AMA message content and turns GS in black again.

In case of delay propagation further upstream and apportionment of delay, the presentation of TTL is not very useful, as TTL contains the total time to be lost.

As in most cases the metering fix is within TMA boundaries, there is no operational need to present the metering fix and relevant time over to the upstream en-route sectors. However, the metering fix could be the TMA/ACC boundary point, which may justify the presentation of time over metring fix to the en-route sector.

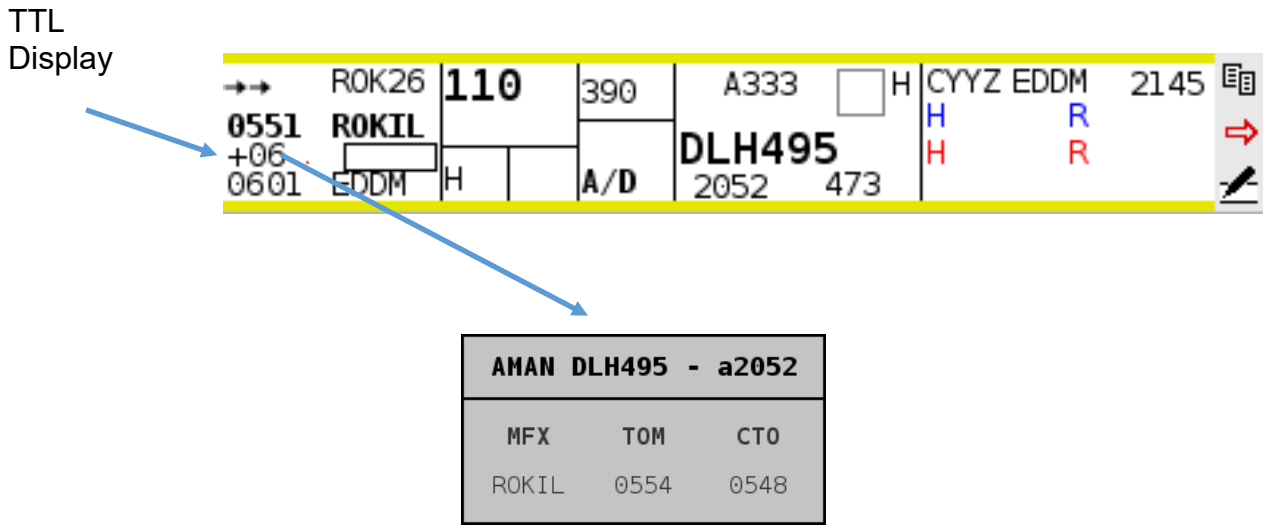


Figure 30 - Presentation of TTL within the electronic strip field

The picture above indicates the presentation of TTL within the electronic strip field; TTG might be presented as -06. A click on TTL field opens a pop-up window with MFX (Metering Fix) and AMAN planning times:

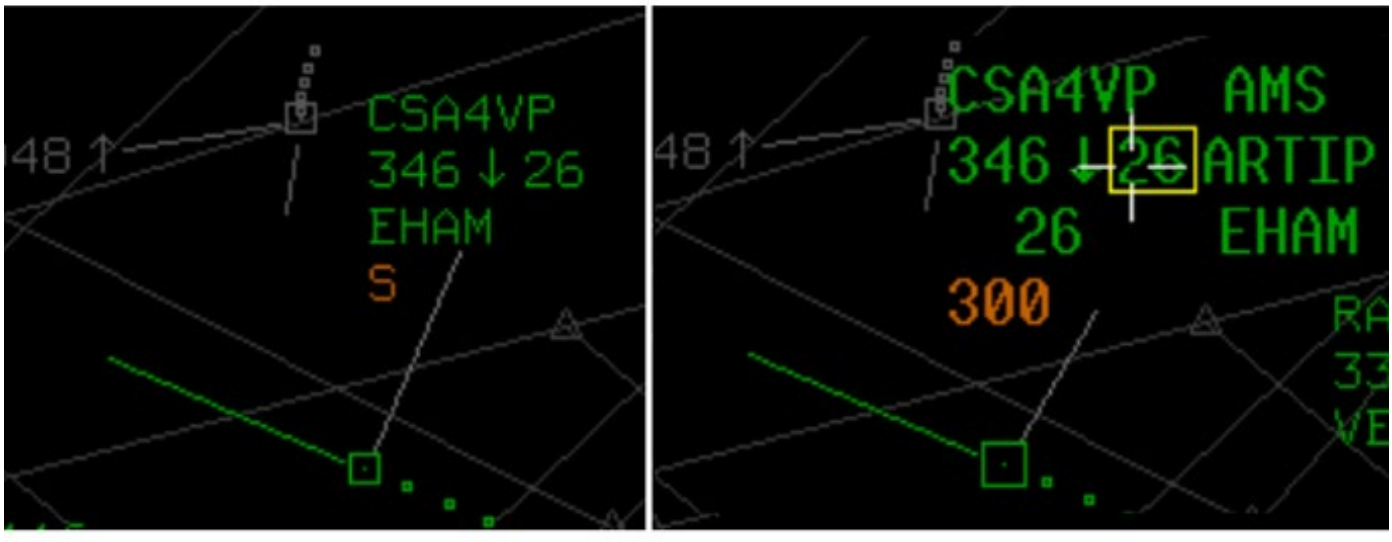
- TOM = Time over Metering Fix
- CTO = Controlled Time over COP

The speed restriction, if contained in an AMA message should be clearly presented in the track label, preferably in the assigned speed track label field with an indication (colour or symbol) that it was received via AMA message. If an AMA message contains the speed restriction application point, this information needs to be presented but the presentation in the track label/electronic strips might not be the most appropriate. The application point of speed adjustment might be highlighted when the track label of a particular flight is selected.

The below picture indicates the presentation of TTL/TTG values within the label and flight plan lists. The TTL/TTG contents of AMA messages is displayed in the label and flight plan list as ‘Lxx’ or ‘Gxx’ (for ‘Lose’ and ‘Gain’ where xx is minutes) for aircraft that are subject to AMA messages. In the picture, the AMA messages for NAX4157 has been received and the flight has to lose 1 minute whereas SAS2111 is not subject to AMAN flow control. Further details like Feeder Fix, the STA over the Feeder Fix and the TTL/TTG applicable for that flight are contained in the flight list, as optional fields that can be selected by the ATCO if desired – an example of one of these lists is also in the picture.

Figure 31 - Example of AMA message content on a flight list

The presentation of ground speed is indicated in the below pictures. The first picture presents the normal track label, and the orange 'S' shows that a speed constraint has been received from the downstream ATCO (internal or external). The second picture presents the magnified track label (by moving the mouse over the track label), the ATCO sees the new speed that has been requested.



"NORMAL" Label. The orange S shows that a speed constraint has been received from the downstream ATCO (internal or external).

"MAGNIFIED" Label. When mousing over the track label, the ATCO sees the speed that has been requested.

Figure 32 - Presentation of ground speed request

The arrival sequence number should not be presented in the track label/electronic strip, except if subject to local practices and it is agreed for the en-route sectors.

4.5.9.1 The Evolution of AMA Presentation before/after Operational Implementation

The purpose of this Section is to describe the change of AMA HMI presentation during the operational deployment of the AMA message. This particular implementation considers the following AMA items as:

- TTL/TTG;
- MFX;
- TOM;

The AMA data was presented at ACC Executive Controller screen as:

- Main object – track label –TTL-TTG in line 0, left
- Supporting object – AMAN window showing MFX/TOM

Figure 33 - Evolution of AMA content presentation 1

Before the operational use of AMA message, the following features had been foreseen:

- New/updated TTL/TTG value was displayed in yellow, mouse action – change to grey (operational meaning – info was passed to the pilot)
- TTL/TTG was displayed at all sectors, all TTL/TTG values, there was threshold when change would be presented to the controller

The following modifications were done after the AMA exchanges became operational (required by ACC after having first operational experience):

- TTL/TTG is always displayed in grey colour (less attractive), non-sensitive field
- TTL/TTG displayed at last sector only

- Threshold TTL/TTG value when initial/change TTL/TTG is displayed, might be specific per partner
- Only values higher that TTL 10 minutes are displayed to the controller (last sector)
- No need for a specific AMA window;
- The following operational procedures (see table below) were agreed and contained in the relevant LoA as:

TTL (based on Metering Fix, in minutes)	ACC's Speed Reduction
< 10	No action
10 – 15	IAS max 270 knots
15+	IAS max 250 knots

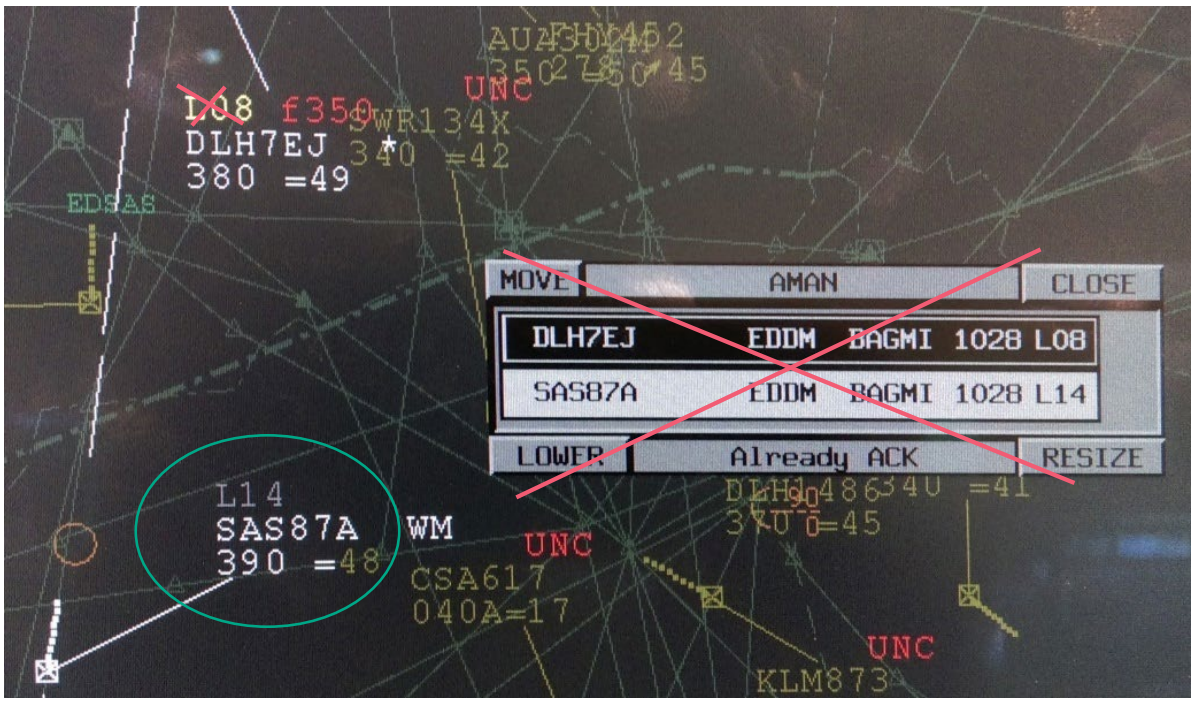


Figure 34 - Evolution of AMA content presentation 2

4.5.10 Extended AMAN and the current AMA message specification

It is not completely clear that the current specification for the AMA message also allows the use of Extended AMAN – that is, AMA message transmissions forwarded to multiple upstream AoRs for a longer arrival sequence look ahead time. As Extended AMAN is also being looked at in the context of SESAR, it is also worth highlighting in these guidelines.

It should be noted that all the 'General' AMA message requirements in Section 11.6.3.1 of the OLDI Specification **Error! Reference source not found.**, with the exception of OLDI-AMA-70-M, can be applied across multiple upstream AoRs according to bilateral agreement. Furthermore, the content of the AMA messages can also be tuned for use with multiple upstream AoRs under the framework of OLDI-AMA-20-M as there to be 'bilaterally agreed'.

Another approach that could be considered for implementing Extended AMAN operations across multiple ACCs is outside the scope of the OLDI Specification – it would be to use B2B/SWIM like messages over the PENS network between participating units. However, as this is outside the scope of the OLDI Specification, this concept is not addressed by this document.

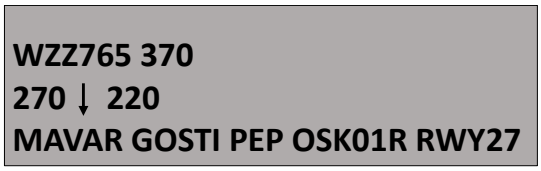
4.6. RST/PST messages clarification

4.6.1 Purpose of PST

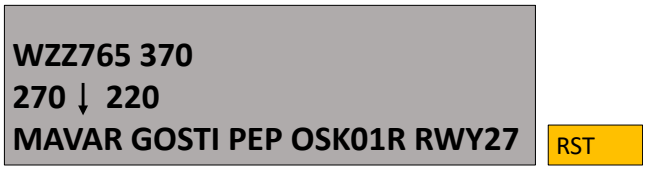
The RST/PST mechanisms is a request/reply exchange between transferring and accepting ATS units to obtain the assigned Standard Instrument Arrival (STAR) and Arrival RWY for a specific flight. The RST message needs to be triggered by the transferring ATS units when the flight starts the descent phase CDA included or from entering the TMA, or APP / top of descent, 3 miles out?. The main applicability areas for this type of mechanism are the ATS units interfacing busy TMAs and airports with a frequent change of arrival patterns depending on specificity of traffic flow, weather conditions and specific timing during the operations.

The Request STAR (RST) message is a simple request mechanism that enables the transferring ATS unit to request the STAR and Arrival RWY for a specific flight. This request is manually initiated by the transferring ATCO, ideally via a specific field on the track label of a flight in the assumed status. This request can only be triggered after the flight (plan?) has been coordinated, before the flight transfer initiation. The data contained in a PST message will be used to update the system flight plan and afterwards displayed in the track label of the transferring ATCO.

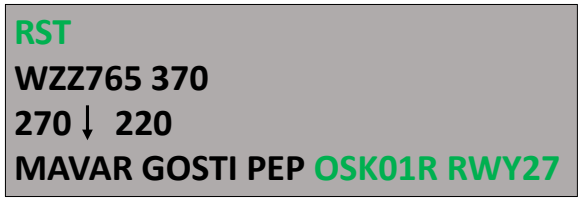
The flight WZZ765 is planned to land at Thessaloniki airport. The information concerning the STAR and Arrival RWY is extracted from the submitted eFPL. The following track label is presented at the transferring ATCO position.



As the transferring ATCO is aware the eFPL data concerning STAR and Arrival RWY for Thessaloniki airport are very reliable, she/he initiates a request for provision of STAR and Arrival RWY for WZZ765. Via sensible? track label field, the RST popup window is activated and the ATCO presses the RST button as depicted below.

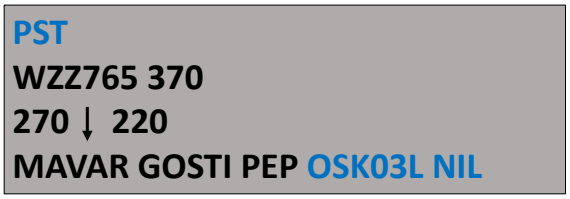


The accepting unit provides LAM to the RST message. The acknowledgment of LAM is indicated in track label line 0, RST LAM received in green colour.

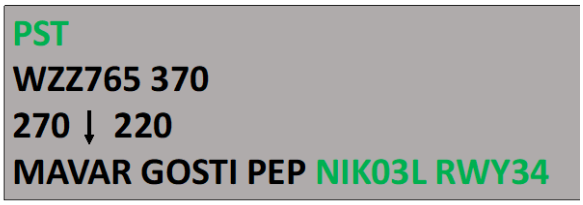


The accepting ATS unit provides a PST message containing a new STAR (OSK03L) and confirming the eFPL runway. The successful reception of PST is indicated in track label line 0, while STAR and Arrival RWY are shown in track label line 3.

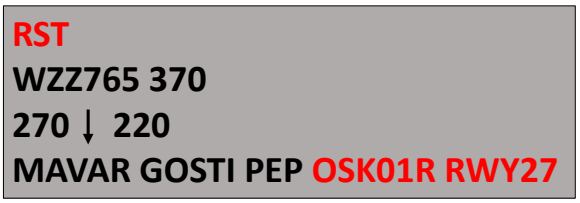
In cases in which a PST message contains incomplete data, the reception of PST and content of the message is indicated in different colour (blue).



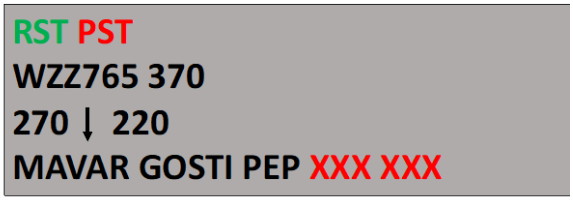
A few minutes after RST/PST MSG exchanges, the accepting ATS unit sends an automatic PST with a new STAR(NIK03L) and Arrival RWY (RWY34). The successful reception of an unsolicited RST message is indicated in track label line 0, while STAR and Arrival RWY in track label line 3.



When an RST message is not acknowledged, the LAM non-reception can be presented at the track label with warning colour as:



In case of RST acknowledgment and non-reception to PST message, the following indication can be presented at the ATCO position as:



4.6.2 Purpose of PST message

The PST message is automatically sent by the accepting ATS unit as:

- A response to a received RST message;
- An unsolicited dispatch at the bilaterally agreed parameters before the boundary.

In case that a PST message is the response to an RST message, the content of the PST message is filled with current available data from the accepting ATS unit FPDS. If a STAR and Arrival RWY are assigned for a specific flight, these data items will be included in the response to an RST message. In case that one or both data items are not yet assigned, the respective content of PST messages contains NIL values for one or both data items. The accepting ATS unit needs to present the content of received PST to the responsible sector and update the system flight plan only if the received data items are not NIL.

An unsolicited PST message needs to be sent when the STAR and Arrival RWY are assigned for a specific flight, and it should not contain NIL values for STAR and/or Arrival RWY.

In cases when the STAR and/or Arrival RWY are not yet assigned at the bilaterally agreed parameters before the boundary, the sending of an unsolicited PST message needs to be delayed until these data items are assigned by the accepting ATS unit.

Example:

Flight WZZ765 is planned to reach the boundary at 14:45. The transferring and accepting ATS units agreed to exchange the unsolicited PST message before the boundary. Therefore, the PST message needs to be sent by the accepting ATS unit at 14:35. However, due to a need to deconflict arrival traffic flow, the sector responsible for STAR/Arrival RWY handling has not yet assigned these data items for WZZ765. In this case, the sending of the PST message needs to be delayed until these values are assigned. At 14:47, the sectors responsible for the handling of arrival traffic flow assigned OSK03L and RWY34 to WZZ765. At 14:47, the accepting ATS unit's FDPS sends the PST message that was due to be sent at 14:45.

4.7. LOF upgrade to cater for ATS B2 needs

4.7.1 Background

The OLDI specification includes provisions to support air-ground data-link exchanges between adjacent ATS units, namely LOF and NAN messages, which implement logon forwarding and next authority notification in line with Regulation (EU) 2017/373 (Part ATS) as amended by Regulation (EU) 2023/1771. The LOF message contains the data item “ATN Logon Parameters”, identifying the CPDLC application type and version. LOF supports the exchange of ATS B1 logon information (CPDLC Version 1) and has been amended to support ATS B2 logon information (CPDLC Version 2 and ADS-C Version 1) to enable mixed ATS B1/B2 environments. Although current European ATS B1 air-ground operations use CPDLC version 1, updating LOF allows ground systems to interoperate with aircraft using different CPDLC/ADS-C versions as ATS B2 capability is introduced. A mixed fleet of aircraft supporting ATS B1 and/or ATS B2 will be deployed progressively. In particular, the Common Project 1 (CP1) Implementing Regulation 2021/116 requires that aircraft operating as GAT above FL285 with a certificate of airworthiness first issued on or after 31 December 2027 be equipped to downlink the ADS-C Extended Projected Profile (EPP) as part of ATS B2, and that ATC systems be able to receive and process ADS-C EPP while maintaining compatibility with ATS B1 CPDLC operations. Furthermore, Regulation (EU) 2023/1770 repealed Regulation (EU) 2009/29 and now provides the overarching aircraft equipment and operating rules relevant to datalink in the Single European Sky.

Note: The terms ATS B1 and ATS B2 designate successive operational baselines of *Air Traffic Services* data-link applications as defined in ICAO Doc. 10037 Vol II and EUROCAE ED-229A. These replace the earlier, informal European usage of “ATN B1” (referring to the same capability suite implemented over the ATN/OSI network). There is no such baseline as “ATN B2” — the second baseline is formally known as ATS B2. The updated terminology was adopted through Regulation (EU) 2017/373, as amended by Regulation (EU) 2023/1771.

4.7.2 Operational Scenario

The operational scenario illustrated in Figure 35 shows a situation involving three ACCs exchanging LOF messages. ACC1 and ACC3 support only ATS B1, whereas ACC2 can support both ATS B1 and ATS B2. The figure indicates the cases in which the LOF message needs to include the optional field ATNLOGONB2, which carries the logon parameters related to ATS B2 applications. The ATNLOGONB2 field is required only when the downstream ATS unit supports ATS B2 applications (CPDLC Version 2 and ADS-C Version 1) in addition to ATS B1. In such case, ACC1 needs to transmit a LOF message containing the mandatory primary field ATNLOGON (for ATS B1 logon parameters) and, where applicable, the optional primary field ATNLOGONB2 (for ATS B2 logon parameters).

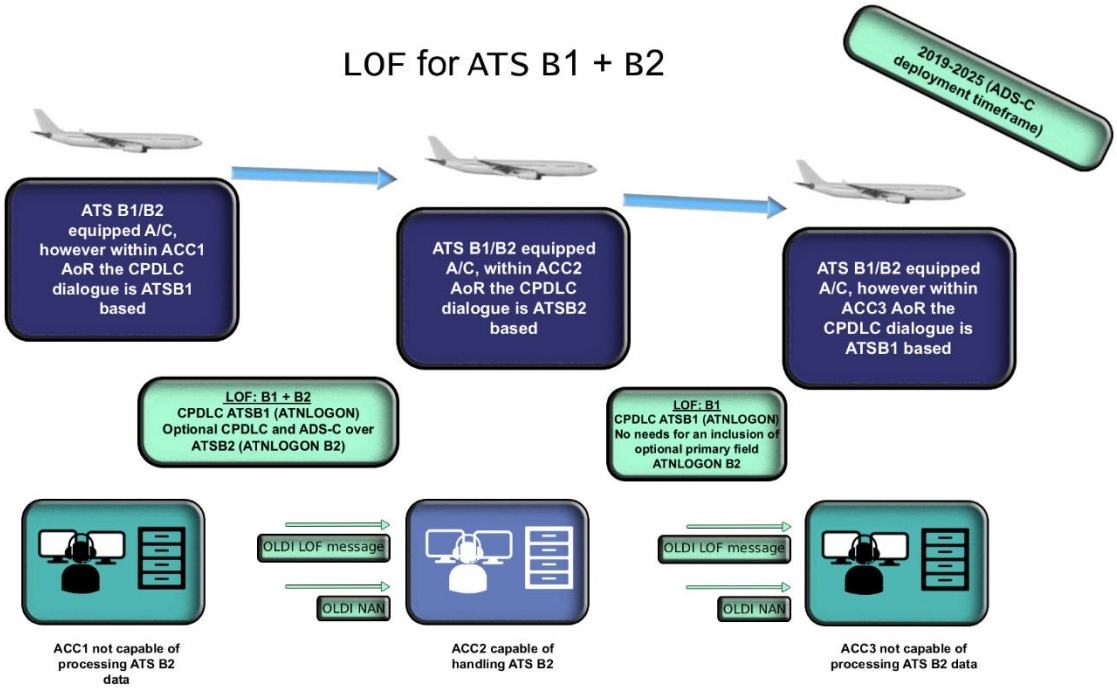


Figure 35 - ATS B1 / B2 Mixed Environment Scenario

As ACC3 does not support ATS B2, the LOF message between ACC2/ACC3 needs to include only the ATNLOGON primary field (the optional field ATNLOGONB2 is not required).

4.7.3 LOF message process and generation

The handing and content of incoming and outgoing LOF messages in different configuration modes (ATS B1, ATS B1/B2, ATS B2) is summarised in the below table.

	Aircraft	ATS B1	ATS B1+B2	ATS B2
		Nominal	Nominal	Nominal
INCOMING LOF	**LOF (incoming) ATN LOGON**			
	ADS-C CPDLC	V0 / 00 V1	V0 / 00 V1	V1 / 01 V2 / 02
	ATN LOGONB2 ADS-C CPDLC	absent absent	V1 V2	Not required Not required
REACTION	Status of the LOF	ACCEPTED (if the nominal conditions for ATN LOGON are met)	ACCEPTED (if the nominal conditions for ATN LOGON are met)	ACCEPTED (if the nominal conditions for ATN LOGON are met)
	SEND LAM to the sender	YES	YES	YES
OUTGOING LOF	LOF sent to the NDA that is ATS B2			
	ATN LOGON ADS-C CPDLC	V0 / 00 V1	V0 / 00 V1	V1 / 01 V2 /02
	ATN LOGONB2 ADS-C CPDLC	absent absent	V1 V2	Not required Not required
	LOF sent to the NDA that is ATS B1			
	ATN LOGON ADS-C CPDLC	V0 / 00 V1	V0 / 00 V1	NO LOF CAN BE SENT Use CM CONTACT
	ATN LOGONB2 ADS-C CPDLC	absent absent	absent absent	NO LOF CAN BE SENT Use CM CONTACT

Figure 36 - Handing and content of incoming and outgoing LOF messages

4.7.4 LOF message examples for the different possible scenarios

a) LOF example aircraft ATS B1 only

-TITLE **LOF**
-REFDATA
    -SENDER -FAC **LWSS**
    -RECVR -FAC **LBSR**
    -SEQNUM **047**
-ARCID **WZZ178**
-ADEP **LIRF**
-ADES **LTBA**
-AF **ATN**
-ARCADDR **ABC123**
-ATNLOGON
    -CMLTSP **8183657500A49CD700010000474731330 1111**
    -ADSQVLTSP
        -AGAPPQUALIFIER **0**
        -AGAPPVERSION **00**
    -CPCQVLTSP
        -AGAPPQUALIFIER **22**
        -AGAPPVERSION **01**
        -CPDLCADDRESS **8183657500A49CD700010000474731330AAAA**

    -ATIQV
    -AGAPPQUALIFIER **3**
    -AGAPPVERSION **00**

b) LOF example aircraft ATS B1 and B2

-TITLE **LOF**
-REFDATA
    -SENDER -FAC **LWSS**
    -RECVR -FAC **LBSR**
    -SEQNUM **047**
-ARCID **WZZ178**
-ADEP **LIRF**
-ADES **LTBA**
-AF **ATN**
-ARCADDR **ABC123**
-ATNLOGON
    -CMLTSP **8183657500A49CD700010000474731330 1111**
    -ADSQVLTSP
        -AGAPPQUALIFIER **0**
        -AGAPPVERSION **00**
    -CPCQVLTSP
        -AGAPPQUALIFIER **22**
        -AGAPPVERSION **01**
        -CPDLCADDRESS **8183657500A49CD700010000474731330AAAA**
    -ATIQV
    -AGAPPQUALIFIER 3
    -AGAPPVERSION 00

-ATNLOGONB2
-ADSQVLTSP
-AGAPPQUALIFIER **0**
-AGAPPVERSION **01**
-ADSADDRESS **8183657500A49CD700010000474731330 1111**
-CPCQVLTSP
-AGAPPQUALIFIER **22**
-AGAPPVERSION **02**
-CPDLCADDRESS **8183657500A49CD700010000474731330AAAA**

c) LOF example aircraft ATS B2 only

-TITLE **LOF**
-REFDATA
-SENDER -FAC **LWSS**
-RECVR -FAC **LBSR**
-SEQNUM **047**
-ARCID **WZZ178**
-ADEP **LIRF**
-ADES **LTBA**
-AF **ATN**
-ARCADDR **ABC123**
-ATNLOGON
-CMLTSP **8183657500A49CD700010000474731330 1111**
-ADSQVLTSP
-AGAPPQUALIFIER **0**
-AGAPPVERSION **01**
-ADSADDRESS **8183657500A49CD700010000474731330 1111**
-CPCQVLTSP
-AGAPPQUALIFIER **22**
-AGAPPVERSION **02**
-CPDLCADDRESS **8183657500A49CD700010000474731330AAAA**
-ATIQV
-AGAPPQUALIFIER **3**
-AGAPPVERSION **00**

4.8. Operational scenario of flight transfer data exchanges in the context of CPDLC exchanges

4.8.1 Scenario

The ground-ground coordination (OLDI) is not coupled with the air-ground message exchanges. It is however recommended to follow a well-defined sequence (agreed by adjacent ATS units), between the ground-ground (ATC system) messages and the air-ground (data link) messages.

For this scenario, flight ETD44A is an A380 on route from KJFK to OMAA that will be transferred by Lima ACC to Mike UAC. Both centres perform CPDLC operations and use the LOF and NAN messages as well as the COF and MAS messages. ETD44A is connected to the ground data link system of Lima ACC.

40 minutes prior to the COP, Lima ACC ATC system sends an ABI message to Mike UAC ATC system. The Mike ATC system acknowledges its receipt by sending back a LAM message.

The next message to be sent is the LOF message. Depending on the local implementation and the needs of the downstream ATS unit, it is sent at any time between the moment when the ABI message reception is acknowledged by a LAM message and a few minutes/seconds before sending an ACT message. The LOF message sent by Lima ACC ATC system to Mike UAC ATC system is also acknowledged by a LAM message.

Note: In case the LOF message is not acknowledged by a LAM message, the transferring ATS unit sends a CPDLC Next Data Authority (NDA) message and a CM CONTACT message to the aircraft to trigger an automatic CM LOGON from the aircraft to the Receiving ATS Unit (R-ATSU). Even if the CPDLC uplink message fails, the CM CONTACT must still be sent, in accordance with Regulation (EC) No. 373/2017 (Part-ATS, Subpart D) as amended by Regulation (EC) No. 1771/2023. When the Transferring ATS Unit is not the Current Data Authority (CDA) and the LOF message is not acknowledged, the sending of the NDA message to the aircraft may be delayed until the Transferring ATS Unit becomes the CDA.

Three minutes later, coordination is effected through the transmission of an ACT message, which is successfully acknowledged by the receipt of a LAM message.

- The Lima ACC ground data link system sends a Next Data Authority (NDA – UM160) request to flight ETD44A (aircraft). This request is acknowledged by a LACK message. Another implementation modality allows the NDA request to be sent to the aircraft at the same time as the LOF message is transmitted to the downstream ATS, rather than after the ACT message as shown in this scenario.

  Note: There are no specific requirements in case the LACK message is not received. Mike UAC does not send a NAN in that case.

- Subsequently, the Lima ACC ATC system sends a NAN message to inform Mike UAC that it has become the Next Data Authority for the flight. Depending on local implementation and the needs of the downstream ATS unit, the NAN message is sent at any time between the moment when the LACK is received in response to the NDA (UM160) request and a few seconds or minutes after the ACT message transmission. The NAN from Lima ACC is acknowledged by a LAM from the Mike UAC ATC system. Another implementation modality allows the NAN transmission to be completely independent of the ACT message (that is, sent immediately once the LACK acknowledging the NDA request is received from the aircraft).

The Mike UAC ground data link system initiates a “CPDLC start request” with flight ETD44A (aircraft), which is replied to by a “CPDLC start confirm” received from the aircraft.

At this stage (11 minutes before the COP / Transfer of Control Point), coordination between units is active.

According to the LoA provisions, any change to the agreed transfer conditions less than five minutes before transfer requires an explicit approval request. This marks the beginning of the transfer phase within the ATC systems.

Note: Given the potential variety of TIM and ROF message exchanges, this scenario does not include them, as they have no direct impact on the CPDLC message exchange.

- A few minutes before the aircraft reaches the Transfer of Communication Point, the Lima ACC ATCO instructs flight ETD44A via data link to contact Mike UAC and makes a “transfer” input in the ATC system. Internally, the Lima ACC ground data link system sends both a “CPDLC end request” and a “Contact instruction” to flight ETD44A (aircrew/aircraft). The aircraft replies with a LACK back to Lima ACC ground data link system and the aircrew sends a WILCO to the Lima ACC ground data link system. This also triggers the “CPDLC end – response” to the Lima ACC ground data link system. Another implementation modality allows the transfer to be performed simultaneously to the aircraft and to the downstream unit– for a CPDLC connected aircraft, when the ATCO selects ‘Transfer’, the system sends TIM and COF messages to the downstream ATS unit while issuing a VCI (Voice Change Instruction) to the aircraft.
- The Lima ACC ATC system sends at the same time a COF message to Mike UAC ATC system, which acknowledges it with a LAM message.

  Note: Waiting for the WILCO from the aircrew before sending the COF to the accepting ATS unit may reduce the likelihood that a COF message be received by the accepting ATS unit while the aircraft fails to call on the assigned frequency (for instance, due to incorrect processing of the “Contact instruction”). Another implementation modality allows the WILCO and COF be independent when the flight is not assumed until voice contact has been established with the ground unit.

The Flight ETD44A (aircraft) sends a Current Data Authority (CDA – DM99) message to the Mike UAC ground data link system, which acknowledges it with a LACK. The “Current ATC Unit” message is generated by the Mike UAC ground data link system and sent to the aircrew when the aircraft is assumed by the ATCO in the ATC system.

The aircrew contacts the Mike UAC ATCO, who assumes the flight in the ATC system. A MAS message is then sent by the Mike UAC ATC system to the Lima ACC ATC system, which acknowledges with a LAM.

Note: The use of the MAS message does not modify the application rules of the “Current ATC Unit” message.

All message exchanges and coordination functions described above are governed by Commission Implementing Regulation (EU) 2027/373 (Part-ATS, Subpart D), as amended by Commission Implementing Regulation (EU) 2023/1771.

4.9. Transfer Phase data exchanges

This section describes an operational scenario highlighting the exchange of transfer OLDI messages.
Flight BAW16 is a B77W from WSSS to EGLL that will be transferred by Kilo UAC to Mike UAC via the agreed COP GARLU. Both units have implemented FRA, but the COPs are still used as reference points for ATCO situational awareness and for OLDI messaging. Co-ordination has been successfully performed.

3 minutes before transfer, the Kilo UAC system automatically sends a TIM message to the Mike UAC system, signifying the end of the coordination phase and the start of the transfer phase. The TIM is replied to by a LAM message from the Mike UAC system.

On top of FRA, Mike UAC uses a Variable Division Flight Level at the interface with Kilo UAC. To support this, an FDM message is sent by the Mike UAC system (as accepting unit) to the Kilo UAC system (as transferring unit), for every incoming traffic, with the frequency and sector ID to which the flight has to be transferred. The FDM message is transmitted automatically as a reply to TIM. It is replied to by a LAM message from the Kilo UAC system. The frequency and Sector ID are displayed on the HMI of the Kilo UAC ATCO. An FDM message can be sent by the Mike UAC system until a COF message has been received from the Kilo UAC system.

Shortly prior the Transfer of Control point, the Kilo UAC ATCO puts the aircraft on a heading to ensure separation. He/she wants to refer this to the Mike UAC ATCO and transfer the aircraft (in case there is no operational need to refer this to the Mike UAC ATCO, an SDM message can be used). A TIP message is triggered by the Kilo UAC ATCO with the assigned heading, replied by a SBY message from Mike UAC system. The Mike UAC ATCO accepts the tactical instructions from Kilo UAC ATCO and makes the corresponding input on the HMI. This automatically results in the transmission of an ACP message.

Shortly after, the Mike UAC ATCO triggers the transmission of a ROF message to request an early transfer of the flight The Kilo UAC ATCO transfers by voice BAW16 to Mike UAC, but performs a “cancel-assume” input by accident for BAW106 instead which is 10 NM behind BAW16 on course to the same COP and destination aerodrome (and for which a TIM message has also been sent). Doing so, a COF message is sent by the Kilo UAC system to the Mike UAC system for BAW106.

On the Mike UAC HMI, the ATCO sees that BAW16 is still under control of Kilo UAC, but the aircraft is already on his/her frequency. Conversely, he/she sees that the BAW106 should be on the frequency, but it is actually not.

The LoA procedures mention that this kind of situation has to be resolved by verbal coordination, since several cases can lead to a “wrong” transfer, e.g. mistake from the transferring controller or callsign confusion. Once the situation is clarified and the transfer completed in the system (“cancel-assume” of the right aircraft), the Mike UAC ATCO assumes BAW16 and BAW106 and a MAS message is sent for both flights by Mike UAC system to Kilo UAC system, that is replied to by two respective LAM messages from Kilo UAC system.

A different possible issue could be that BAW16 is correctly transferred and “cancel-assumed” by the Kilo UAC ATCO (meaning that a COF message is sent), but the Mike UAC ATCO “assumes” by accident BAW106 which is 10 NM behind. Doing so, and since COF and MAS messages can be operated independently, the Mike UAC system sends a MAS message to the Kilo UAC system for BAW106. The Kilo UAC ATCO sees on his/her HMI that the Mike UAC ATCO has assumed the flight. Here as well, the LoA procedures mention that this kind of situation has to be resolved by verbal coordination.

In the above example, the TIM message is used to signal the transfer phase and trigger a FDM message with the frequency and sector ID from the accepting ATS unit, Mike UAC. However, an equivalent capability can be achieved without having implemented the TIM message. In such a case, a system parameter (bilaterally agreed in the LoA) can be used to signal the end of the coordination phase and start of the transfer phase. The FDM message can then be bilaterally agreed to be automatically provided to Kilo UAC a certain time before the boundary. Alternatively, if an early transfer of communications is requested, the ROF message may also contain the frequency and sector ID of the accepting ATS unit.

It must be noted that from the OLDI Specification Edition 6.0, the SFP message can be used to provide the frequency and neighbouring sectors, normally sent when there is a change in the sector opening scheme, instead of the FDM message. This is a non-flight-centric message, thus, not linked to the phase of a flight, but it also achieves the provision of the frequency and sector ID, which are key data items in the transfer phase. For more information, read Exchange of Sectorisation and Frequency plan (SFP message).

4.10. Change of downstream ATSU with CPDLC transfer

When a flight is re-routed and the downstream ATS unit changes after the original downstream ATS Unit has already received the aircraft's ATN Logon parameters through a LOF message, the following message sequence ensures that the new downstream ATS unit will be able to successfully establish a CPDLC connection with the flight:

A configurable parameter time (to allow time for message correction in the new receiving ATSU) after the new ATSU has been notified of the flight (through either ABI or ACT), a LOF message is sent to the new ATSU. A MAC is sent to the old ATSU to indicate that no further data link communication management processing should be performed for this flight within the old ATSU.

After a CPDLC NDA message has been successfully sent to the aircraft identifying the new receiving ATSU, a NAN is sent to the new receiving ATSU. NDA-timing is up to local implementation.

In case the old receiving ATSU has already established a CPDLC connection with the aircraft, the new NDA received by the aircraft will lead to a CPDLC user-abort of this connection. After that, the aircraft is ready to accept a CPDLC connection from the new downstream ATSU.

After the new receiving ATSU receives the NAN message, it starts a CPDLC connection with the aircraft.

4.11. FDM message

The OLDI Specification edition 6.0 introduces the FDM message as a dedicated message to exchange the radio telephony frequency and sector identifier of the sector in the receiving ATS unit that will take control of the flight. The message can only be sent by the accepting ATS unit. This purpose was fulfilled in previous OLDI Specification editions by the SDM message, which had two main purposes depending on the sending ATS unit. The creation of the FDM message should simplify the implementation of OLDI by ensuring the unique purpose of each message.

The FDM message might be exchanged during the coordination and transfer phases, although its data lies at the core of the transfer phase. The exchange is always automated (no ATCO input) and there are three possible options that result in the provision of an FDM:

- At a bilaterally agreed time/distance before the boundary. The information on the boundary data is known by the receiving ATS system thanks to the previous exchange of coordination data.
- As a response to a TIM message. In this case, the FDM message will refer to the received TIM message.
- After a modification of the frequency or sector identifier of the sector that will take control of the flight, if an FDM for the flight was already sent before and the flight has not been assumed by the receiving ATS unit.

The content of the FDM message needs to be made available to the ATCO in the HMI at the appropriate time to support the voice change instruction to the specified frequency. The flight DLH765 is planned to be transferred to ATSU B. Predefined time before the boundary (in this case 7 minutes before the boundary crossing time), the transferring unit (ATSU A) automatically initiated TIM message to get the frequency and sector identifier of accepting ATSU (ATSU B).

ATSU B receives the TIM message, acknowledges it and sends out FDM message. After the reception of FDM message from ATSU B (indicated in the track label line 0), the received frequency and sector identifier of accepting ATSU are presented in the track label.

5 minutes before boundary exit time, ATSU B conducts re-sectorization (change of division flight level) which impacts the sector that is supposed to receive flight DLH765. ATSU B provides new frequency and sector plan via unsolicited FDM message.

In case that TIM message is not acknowledged or the FDM message is not provided within the specified time limits, the specific warning needs to be presented in the track label of ATSU A as an example shown below:

TIM not LAMed.

FDM not provided.

5 OLDI Relationship with Other Methods for Flight Data Exchanges

5.1. IFPS data exchanges impacting OLDI

5.1.1 Background

To improve traffic predictability and ensure the distribution of accurate flight plan information, a mechanism for provision of ATC flight plan updates and their distribution via IFPS to all concerned ATS units was developed. This mechanism is in place since 2001 and consists of the following elements:

- ATC Flight plan Proposal message (AFP);
- ATC flight plan message (APL);
- ATC flight plan change message (ACH).

The primary aim of these data exchanges is to improve the traffic situation awareness at network and local level as well as the reduction of workload and disruption caused by last minute flight data updates.

These messages have been developed several years after the initial deployment of OLDI exchanges and their impact on local systems in correlation with the OLDI updates is still not fully elaborated in terms of content and timing.

Since the initial AFP/APL/ACH deployment target (2005), implementation has significantly improved. According to EUROCONTROL's pan-European monitoring, by 2024 around 70% of ECAC+ stakeholders had completed Collaborative Flight Planning (FCM03). While gaps remain, the provision of AFPs improves the overall network predictability.

5.1.2 AFP purpose

The AFP message is provided by ATC units to IFPS if certain parameters of flights have been changed or in cases of missing flight plan. After the reception of an AFP message, the IFPS creates or updates the flight plan information and distributes the updates to the downstream units via APL and ACH messages.

AFP – ATC Flight Proposal. This message can be used by ATC to:

- insert a missing plan;
- change a route/divert a flight;
- amend aircraft type;
- amend cruising level;
- amend flight rules, flight type or equipment.

Note: This message is an IAFP message in ADEXP format.

5.1.3 APL/ACH purpose

An APL message is sent by the IFPS whenever information is received from an ATC Unit via an AFP message, concerning a flight that does not exist in the IFPS; or does exist but as a result of the information received i.e. change of route, the flight plan details need to be sent to an ATS centre which did not receive the original FPL. This message is sent to all ATS units concerned by the flight situated downstream that did not receive a flight plan from IFPS before.

An ACH message is sent by the IFPS whenever information is received on an AFP message concerning a modification to a flight. The IFPS distributes an ACH message to all ATC centres concerned by the flight that have already received flight plan information and that are situated downstream of the estimate point received in the incoming AFP message but not to the ATS unit from which the message was originated.

Note: These messages are IAPL and IACH messages in ADEXP format.

5.1.3.1 Key assumptions

The elaboration of IFPS/OLDI data exchanges takes in account that:

- Automation systems generate and display flight plan, control and coordination data in a timely, accurate and easily recognisable manner and in accordance with human factors principles.
- The key factor in using these messages is the introduction of accurate data that links the FPL data in the ATC environment and on the flight deck.

5.1.3.2 AFP dissemination guidance

The generation of AFP messages is important and provides significant benefits. These guidelines recommend the following best practice for units intending to use AFP:

- The creation of an AFP message should be triggered automatically in the system where possible to minimise controller workload.
- Any downstream ATSU will need to ensure that they send AFP messages for any change of flight data for a flight that is operating with an ATC Flight Plan Proposal.
- These guidelines recommend that the ATC unit stops transmitting AFP messages from the moment that the OLDI ACT message has been sent.

5.1.4 IFPS/OLDI data exchanges

The paragraphs below intend to elaborate the cases of APL and ACH data interaction with OLDI messages and system flight plan in case of AFP provision for missing flight plan, diversion and change of route.

The ACH dissemination concerning the AFP triggers for change of aircraft type and equipment and flight rules/type are not elaborated in detail as some general rules might be applied.

The delay between the AFP reception and APL/ACH dissemination may be random due to the intervention of an operator, as there is no computational delay.

5.1.5 Scenario 1 - IFPS/OLDI data exchanges for missing flight plan

The airspace and flight elements used for the cases of this scenario illustrated by Figure 37 are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

- ATS A in red with three sectors SC1, SC2 and SC3
- ATS B in blue with four sectors SC1, SC2, SC3 and SC4
- ATS C in purple with four sectors SC1, SC2, SC3 and SC4

The airways are depicted in green and significant points in black.

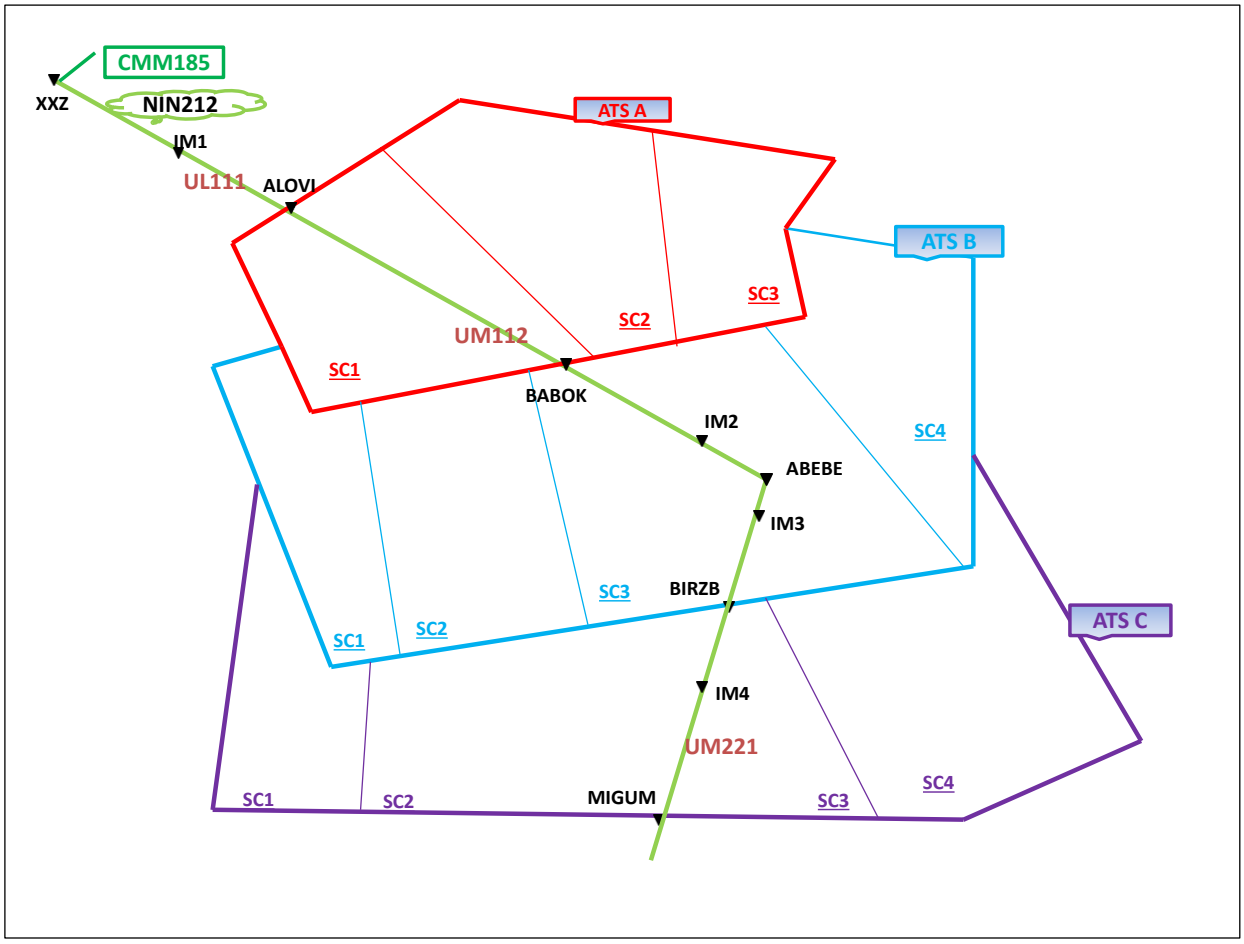


Figure 37 - Missing Flight Plan

5.1.5.1 Case1: Air Mali flight from Bamako to Lille

12:24 Flight CMM185 contacts ATS A, no system flight plan can be retrieved.

12:25 The ATCO on sector ATS A SC1 introduces a mini-flight plan for flight CMM185. ATS A tries to build the system flight plan based on the entry point and the departure/destination airport, but the correctness of this systems flight plan is very low, as ATS A has limited information about the downstream route structure.

12:25 ATS A sends an IAFP message to IFPS.

-TITLE **IAFP**
-ARCID **CMM185**
-ARCTYP **A330**
-ADEP **GABS**
-ESTDATA
    -PTID **ALOVI**
    -ETO **180129122400**
    -FL **F330**
-ADES **LFQQ**

IFPS tries to build the route of the flight using the “propose route” function and validation by the operator or the route is manually built from departure to destination.

An APL message is assembled by the IFPS after the route has been constructed by the IFPS staff to connect the last point given, in this case ALOVI, to the destination.

12:30 An APL message is sent to all downstream units including ATS B and ATS C.

(APL-CMM185-A330—GABS0911-ALOVI/1224F330 -N0430F330 ……..XTZ UG111 XXZ UL111 ALOVI UM112 ABEBE UM221…….–LFQQ1420 - DOF/180129 ORGN/ATCA SRC/AFP)

12:30 ATS B and ATS C receive the APL message for the flight CMM185 and build a system flight plan based on the APL message for flight CMM185.

12:33 ATS A sends an ABI message to ATS B with limited route information.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **015**
-ARCID **CMM185**
-SSRCODE **A1576**
-ADEP **GABS**
-COORDATA
    -PTID **BABOK**
    -TO **1253**
    -TFL **F330**
-ADES **LFQQ**
-ARCTYP **A330**
-ROUTE **ALOVI UM1112 BABOK UM112 IM2**

If the route information contained in the ABI message does not correlate against the route information of the FDPS SFPL created from the APL, these guidelines recommended that this message might be referred to the operator at the downstream/receiving ATSU. The ATC route can be corrected/updated to ensure the flight deck and ATC are aligned.

12:41 ATS A sends an ACT message to ATS B,

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **033**
-ARCID **CMM185**
-SSRCODE **A1576**
-ADEP **GABS**
-COORDATA
    -PTID **BABOK**
    -TO **1251**
    -TFL **F330**
-ADES **LFQQ**
-ARCTYP **A330**
-ROUTE **ALOVI UM112 BABOK UM112 IM2**

These guidelines recommend not acknowledging any ACT message for a flight where the data contained in the system flight plan has been created from an APL and the data in the ACT message cannot be completely correlated by the FDPS of the receiving ATSU.

If the route information contained in ACT does not correlate against the route information in the system flight plan created from an APL, it is recommended that this message is referred to the operator at the downstream/receiving ATSU. Alternatively, it may be considered that in this condition the LAM for the ACT is not sent. Although this increases the workload, it does ensure that all downstream data is corrected.

5.1.5.2 Case2: Niger airlines flight from Niamey to Beauvais

15:00 Flight NIN212 contacts ATS A, no system flight plan can be retrieved.

15:02 The ATCO on sector ATS A SC1 introduces a mini-flight plan for flight NIN212. ATS A tries to build the system flight plan based on the entry point and the departure/destination airport, but the correctness of this systems flight plan is very low, as ATS A has limited information about the downstream route structure.

15:02 ATS A sends an IAFP message to IFPS.

-TITLE **IAFP**
-ARCID **NIN212**
-ARCTYP **B757**
-ADEP **DRRN**
-ESTDATA
    -PTID **ALOVI**
    -ETO **180129150000**
    -FL **F370**
-ADES **LFOB**

The IFPS tries to build the route of the flight using the “propose route” function and validation by the operator or the route is manually built from departure to destination. However, ATS A sends the ABI message to ATS B before the IFPS can disseminate the APL message.

15:07 ATS A sends an ABI message to ATS B with limited route information as the further route is unknown.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **028**
-ARCID **NIN212**
-SSRCODE **A7321**
-ADEP **DRRN**
-COORDATA
    -PTID **BABOK**
    -TO **1527**
    -TFL **F370**
-ADES **LFOB**
-ARCTYP **B757**

-ROUTE **ALOVI UM112 BABOK**

15:07 ATS B builds a new system flight plan based on the ABI message for the flight NIN212. The system flight plan may contain very limited route information as the FDPS tries to build the route based on the entry point and the departure/destination airport.

An APL message is assembled by the IFPS after a route has been constructed to connect the last point given, in this case ALOVI, to the destination.

15:10 The IAPL message is sent to all downstream units including ATS B and ATS C.

-TITLE **IAPL**
-BEGIN ADDR
    -FAC **ATCB**
    -FAC **ATCC**
    -FAC **ATCD**
    -….
    -….
    -FAC **ATCM**
-END ADDR
-ADEP **DRRN**
-ADES **LFOB**
-ARCID **NIN212**
-ARCTYP **B757**
-EOBD **180129**
-EOBT **1122**
-IFPLID **AB49255011**
-ORGNID **ATCA**
-SSRCODE **A7321**
-SRC **AFP**
-TTLEET **0648**
-RFL **F370**
-SPEED **N0450**
-FLTRUL **I**
-FLTTYP **S**
-ROUTE **……XTZ UM111 XXZ UL111 ALOVI UP111 ABEBE UL123 ……**
-ESTDATA
    -PTID **ALOVI**
    -ETO **180129150000**
    -FL **F380**
-ATSRT ……
…..
…..
-ATSRT **UM111 AXTZ XXZ**
-ATSRT **UL111 XXZ XXY**
-ATSRT ……

15:11 ATS B and ATS C receive the APL message for the flight NIN212. ATS B updates the system flight plan with the APL message content (mostly route information) or builds a new system flight plan. In case of building new system flight plan, ATS B might have potentially two SFPLs, one from an APL and one from an ABI. It is recommended that in this case the affected flight is flagged to Flight Data Assistant for repair/resolution.

ATS C builds the system flight plan based on APL for the flight NIN212.

15:15 ATS A sends an ACT message to ATS B.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **086**
-ARCID **NIN212**
-SSRCODE **A7321**
-ADEP **DRRN**
-COORDATA
    -PTID **BABOK**
    -TO **1525**
    -TFL **F370**
-ADES **LFOB**
-ARCTYP **B757**
-ROUTE **ALOVI UM112 BABOK**

As with Case 1, the recommendation here is not to acknowledge any ACT message for a flight where the FDP SFPL has been created from an APL message and the data in the ACT message cannot be correlated with the data in the FDP system of the receiving ATSU.

5.1.6 Scenario 2 - IFPS/OLDI data exchanges for missing flight plan, different routings

The airspace and flight elements used for scenario 2 illustrated by Figure 38 are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

- ATS A in red with three sectors SC1, SC2 and SC3
- ATS B in blue with two sectors SC1 and SC2
- ATS C in purple with two sectors SC3 and SC4
- ATS D in orange with two sectors SC1 and SC2
- ATS E in grey with two sectors SC1 and SC2

The flight trajectories are depicted in green, and significant points in black.

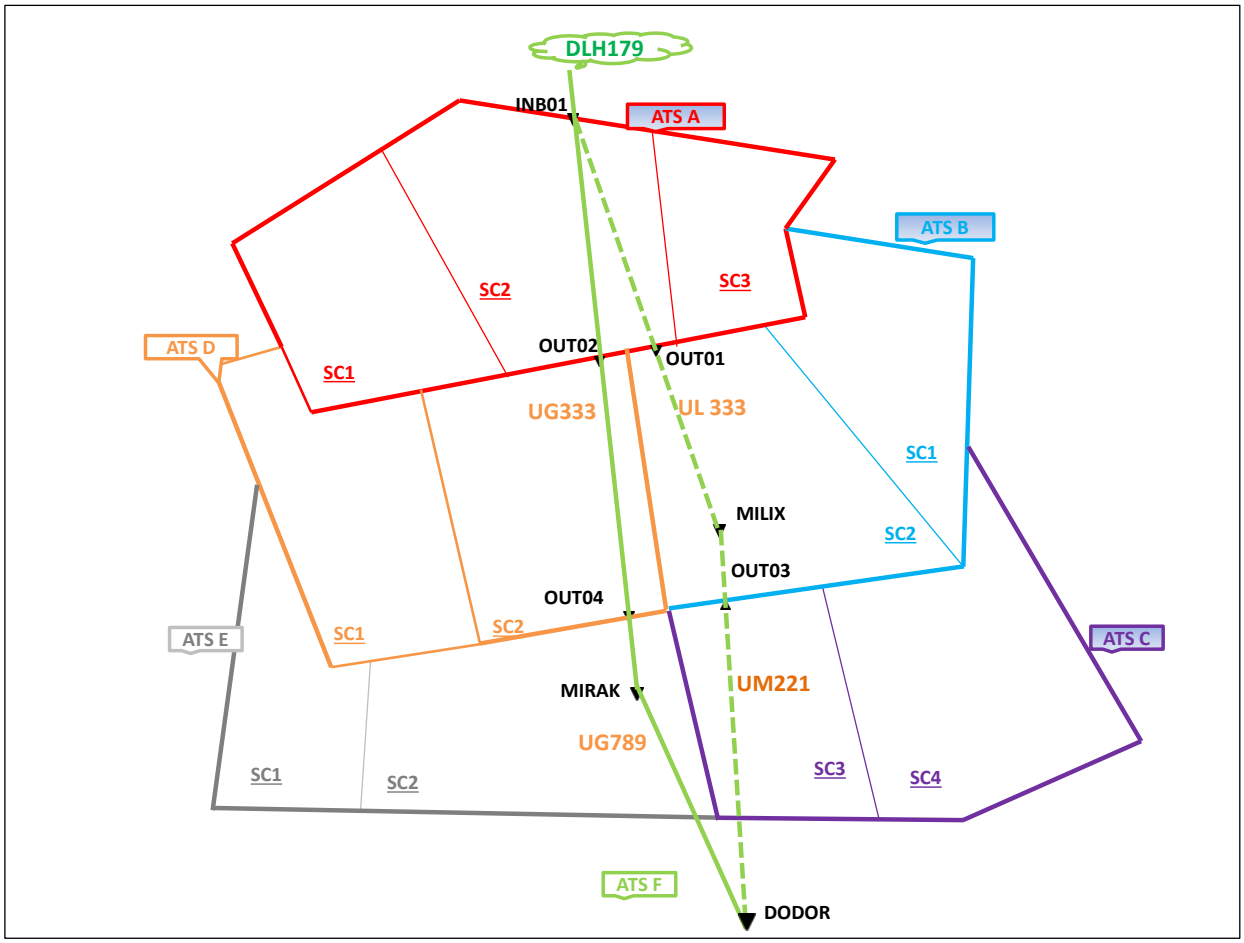


Figure 38 - Missing Flight Plan and Different Routings

5.1.6.1 Case1: Lufthansa flight from Mombasa to Frankfurt.

13:44 Flight DLH179 contacts ATS A, no system flight plan can be retrieved.

13:45 The ATCO on sector ATS A SC2 introduces a mini-flight plan for flight DLH179. ATS A tries to build the system flight plan based on the entry point and the departure/destination airport, but the correctness of this system flight plan is very low, as ATS A has limited information about the downstream route structure.

13:45 ATS A sends an IAFP message to IFPS (AFP#1).

-TITLE **IAFP**
-ARCID **DLH179**
-ARCTYP **A330**
-ADEP **HKMO**
-ESTDATA
    -PTID **INB01**
    -ETO **180129134400**
    -FL **F330**
-ADES **EDDF**

-ROUTE **N0420F350 INB01 UL333 OUT01**

13:45 IFPS tries to build the route of the flight using the “propose route” function and validation by the operator or the route is manually built from departure to destination. An APL message is assembled by the IFPS after the route has been constructed by the IFPS staff to connect the last point given, in this case INB01, to the destination.

13:47 The IAPL message is sent to all downstream units including ATS B and ATS C.

-TITLE **IAPL**
-BEGIN ADDR
    -FAC **ATCB**
    -FAC **ATCC**
    -FAC **ATCF**
    ……
    -FAC **ATCX**
-END ADDR
-ADEP **HKMO**
-ADES **EDDF**
-ARCID **DLH179**
-ARCTYP **A330**
-EOBD **180129**
-EOBT **0930**
-IFPLID **AB49277011**
-ORGNID **ATCA**
-SSRCODE **A6551**
-SRC **AFP**
-TTLEET **0648**
-RFL **F330**
-SPEED **N0430**
-FLTRUL **I**
-FLTTYP **S**
-ROUTE **…XX1 UM222 XX2 UG111 INB01 UL333 MILIX UM221 DODOR UP111…**
-ESTDATA
    -PTID **INB01**
    -ETO **180129134500**
    -FL **F330**

13:47 ATS B and ATS C receive the APL message for the flight DLH179 and build a system flight plan based on the APL message for the flight DLH179.

13:48 The ATCO on sector ATS A SC2 gives a clearance to flight DLH179 to proceed direct to OUT02, changing the exit ATS unit from ATS B to ATS D. ATS A has no knowledge about the route planned by IFPS and cleared the flight to exit at OUT02 (this coordination point belongs to ATS A /ATS D interface). The system trajectory is updated by ATCO’s manual input.

13:48 The DLH179 trajectory update triggers the transmission of an AFP message (AFP#2) from ATS A to IFPS for the route change as:

-TITLE **IAFP**
-ARCID **DLH179**
-ADEP **HKMO**
-ESTDATA
    -PTID **OUT02**
    -ETO **180127141000**
    -FL **F330**
-ROUTE **N0420F350 INB01 UG333 OUT02**

-ADES **EDDF**

13:50 The IFPS tries to update the route of the flight using the data contained in the AFP#2 message by connecting AFP data with the destination airport. Based on these inputs, the old route (UG111 INB01 UL333 MILIX UM221 DODOR UP111) that penetrates ATS A, ATS B and ATS C is updated and replaced by a new route. The IFPS then proposes a new route (UG111 INB01 UG333 OUT02 UG333 MIRAK UG789 DODOR UP111) that will penetrate ATS A, ATS D and ATS E. The updated route is validated by the operator. The route change will trigger the dissemination of APLs towards ATS D and ATS E, as they were not in the previous list of concerned ATS units. However, it should be noted that ATS B and ATS C will not be notified of the route change.

-TITLE **IAPL**
-BEGIN ADDR
    -FAC **ATCD**
    -FAC **ATCE**
    -FAC **ATCF**
    ……
    -FAC **ATCX**
-END ADDR
-ADEP **HKMO**
-ADES **EDDF**
-ARCID **DLH179**
-ARCTYP **A330**
-EOBD **180129**
-EOBT **0930**
-IFPLID **AB49277011**
-ORGNID **ATCA**
-SSRCODE **A6551**
-SRC AFP
-TTLEET **0648**
-RFL **F330**
-SPEED **N0430**
-FLTRUL **I**
-FLTTYP **S**
-ROUTE **…XX1 UM222 XX2 UG111 INB01 UG333 MIRAK UG789 DODOR UP111 …**
-ESTDATA
    -PTID **OUT02**
    -ETO **180129141300**
    -FL **F330**

13:51 ATS D and ATS E receive the APL message for the flight DLH179. ATS D and ATS E build a system flight plan based on the APL message for the flight DLH179.

13:53 ATS A sends an ABI message to ATS D.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSD**
    -SEQNUM **097**
-ARCID **DLH179**
-SSRCODE **A6651**
-ADEP **HKMO**

-COORDATA
    -PTID **OUT02**
    -TO **1413**
    -TFL **F330**
-ADES **EDDF**
-ARCTYP **A330**
-ROUTE **N0420F350 INB01 UG333 OUT02**

13:53 ATS D updates the system flight plan for the flight DLH179 using the data contained in the ABI message.

14:03 ATS A sends an ACT message to ATS D, route information depending on the LoA between ATS A and ATS D might be omitted.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSD**
    -SEQNUM **187**
-ARCID **DLH179**
-SSRCODE **A6651**
-ADEP **HKMO**
-COORDATA
    -PTID **OUT02**
    -TO **1414**
    -TFL **F330**
-ADES **EDDF**
-ARCTYP **A330**
-ROUTE **N0420F350 INB01 UG333 OUT02**

14:03 ATS D updates the system flight plan for the flight DLH179 using the data contained in the ACT message.

14:05 As ATC B has not received a notification or coordination message for flight DLH179:

- ATC B may call ATC A to identify what happened with this flight. ATS A notifies ATS B that the flight is exiting via OUT02 and ATS B is not the next downstream unit. ATS B manually terminates the flight DLH179.
- Or alternatively, as the flight DHL179 is in some kind of initial status usually not highlighted on HMI, it remains inactivate, the SFPL is silently archived after a pre-defined time parameter.

14:25 As ATC C has not received a notification or coordination message for flight DLH179:

- ATC C may call ATC B in order or identify what happened with this flight. ATS B notifies ATS C that the flight was re-routed by ATS A and it was not transferred to ATS B. Therefore, ATS C is not the next downstream unit. ATS C manually terminates the flight DLH179.
- Or alternatively, as the flight DHL179 is in some kind of initial status usually not highlighted on HMI, it remains inactivate, the SFPL is silently archived after a predefined time parameter.

5.1.7 Scenario 3 - IFPS/OLDI data exchanges for diversion

The airspace and flight elements used for scenario 3 illustrated by Figure 39 are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

- ATS A in red with three sectors SC1, SC2 and SC3
- ATS B in blue with three sectors SC1, SC2 and SC3
- ATS C in purple with two sectors SC3 and SC4
- ATS D in orange with one sector SC1
- ATS E in grey with two sectors SC1 and SC2

The airways are depicted in green and significant points in black.

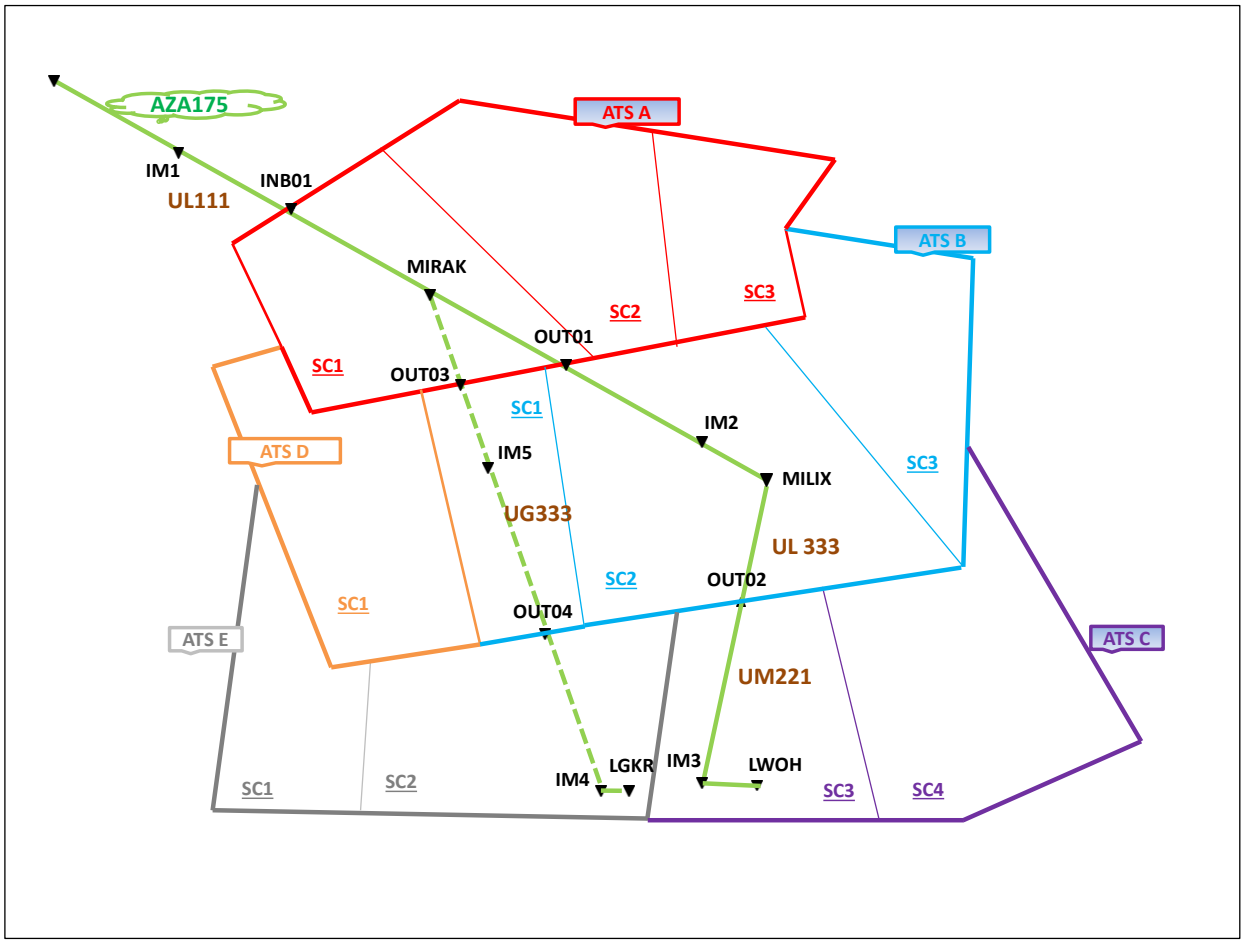


Figure 39 39 - IFPS/OLDI Messaging for Diversions

The flight AZA175 departed from LIPH at 12:30 and it is planned to land at LWOH.

IFPS distributed the original FPL (FPL-AZA175-IS –A320/M-SRWY/C –LIPH1230 -N0420F350 KOBAN UM999 BXX UL111 MILIX UL333 IM3 –LWOH0200 ZZZZ -DOF/180127 ALTN/LGKR) to ATS A, ATS B and ATS C.

13:15 Flight AZA175 is transferred to ATS A, the ATCO on sector ATS A SC1 assumes the flight.

13:19 ATS A sends an ABI Message to ATS B.

-TITLE **ABI**
-REFDATA

-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **035**
-ARCID **AZA175**
-SSRCODE **A5567**
-ADEP **LIPH**
-COORDATA
-PTID **OUT01**
-TO **1339**
-TFL **F350**
-ADES **LWOH**
-ARCTYP **A320**
-ROUTE **IM1 UL111 OUT01 UL111 IM2**

13:19 ATS B acknowledges the ABI by sending a LAM message to ATS A, and puts flight AZA175 into the notified state, the inbound COP is OUT01.

13:20 The pilot receives a notification from the Flight Operating Centre (FOC) that LWOH is closed due to fog and that flight AZA175 is diverted to land at the alternate aerodrome (LGKR) as specified in the submitted FPL.

13:21 ATS A SC1 re-routes the flight to exit ATS A via the point OUT03.

13:21 ATS A sends a revised ABI to ATS B.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **047**
-ARCID **AZA175**
-SSRCODE **A5567**
-ADEP **LIPH**
-COORDATA
-PTID **OUT03**
-TO **1337**
-TFL **F350**
-ADES **LGKR**
-ADESOLD **LWOH**
-ARCTYP **A320**
-ROUTE **IM1 UL111 MIRAK UG333 IM5**

13:21 ATS B acknowledges the ABI by sending a LAM message and keeps flight AZA175 in the notified state, the inbound COP is OUT03.

13:21 ATS A sends an AFP message to IFPS to inform of the diversion to a new aerodrome.

-TITLE **IAFP**
-ARCID **AZA175**
-ADEP **LIPH**
-ESTDATA
-PTID **MIRAK**
-ETO **180127132100**
-FL **F350**
-ROUTE **N0420F350 IM1 UL111 MIRAK UG333 IM5**

-ADES **LGKR**
-ADESOLD **LWOH**

The IFPS tries to build the route of the flight using the “propose route” function and validation by the operator or the route is manually built from departure to destination. However, ATS A sends the revised ABI to ATS B before IFPS disseminates the ACH message.

APL/ACH messages are assembled by the IFPS after a route has been constructed by the IFPS staff from the last reported point (MILAK) to the alternate airport.

13:23 An ACH message is sent to ATS B, the 2-minute delay between AFP reception and ACH transmission is due to the operator intervention.

-TITLE **IACH**
-BEGIN ADDR
    -FAC **ATCB**
-END ADDR
-ADEP **LIPH**
-ADES **LGKR**
-ADESOLD **LWOH**
-ARCID **AZA175**
-ARCTYP **A320**
-EOBD **180127**
-EOBT **1230**
-IFPLID **BX441510011**
-ORGNID **ATCA**
-WKTRC **M**
-SRC DIV **LWOH**
-SSRCODE **A5567**
-SRC **AFP**
-TTLEET **0200**
-RFL **F350**
-SPEED **N0420**
-FLTRUL **I**
-FLTTYP **S**
-ROUTE **N0420F350 KOBAN UM999 BXX UL111 MIRAK UG333 IM4**
-ESTDATA
    -PTID **MIRAK**
    -ETO **180127132100**
    -FL **F350**

13:23 An APL message is sent to ATS E, the 2-minute delay between AFP reception and APL transmission is due to the operator intervention.

-TITLE **IAPL**
-BEGIN **ADDR**
    -FAC **ATCE**
-END **ADDR**
-ADEP **LIPH**
-ADES **LWOH**
-ARCID **AZA175**
-ARCTYP **A320**
-EOBD **180127**
-EOBT **1230**

-IFPLID **BX441510011**
-ORGNID **ATCA**
-WKTRC **M**
-SRC DIV **LWOH**
-SSRCODE **A5567**
-SRC **AFP**
-TTLEET **0200**
-RFL **F350**
-SPEED **N0420**
-FLTRUL **I**
-FLTTYP **S**
-ROUTE **N0420F350 KOBAN UM999 BXX UL111 MIRAK UG333 IM4**
-ESTDATA
    -PTID **MIRAK**
    -ETO **180127132100**
    -FL **F350**

13:24 ATS B receives the ACH message from IFPS. As the flight AZA175 is already in the notified state and a revised ABI message for the diversion had been received, the ACH message is disregarded for the update of system flight plan.

13:24 ATS E receives and accepts the APL message for the flight AZA175. ATS E builds a system flight plan based on the APL message content for flight AZA175.

13:28 ATS A sends an ACT message to ATS B.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **117**
-ARCID **AZA175**
-SSRCODE **A5567**
-ADEP **LIPH**
-COORDATA
    -PTID **OUT03**
    -TO **1338**
    -TFL **F350**
-ADES **LGKR**
-ARCTYP **A320**
-ROUTE **IM1 UL111 MIRAK UG333 IM5**

5.1.8 Scenario 4 - IFPS/OLDI data exchanges for change of route

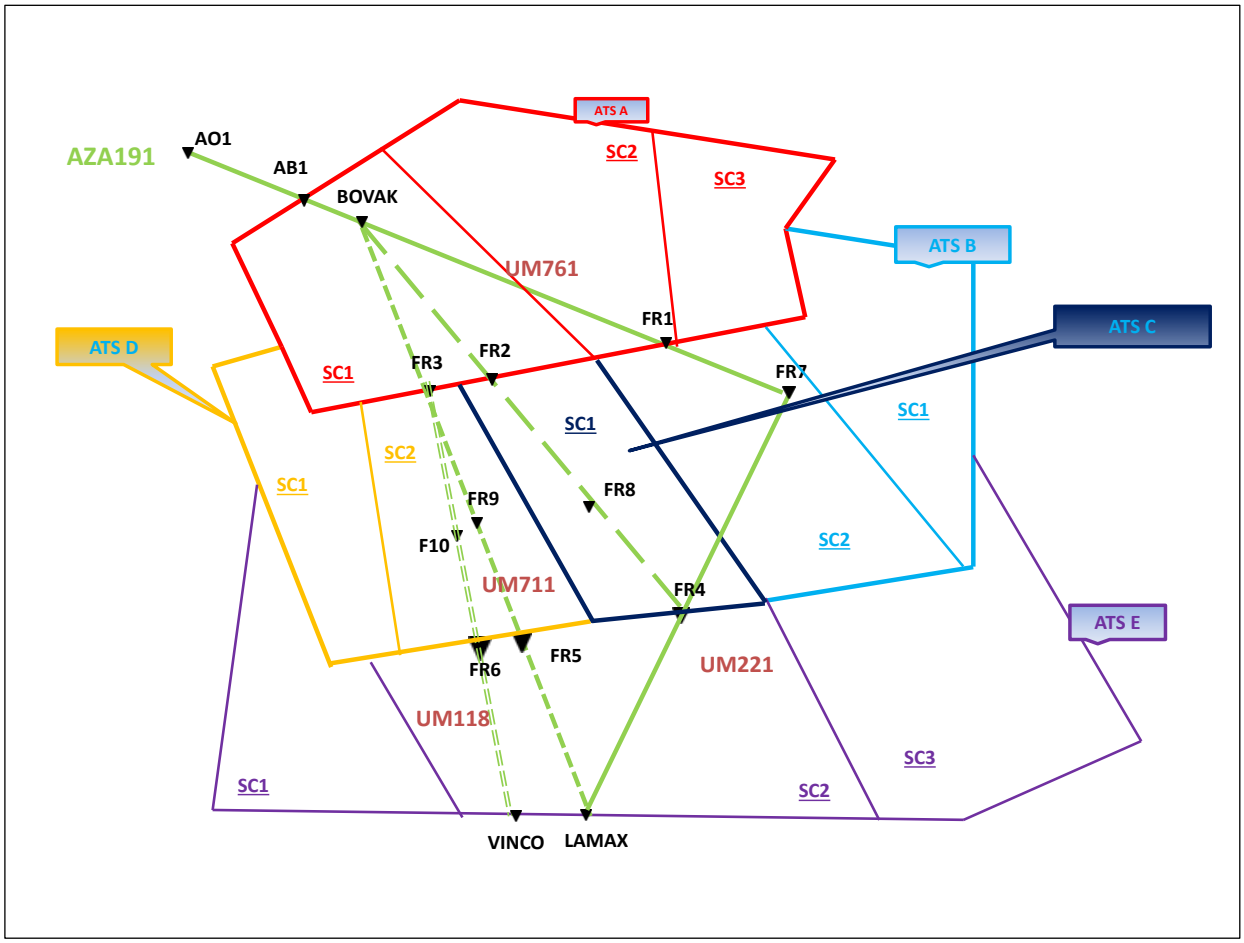


Figure 40 40 - IFPS/OLDI Messaging for Route Changes

The airspace and flight elements used for scenario 4 illustrated by Figure 40 are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

ATS A in red with three sectors SC1, SC2 and SC3;

ATS B in light blue with two sectors SC1 and SC2;

ATS C in dark blue with one sector SC1;

ATS D in beige with two sectors SC1 and SC2

ATS E in purple with three sectors SC1, SC2 andSC3;

The flight trajectories are depicted in green and significant points in black.

The flight AZA191 departed from LIRF at 11:00 and it is planned to land at LCPH.

IFPS distributed the original FPL (FPL-AZA191-IS –A330/H-SRWY/C –LIRF1100 -N0420F370 MIDOX UM888 BYY UM761 FR1 DCT FR7 DCT FR4 UM221 LAMAX UM377 KHIRO UM111 JATOR–LCPH0330 -DOF/180129) to ATS A, ATS B, ATC and ATS E.

This scenario describes the current ANSPs capability to provide an AFP message to IFPS in case there is a change of exit conditions before transferring a flight to the downstream ATS unit. It should be noted that according to the IFPS User's Manual, an AFP is to be sent only by the ATS unit that has assumed control of the flight until the ACT message to the following ATS unit has been sent, except when the AFP communicates a diversion. However, this example highlights the conditions that the ATS A FDPS has not been updated yet in line with in the updated IFPS requirements. Therefore, the provision of AFP after REV message is elaborated.

12:20 Flight AZA191 is transferred to ATS A; the ATCO on sector ATS A SC1 assumes the flight.

12:26 ABI from ATS A to ATS B

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **054**
-ARCID **AZA191**
-SSRCODE **A6645**
-ADEP **LIRF**
-COORDATA
    -PTID **FR1**
    -TO **1251**
    -TFL **F370**
-ADES **LCPH**
-ARCTYP **A330**
-ROUTE **AO1 UM761 FR1 DCT FR7**

12:27 The ATCO on sector ATS A SC1 performs a re-routing of flight AZA191 from the BOVAK point to FR8, the exit point changes to FR2.

12:27 ATS A sends a MAC message to ATS B

-TITLE **MAC**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **078**
-ARCID **AZA191**

-ADEP **LIRF**
-ADES **LCPH**
-MSGREF
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **054**
-CSTAT
    -STATID **INI**
    -STATREASON **ROUTE**

12:27 ATS A sends an ABI message to ATS C.

-TITLE **ABI**
-REFDATA

-SENDER -FAC **ATSA**
-RECVR -FAC **ATSC**
-SEQNUM **855**
-ARCID **AZA191**
-SSRCODE **A6645**
-ADEP **LIRF**
-COORDATA
-PTID **FR2**
-TO **1246**
-TFL **F370**
-ADES **LCPH**
-ARCTYP **A330**
-ROUTE **AO1 UM761 BOVAK DCT FR2 DCT FR8**

12:27 ATS A sends an AFP message to IFPS for the change of route (partner has been changed from ATS B to ATS C).

-TITLE **IAFP**
-ARCID **AZA191**
-ADEP **LIRF**
-ESTDATA
-PTID **BOVAK**
-ETO **180129122700**
-FL **F370**
-ROUTE **N0420F370 AO1 UM761 BOVAK DCT FR2 DCT FR8**
-ADES **LCPH**

12:29 The IFPS adapts the original route of the flight with the AFP message data. The ACH message is provided by IFPS to ATS C as the entry point is modified. The ACH message for ATS E is inhibited, as the entry point remains the same, only a small-time shift at ATS E entry point is expected. The ACH message is only triggered if the time difference is more than 10 minutes, which is not the case.

(ACH-AZA191/A6645-LIRF1230-LCPH-14/BOVAK/1227F370-15/N0420F370 BOVAK DCT FR2 DCT FR8 DCT FR4 UM221 LAMAX UM377 KHIRO UM111 JATOR -16/LCPH-18/DOF/180129 SRC/AFP ORGN/ ATSA)

12:29 ATS C receives the ACH message from the IFPS after the ABI message is sent by ATS A. The flight AZA175 is already in the notified state after receiving the revised ABI message so the ACH message is disregarded.

12:30 ATS A receives a phone call from ATS CSC1, requesting re-routing due to the overload of ATS C SC1. The ATCO staffing ATC A SC1 perform rerouting, the flight is planned to exit via ATS D.

12:32 ATS A sends a MAC message to ATS C

-TITLE **MAC**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSC**
-SEQNUM **875**
-ARCID **AZA191**

-ADEP **LIRF**
-ADES **LCPH**
-MSGREF
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSC**
    -SEQNUM **0855**
-CSTAT
    -STATID **INI**
    -STATREASON **ROUTE**

12:32 ATS A sends an ABI message to ATS D with new coordination point and transfer conditions are agreed (FR3, TFL 370 ETO 12:45)

TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSD**
    -SEQNUM **545**
-ARCID **AZA191**
-SSRCODE **A6645**
-ADEP **LIRF**
-COORDATA
    -PTID **FR3**
    -TO **1245**
    -TFL **F370**
-ADES **LCPH**
-ARCTYP **A330**
-ROUTE **AO1 UM761 BOVAK DCT FR2 DCT FR8**

12:33 The ATCO on sector ATS A SC1 performs rerouting from the BOVAK point, the exit point changes to FR3.

12:33 ATS A sends an AFP message to IFPS for change of route (accepting ATS unit changed).

-TITLE **IAFP**
-ARCID **AZA191**
-ADEP **LIRF**
-ESTDATA
    -PTID **BOVAK**
    -ETO **180129123300**
    -FL **F370**
-ROUTE **N0420F370 AO1 UM761 BOVAK DCT FR3 DCT FR9**
-ADES **LCPH**

The IFPS adapts the route of the flight AZA191 with the AFP message data.

12:33 The ACH message is provided by the IFPS to ATS D The ACH message is also provided to ATS E as the entry point is modified (FR5 instead of FR4).

(ACH-AZA191/A6645-LIRF1230-LCPH-14/BOVAK/1233F370-15/N0420F370 BOVAK DCT FR3 DCT FR9 DCT FR5 UM711 LAMAX UM377 KHIRO UM111 JATOR -16/LCPH-18/DOF/180129 SRC/AFP ORGN/ ATSA)

ATS E receives the ACH message but disregards it, as already received ABI from ATS A.

ATS C receives and accepts the ACH message for flight AZA191. ATS C updates the entry conditions and routing based on the ACH message content.

12:35 ATS A sends an ACT message to ATS E.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSD**
    -SEQNUM **654**
-ARCID **AZA191**
-SSRCODE **A6645**
-ADEP **LIRF**
-COORDATA
    -PTID **FR3**
    -TO **1245**
    -TFL **F370**
-ADES **LCPH**
-ARCTYP **A330**
-ROUTE **AO1 UM761 BOVAK DCT FR2 DCT FR8**

After sending ACT message, further route changes by ATS A will not trigger the dissemination of AFP.

12:36 ATS B sends an ABI message to ATS E.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **021**
-ARCID **AZA191**
-SSRCODE **A6645**
-ADEP **LIRF**
-COORDATA
    -PTID **FR5**
    -TO **1256**
    -TFL **F370**
-ADES **LCPH**
-ARCTYP **A330**
-ROUTE **FR3 DCT FR9 DCT FR5 UM711 LAMAX**

12:43 ATS A transfers the flight to ATS D.

12:44 The pilot of flight AZA191 requests a re-routing via data link message DM22 (REQUEST DIRECT TO VINCO).

12:44 From the current aircraft position, the ATCO on sector ATS D SC2 performs the re-routing, the exit point changes to FR6.

12:44 ATS B sends a revised ABI message to ATS E.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSE**

-SEQNUM **075**
-ARCID **AZA191**
-SSRCODE **A6645**
-ADEP **LIRF**
-COORDATA
-PTID **FR6**
-TO **1255**
-TFL **F370**
-ADES **LCPH**
-ARCTYP **A330**
-ROUTE **FR3 DCT FR10 DCT FR6 UM118 VINCO**

12:44 ATS B does not send an AFP message to IFPS for change of route, as the downstream ATS unit his not changed.

5.1.9 Scenario 5 - IFPS/OLDI data exchanges for re-routings involving different ATS units involved

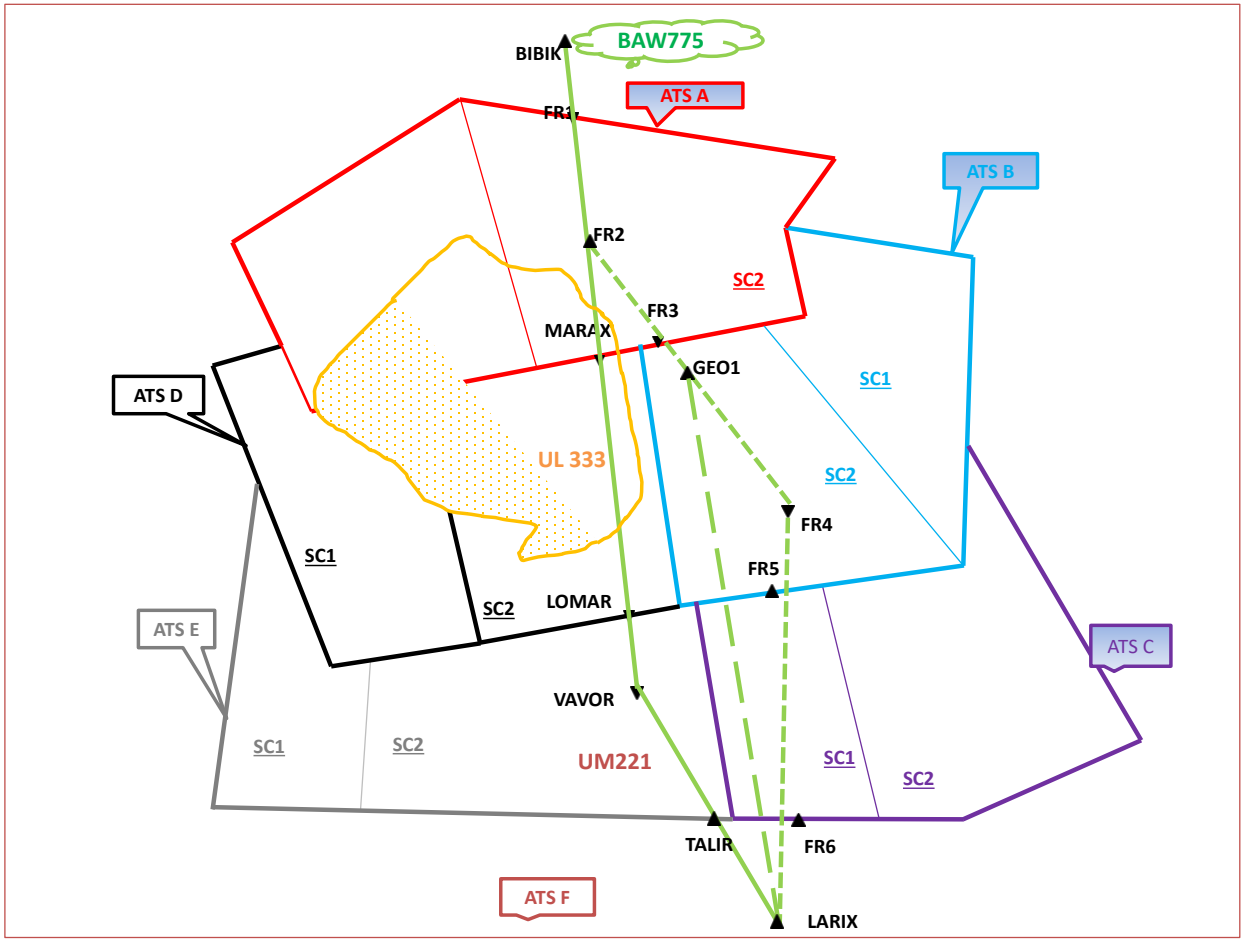


Figure 41 41 - IFPS/OLDI Messaging for Re-routing

The airspace and flight elements used for scenario 5 illustrated by Figure 41 are fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

ATS A in red with two sectors SC1 and SC2

ATS B in blue with two sectors SC1 and SC2

ATS C in purple with two sectors SC1 and SC2

ATS D in black with two sectors SC1 and SC2

ATS E in grey with two sectors SC1 and SC2

ATS F as a contextual unit

The airways are depicted in green and significant points in black. ATS A, ATS D and ATS E have deployed FRA with intermediate points, while ATS B and ATS C maintain the fixed route network. The ATS units that have deployed FRA retain the relevant static airspace data of the neighbouring ATS units.

The flight BAW775 departed from London Heathrow (EGLL) at 05:30 and it is planned to land at Dubai Airport (OMDB).

IFPS distributed the original FPL (FPL-BAW775-IS –B737/M-SRWY/C –EGLL0530 -N0440F370 KOBAN UM999 BXX UL111 BIBIK FR1 DCT FR2 DCT MARAX UL333 VAVOR UM221 LARIX UG669 MILIX UL933 IM3 –OMDB0600 ZZZZ -DOF/180127 ALTN/OMDW) to ATC A, ATS D and ATS E.

Severe weather has developed before the BAW775 departure within the airspace of ATS A and ATS B, the weather contours are indicated in orange.

07:20 Flight BAW775 is transferred to ATS A, the ATCO on sector ATS A SC2 assumes the flight.

07:22 ATS A sends an ABI message to ATS D.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSD**
    -SEQNUM **077**
-ARCID **BAW775**
-SSRCODE **A0556**
-ADEP **EGLL**
-COORDATA
    -PTID **MARAX**
    -TO **0742**
    -TFL **F370**
-ADES **OMDB**
-ARCTYP **B737**
-ROUTE **BIBIK DCT FR1 DCT FR2 DCT MARAX UL333 LOMAR**

07:29 As severe weather conditions develop in south-east part of ATS A, the pilot requests weather avoidance re-routing.

07:30 ATS A clears the flight BAW775 from the FRA intermediate point (FR2) direct to FR4. By clearing the flight directly to FR4, the downstream unit and exit points change. The flight is re-routed to ATS B and the exit point is a dynamic COP, with a reference to FR3.

07:30 ATS A sends a MAC message to the previous downstream unit (ATS D).

-TITLE **MAC**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSD**
    -SEQNUM **098**
-ARCID **BAW775**

-ADEP **EGLL**
-ADES **OMDB**
-MSGREF
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSD**
    -SEQNUM **077**
-CSTAT
    -STATID **INI**

-STATREASON **ROUTE**

07:30 ATS A sends an ABI message to ATS B, the new downstream unit.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **448**
-ARCID **BAW775**
-SSRCODE **A0556**
-ADEP **EGLL**
-COORDATA
-PTID **FR3**
-TO **0744**
-TFL **F370**
-ADES **OMDB**
-ARCTYP **B737**
-ROUTE **BIBIK DCT FR1 DCT FR2 DCT FR4**

07:30 ATS A sends an AFP message to IFPS for change of route (AFP#1) with different partner.

-TITLE **IAFP**
-ARCID **BAW775**
-ADEP **EGLL**
-ESTDATA
-PTID **FR2**
-ETO **180129073200**
-FL **F370**
-ROUTE **N0440F370 BIBIK DCT FR1 DCT FR2 DCT FR4**
-ADES **OMDB**

07:30 ATS D receives the MAC message from ATS A and terminates the coordination for flight BAW775.

07:30 ATS B receives the ABI message from ATS A for the flight BAW775 and builds a new system flight plan based on the ABI message content. The system flight plan contains very limited route information as the FDPS tries to build the route based on the entry point and the departure/destination airport.

07:31 IFPS receives message AFP#1. IFPS tries to update the route of the flight using the data contained in AFP#1 by joining the AFP#1 route data with that of the previous route. The old route (KOBAN UM999 BXX UL111 BIBIK FR1 DCT FR2 DCT MARAX UL333 VAVOR UM221 LARIX UG669 MILIX UL933 IM3) that penetrates ATS A, ATS D and ATS E is updated. IFPS proposes a new route that will re-join the old one at the LARIX point and that will penetrate ATS A, ATS B and ATS C (KOBAN UM999 BXX UL111 BIBIK FR1 DCT FR2 DCT FR4 DCT LARIX UG669 MILIX UL933 IM3). The route change will trigger the dissemination of APL messages to ATS B and ATS C, as they were not in the previous list of concerned ATS units. The route change will trigger the dissemination of an ACH message to ATS F that needs to be used for updating the system flight plan with the additional flight plan data. However, it should be noted that ATS D and ATS E will not be notified of the route change.

07:31 An APL message is sent to the downstream units including ATS B and ATS C.

-TITLE **IAPL**
-BEGIN ADDR
	-FAC **ATCB**
	-FAC **ATCC**
-END ADDR
-ADEP **EGLL**
-ADES **OMDB**
-ARCID **BAW775**
-ARCTYP **B737**
-EOBD **180129**
-EOBT **0530**
-IFPLID **AT49277011**
-ORGNID **ATCA**
-SSRCODE **A0556**
-SRC **AFP**
-TTLEET **0648**
-RFL **F370**
-SPEED **N0440**
-FLTRUL **I**
-FLTTYP **S**
-ROUTE **KOBAN UM999 BXX UL111 BIBIK FR1 DCT FR2 DCT FR4 DCT LARIX UG669 MILIX UL933 IM3**
-ESTDATA
	-PTID **FR3**
	-ETO **1801290074400**
	-FL **F370**

07:31 An ACH message is sent to the downstream unit ATS F, due to the change of entry point.

-TITLE **IACH**
-BEGIN ADDR
	-FAC **ATCF**
-END ADDR
-ADEP **EGLL**
-ADES **OMDB**
-ARCID **BAW775**
-ARCTYP **B737**
-EOBD **180129**
-EOBT **0530**
-IFPLID **AT49277011**
-ORGNID **ATCA**
-SSRCODE **A0556**
-SRC **AFP**
-TTLEET **0648**
-RFL **F370**
-SPEED **N0440**
-FLTRUL **I**
-FLTTYP **S**
-ROUTE **KOBAN UM999 BXX UL111 BIBIK FR1 DCT FR2 DCT FR4 DCT LARIX UG669 MILIX UL933 IM3**
-ESTDATA
	-PTID **FR3**
	-ETO **1801290074400**

-FL **F370**

07:31 ATS B receives the APL message for the flight BAW775. As ATS B created the system flight plan from the received ABI message data with very limited information, the APL may be used to update the system flight plan with additional flight plan data, despite the fact the system flight plan is in the notified state.

07:31 ATS C receives the APL message for the flight BAW775 and builds the system flight plan based on the APL message content.

07:31 ATS F receives the ACH message for the flight BAW775 and updates the system flight plan with additional flight plan data.

07:34 ATS A sends an ACT message to ATS B.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **499**
-ARCID **BAW775**
-SSRCODE **A0556**
-ADEP **EGLL**
-COORDATA
    -PTID **FR3**
    -TO **0744**
    -TFL **F370**
-ADES **OMDB**
-ARCTYP **B737**
-ROUTE **BIBIK DCT FR1 DCT FR2 DCT FR4**

07:42 ATS B sends an ABI message to ATS C.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **021**
-ARCID **BAW775**
-SSRCODE **A0556**
-ADEP **EGLL**
-COORDATA
    -PTID **REF01**
    -TO **0802**
    -TFL **F370**
-ADES **OMDB**
-ARCTYP **B737**
-REF
    -REFID **REF01**
    -PTID **FR5**
    -BRNG **022**
    -DISTNC **005**
-ROUTE **FR2 DCT FR3 DCT FR4 DCT LARIX**

07:44 Flight BAW775 is transferred from ATS A to ATS B.

07:47 Close after the boundary (GEO1 point), ATS B SC2 clears BAW775 direct to LARIX.

07:47 ATS B sends a revised ABI message to ATS C.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **045**
-ARCID **BAW775**
-SSRCODE **A0556**
-ADEP **EGLL**
-COORDATA
    -PTID **REF02**
    -TO **0759**
    -TFL **F370**
-ADES **OMDB**
-ARCTYP **B737**
-REF
    -REFID **REF02**
    -PTID **FR5**
    -BRNG **195**
    -DISTNC **017**
-ROUTE **FR2 DCT FR3 DCT 4207N05301E DCT LARIX**

07:47 ATS B does not sends an AFP message to IFPS for change of route, as the coordination partner (ATS C) remains the same.

-TITLE **IAFP**
-ARCID **BAW775**
-ADEP **EGLL**
-ESTDATA
    -PTID **REF02**
    -ETO **180129075900**
    -FL **F370**
-REF
    -REFID **REF02**
    -PTID **FR5**
    -BRNG **195**
    -DISTNC **017**
-ROUTE **FR2 DCT FR3 DCT 4207N05301E DCT LARIX**
-ADES **OMDB**

07:49 ATS B sends an ACT message to ATS C and as bilaterally agreed without any route information.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **069**
-ARCID **BAW775**
-SSRCODE **A0556**

-ADEP **EGLL**
-COORDATA
-PTID **REF02**
-TO **0759**
-TFL **F370**
-ADES **OMDB**
-ARCTYP **A330**
-REF
-REFID **REF02**
-PTID **FR5**
-BRNG **195**
-DISTNC **017**

5.1.10 Conclusions

5.1.10.1 Use cases summary

These guidelines recommend that APL messages created because of missing flight plans or diversion should be accepted and processed by all downstream ATS units as they contain useful information, which was not previously available, even in the cases that the first downstream unit already received notification for the missing flight plan.

ACH messages should not be considered for updating of system flight plan by the first downstream ATS unit, as the notification messages from the upstream units contain the most recent flight plan information. These messages arrived in most of the cases before the IFPS messages due to the different procedures and communication mechanisms applied.

ACH messages should be accepted and processed by all downstream ATS units except the first one, as they are supposed to arrive before any OLDI message and thus improving the traffic predictability and awareness with the concerned ATS units.

5.1.10.2 Handling of ACH for other triggers

IFPS disseminated ACH messages because of a received AFP message for:

- change of aircraft type
- change of flight rules
- change of flight type
- change of aircraft equipment

should be ignored by the first downstream unit, as ABI/ACT messages most likely contain the same information. However, these ACH messages need to be processed by the subsequent downstream ATS units to obtain the AFP change info in due time.

6 OLDI Situational awareness messages

6.1. Runway Configuration Message (RCM)

6.1.1 Introduction

A working draft of EUROCONTROL Guidelines for On-Line Environment Data Interchange has been developed in 2007 and described three messages for the exchange of environmental data via OLDI.

- Runways in use and availability (RCM messages)
- Airspace available for direct Routing (GAM messages)
- Status of temporary restricted area (TSM messages)

These messages were never part of any approved OLDI Specification. Their use has been re-assessed

As these messages were conceived more than 10 years ago, they refer to the mechanism of peer-to-peer exchanges of static and dynamic aeronautical data. With the implementation of new airspace concepts like Direct Routing and Free Route Airspace as well as with the Airspace Management Tools that enables dynamic exchanges of airspace reservations and activations, the GAM and TSM messages exchanges are deemed as obsolete.

The exchange of runway in use and availability (RCM messages) information is planned to be part of Airport Operation Plan (AOP) and the integration of AOP with Network Operation Plan (NOP). These data exchanges and AOP/NOP integration are requirements stemming from the Common Project Implementing Rule [RD 6] ; ‘Runways in use’ information in the AOP, should be exchanged with NM, allowing NM systems improve traffic prediction in the planning phase, providing to the NOP portal for viewing purpose and exchanged with operational Stakeholders via NM B2B interfaces.

The OLDI group considers that the RCM message should be kept within OLDI Guidelines, since some ANSPs already implemented this message or plan to deploy it in the coming years. As the RCM message was deployed on a tactical basis, the operational objective of this message has been extended to provide the tactical updates of static aerodrome data to be applied immediately after its receipt.

Note - The below sections describe the RCM message and are purely informational.

6.1.2 Runway Configuration Message (RCM)

The Runway Configuration Message serves the following purposes:

- Notification of planned or current runway in use and availability, between adjacent TWR and ACC units, respectively between adjacent APP and ACC units where these are established as different ATC units;
- Notification of current runway configurations to interested neighbouring ATC Units and other interested parties.

6.1.3 Message contents

The RCM message contains the following items of data:

- Message Type;
- Message Number;
- Aerodrome Designator;
- Runways Identification and Availability;

- Start Time of Applicability. (Optional item);
- End time of applicability (Optional Item)

The following ADEXP primary fields could be used for exchange of RCM message data items as:

- Primary field "*title*" for message type;
- Primary field "*refdata*" for message number;
- Primary fields "*ades*" or "*ad*" for the aerodrome designator;
- Primary field "*rwylist*" contains the list of runaway data for exchanges;
- Subfield "*rwyinfo*" for configuration data of specific runway;
- Subfield "*rwyid*" as runway identifier;
- Subfield "*rwyavail*" or similar to indicate the opening/closure of runway for arrivals/departures;
- Primary fields "*starttime*"and "*endtime*" for start and time of applicability.

If the RCM message intends to provide the tactical updates of runway configuration, the start time/end time data items are not required. If the RCM message intends to provide the future planned runway configuration changes, the start time and/or end time of applicability data item might be useful. The 'Runways Identification and Availability' item contains the list of runway data used for the runway configuration exchange and includes information for all published runways irrespective of the availability. If bilaterally agreed the RCM message contains:

- ILS Category and Status.

6.1.4 Transmitting unit

An RCM message is sent to the receiving unit for every change in the Runways Identification and Availability data. The RCM message may be transmitted, as bilaterally agreed, sufficiently in advance to allow the receiving unit to process the runway configuration data. In case of tactical runway configuration updates, the RCM message can be automatically or manually triggered whenever the runway configurations are modified.

If the 'ILS Category and Status' item is used based on bilateral agreement, a new RCM message needs to be sent for every change in these items.

The manual update of the runway configuration data from a relevant working position results in the automatic generation and transmission of the RCM message.

On bilateral agreement, a received RCM message can be automatically forwarded to other unit(s).

6.1.5 Receiving unit

The ATS unit receiving an RCM message is to check the syntax and semantic of the received message.
If no syntax nor semantic error is present in the message, a LAM message should be returned.

6.1.6 Acknowledgement of RCM

The RCM is acknowledged by the generation and transmission of a LAM.

6.1.7 No acknowledgement cases

If no LAM is received within a specified parameter time, it is recommended that a warning is displayed at the appropriate working position.

If no LAM is received within a specified parameter time, the transmitting ATS unit may attempt to retransmit the RCM message.

6.1.8 Examples

6.1.8.1 Tactical RCM

-TITLE **RCM**
-REFDATA
-SENDER -FAC **LROP**
-RECVR -FAC **LBSR**
-SEQNUM **078**
-ADEP **LROP**
-BEGIN RWYLIST
    -RWYINFO –RWYID **08R** -RWYAVAIL **D** –ILSCAT **IIIB**
    -RWYINFO –RWYID **26L** -RWYAVAIL **D** –ILSCAT **II**
    -RWYINFO –RWYID **08L** -RWYAVAIL **C** –ILSCAT **IIIA**
    -RWYINFO –RWYID **26R** -RWYAVAIL **A** –ILSCAT **II**
-END RWYLIST

6.1.8.2 Planning RCM

-TITLE **RCM**
-REFDATA
    -SENDER -FAC **LROP**
    -RECVR –FAC **LBSR**
    -SEQNUM **527**
-ADEP **LROP**
-BEGIN RWYLIST
    -RWYINFO –RWYID **08R** -RWYAVAIL **B** –ILSCAT **IIIB**
    -RWYINFO –RWYID **08L** -RWYAVAIL **C** –ILSCAT **IIIA**
    -RWYINFO –RWYID **26L** -RWYAVAIL **C** –ILSCAT **II**
    -RWYINFO –RWYID **26R** -RWYAVAIL **A** –ILSCAT **II**
-END RWYLIST
-STARTTIME **072200**
-ENDTIME **072330**

6.1.9 Current implementations

As RCM message was never part of any OLDI specification but was included in the EUROCONTROL working draft guidance material for the exchange of aeronautical data, different stakeholders deployed the runway configuration exchanges that slightly differ from ADEXP specification. For example, ANS CR confirmed that the RCM message has been deployed as described in the EUROCONTROL working draft guidance document.

However, it has been reported that some deployments are not fully aligned with the ADEXP Specification regarding the runway availability information item. The examples below indicate the current deployments that differ from the ADEXP standard for the runway availability

information. The permissible values for RWYAVAIL are defined in ADEXP to be one character (A, B, C or D), while this particular implementation uses out of range values for the RWYAVAIL field. The discrepancies compared with ADEXP standard are indicated in blue.

-TITLE **RCM**
-AD **ESSA**
-REFDATA
    -SENDER -FAC **ESOS**
    -RECVR -FAC **ESMM**
    -SEQNUM **730**
-BEGIN RWYLIST
    -RWYINFO -RWYID **19L** -RWYAVAIL **DALLOCATION**
    -RWYINFO -RWYID **26** -RWYAVAIL **AALLOCATION**
    -RWYINFO -RWYID **01L** -RWYAVAIL **C**
    -RWYINFO -RWYID **01R** -RWYAVAIL **C**
    -RWYINFO -RWYID **19R** -RWYAVAIL **C**
    -RWYINFO -RWYID **08** -RWYAVAIL **C**
    -RWYINFO -RWYID **00** -RWYAVAIL **C**
-END RWYLIST
-STARTTIME **0911181946**

Note: Blue highlighted text does not conform to the ADEXP Specification.

-TITLE **RCM**
-AD **ESSB**
-REFDATA
    -SENDER -FAC **ESOS**
    -RECVR -FAC **ESMM**
    -SEQNUM **333**
-BEGIN RWYLIST
    -RWYINFO -RWYID **30** -RWYAVAIL **BALLOCATION**
    -RWYINFO -RWYID **12** -RWYAVAIL **C**
-END RWYLIST
-STARTTIME **0912180408**

-TITLE **RCM**
-AD **ESMS**
-REFDATA
    -SENDER -FAC **ESMM**
    -RECVR -FAC **EKDK**
    -SEQNUM **072**
-BEGIN RWYLIST
    -RWYINFO -RWYID **17** -RWYAVAIL **DALLOCATION**
    -RWYINFO -RWYID **35** -RWYAVAIL **AALLOCATION**
    -RWYINFO -RWYID **11** -RWYAVAIL **C**
    -RWYINFO -RWYID **29** -RWYAVAIL **C**
-END RWYLIST
-STARTTIME **0912180604**

Another implementation refers to a pseudo-RCM message (named RWYMSG) that includes all RCM fields in ADEXP format. The RWYMSG message exchange is foreseen between TWR and APP/ACC Units. The message is intended for tactical updates of runway configurations. When

there is a change in runway configuration, the RWYMSG message is transmitted from TWR Unit to APP/ACC Unit. The change applies to all flights after the receipt of the RWYMSG message.

6.2. OLDI data exchanges with TWR

This section addresses the LVNL approach of OLDI sharing with TWR units.

6.2.1 Detailed interface requirement

iCAS iFDP - TWR FDPS Application Messages

The following diagram details the main data flows that can be supported by the iFDP system and the TWR FDPS.

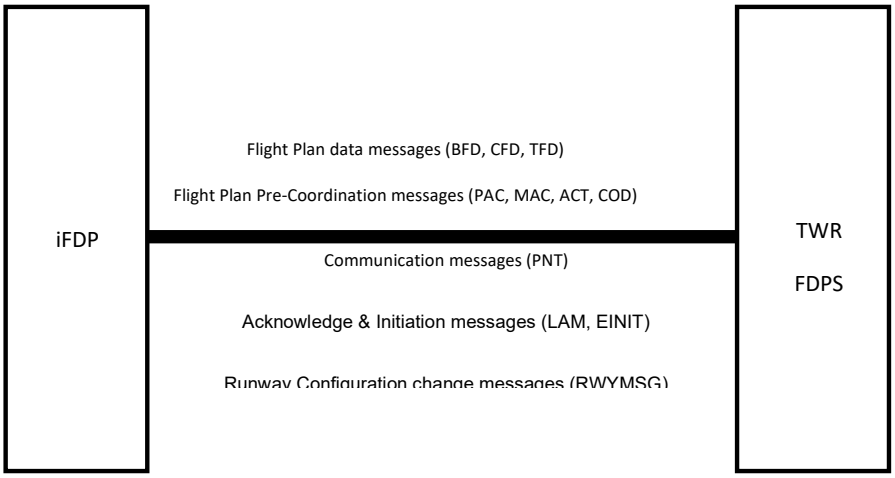


Figure 42 - iCAS iFDP-TWR FDPS Dataflow Diagram

6.2.2 Message Description

Flight Plan data messages (BFD, CFD, TFD) are used to create, cancel and update flight plans, between Tower Systems & iFDP (without coordination intentions).

Flight Plan Pre-coordination message exchange between Tower systems FDP and iFDP (PAC, MAC, ACT, COD), includes those messages Tower systems use to notify iFDP of departing flights from the aerodrome. The messages will also be used to notify iFDP about departure sequence changes.

Communication messages (PNT) are used to exchange flight plan related free text messages and highlight label display between specific controllers on both systems.

Acknowledge (LAM) and initiation messages (EINIT) are defined system messages to support the proper message processing. It shall be configurable that initiation of flight plan sending, ends with an EINIT message (as start for the TWR pre-departure planning processing).

Runway change handling messages (RWYMSG) will communicate the change in configuration of a given runway at an aerodrome and coordinate this change with iFDP for flight plan rerouting.

6.2.3 Flight Plan Pre-Coordination OLDI Messages

iFDP receives Pre-Coordination messages from the connected TWR FDPS, to exchange relevant flight plan data, at a pre-departure stage:

- The PAC is used to exchange departure planning information and as trigger for SSR code request. The PAC message can also be used to create a Pure VFR flight plan, when relevant flight plan is not available in iCAS.
- COD message returns the assigned SSR code.
- MAC messages are used to return flight plans to a previous (pre-) coordination stage, when a flight for instance returns to gate or departure has to be cancelled. Appendix A describes the different cases for the use of the MAC message with intended iFDP processing and relevant STATREASON distinctions as processing triggers.
- The ACT is finally sent by TWR FDPS when the departure flight was detected airborne (automatically or by manual controller input according to the used TWR FDPS).

6.2.4 Flight Plan Data Messages

iCAS continuously provides the connected TWR FDPS with relevant flight plan data:

- A Basic Flight Data (BFD) message shall be sent, as first flight plan initiation message, for each arrival- or departure flight to the configured aerodrome(s) on relevant TWR FDPS interface. This BFD message will be also sent to TWR FDPS interfaces that have been configured to receive any flight plan regardless the ADEP/ADES.
- The System Flight Plans (SFPLs) distributed by considering the ADEP/ADES will be sent by BFD message an adapted time parameter before EOBT for departure flights and/or adapted time parameter before ETA for arrival flights. For SFPLs that are distributed regardless the ADEP/ADES, a BFD message will be sent to the configured TWR FDPS interface(s) an adapted time parameter before the EOBT.
- Abbreviated Flight Plans (ASPLs) will be sent to the configured TWR FDPS interface(s) upon creation regardless any time parameter.
- A Change Flight Data (CFD) message shall be sent to the relevant TWR FDPS, for the configured data updates of the flight plans in TWR FDPS. The CFD includes mandatory and just optional data fields which have been changed.

iCAS receives a Change Flight Data (CFD) message from TWR FDPS if the tower has updated flight plan data items.

A TFD message is sent by iCAS when it needs to terminate a flight in the relevant TWR FDPS. Any BFD, CFD and TFD messages shall be acknowledged by a LAM message, when it was correctly processed on the interface.

Note:

A diversion of a flight triggers in iCAS a BFD, CFD or TFD as follows:

1. For ADEP and ADES dependent message exchange adaptation

a) Diversion to a new ADES:

- The BFD to the new destination tower (new ADES).
- A TFD to the previous destination tower (old ADES).

b) Diversion to the ADEP:

- A BFD to the new destination tower (new ADES = ADEP).
- A TFD to the previous destination tower (old ADES).

If iCAS is configured to send only one BFD message for departure and arrival at the same aerodrome, then a CFD message is sent instead of the BFD message to the arrival tower:

- A CFD to the new destination tower (new ADES = ADEP).
- A TFD to the previous destination tower (old ADES).

2. For ADEP and ADES independent (All flight plan) message exchange adaptation, where always only one BFD is sent.
   - A CFD to the tower is sent with an update of the ADES.

The BFD or CFD message is sent to the new destination TWR including the new destination in the field ADES and if available the old destination in the field ADESOLD.

The TFD message is sent to the old destination TWR including the new destination in field ADES and the old destination in field ADESOLD.

6.2.5 Runway Change Message

Information relating to runway use shall be communicated between iCAS iFDP and TWR FDPS using the RWYMSG message. Each Runway Configuration Message (RWYMSG) contains the changes in runway availabilities at the relevant aerodrome. This includes runways that are open for arrivals, open for departures or for both arrivals plus departures and runways that change to a closed status.

Each RWYMSG message may also contain information about the assignment of stacks to runways and about SID preferences.

At LVNL the RWYMSG message will be sent from TWR to iFDP when departure runways and SID preferences are changed. The RWYMSG message will be sent from iFDP to TWR, when arrival runways and stack assignment are changed (in AMAN).

At DFS the RWYMSG message is currently not planned to be used. If a RWYMSG message is sent from iFDP to TWR, it will be rejected by the TWR.

The RWYMSG message exchange is also part of the interface initialization and recovery mechanism. On a resynchronization, iCAS will send the complete configuration of RWYs (Open Arrival, Departure, Both and Closed). If a RWY or a set of RWYs configuration is changed at iCAS, it only sends those changes to the TWR.

6.2.6 Communication Messages [LVNL only]

The (OLDI) PNT messages is used to exchange (flight plan related) messages between controller functions at TWR and iCAS Controller Working Position, which can trigger HMI behaviour.

6.2.7 End of Initiation Messages

It is configurable, that the iFDP sends an EINIT message, after all the BFD messages were sent to TWR at interface (re)start. The EINIT can therefore be a trigger to start the pre-departure planning processing, which can result in PAC (ETOT, RWYDEP and SID) responses from TWR to iFDP. The TWR does not strictly need to wait until the upload of BFD messages

is finalized and an EINIT message is received to send messages to iCAS, but it is recommended.

6.2.8 Logical Acknowledge Messages

Both iCAS and FMTP connected TWR generate and transmit a Logical Acknowledgement message (LAM) if a message (excluding an acknowledgement) has been received and syntactic and semantic correctness of the message has been assured. If no LAM message is received within the time limit, after the complete transmission of a message (excluding a LAM), a warning shall be displayed

7 OLDI relationship with Core FDP functions

7.1. OLDI handling of re-entrant flights

7.1.1 Objective

The re-entrant flights are those ones that leave the ATS unit Area of Responsibility (AoR), fly in the adjacent airspace and re-enter in the same ATS units. The handling of re-entrant flights is usually considered as a core FDP function. The relationship of re-entrant flight handling with the OLDI data exchanges is elaborated in this paragraph. There are many real examples of re-entrant flight within the ECAC airspace due to the shapes of CTA/UTA borders. However, as the handling of re-entrant flight is not always supported by the ATM systems, these re-entrant route portions are handled by the route availability restrictions, which require Airspace Users to fly longer routes.

There are different solutions for handling re-entrant flight and a few of them with different level of complexity are described in this Section.

7.1.2 System handling of re-entrant flight (two system flight plans)

Upon receiving a flight plan with a re-entrant route, the FDP needs to flag this flight plan and divide it into two separate system flight plans. The first one will cover the route segment from the departure up to the exit point of the AoR, while the second system flight plan will cover the route segment from AoR the point of re-entry up to its destination. This approach would require a careful handling of OLDI messages received and correlating them with the correct FP segment, mostly using the COP name as additional criteria.

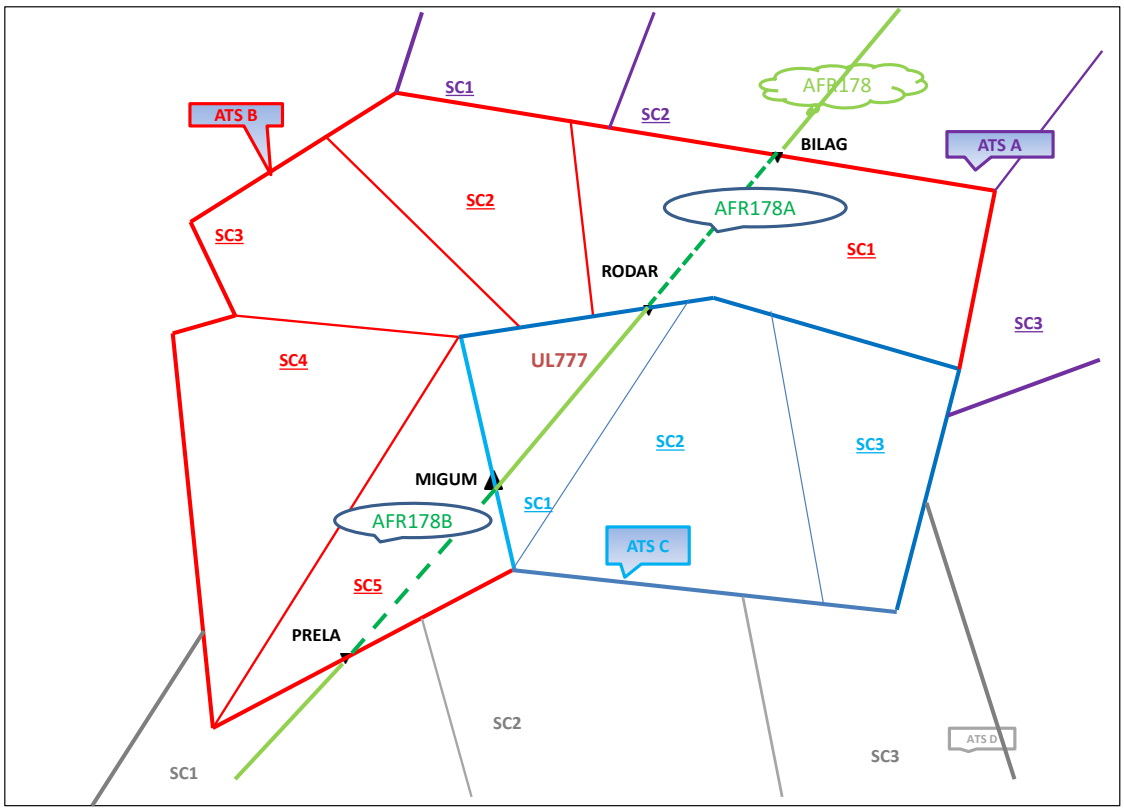


Figure 43 43 - Flight Re-entry Case Study 1

In addition, the OLDI messages to the downstream unit should include the original flight plan callsign as the downstream unit has no notion about splitting this flight plan in two segments.

7.1.2.1 Case study 1

This case study elaborates the capability of fictitious FDP for handling of re-entrant flight. The airspace and flight elements used for case study 1 illustrated by Figure 43 are also fictitious. Only the departure and destination airports exist. The airspace data is depicted as:

- ATS A in magenta;
- ATS B in red; (ATS unit need to handle the re-entrant flight)
- ATS C in blue;
- ATS D in grey;

The airways are depicted in green and significant points in black.

Flight AFR178 departed from Lille (LFQQ) at 13:00 and it is planned to land at Larnaca (LCLK). IFPS distributed the original FPL (FPL- AFR178 -IS –A330/H-SRWY/C –LFQQ0800 -N0430F370 VIKAW UM457 MXX UL111 LIMAM UL777 BOTOM UM457 IM3 – LCLK0400 -DOF/180125) to all concerned ATS units.

After the receiving the flight plan for AFR178, it is tagged as a re-entrant flight and the ATS B FDP creates the two-system flight plans AFR178A (with route segment from VIKAW up to RODAR) and AFR178B (with route segment from MIGUM up to IM3).

13:02 The flight AFR178 departs from LFQQ.

13:22 ATS A sends an ABI message to ATS B.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **053**
-ARCID **AFR178**
-SSRCODE **A6742**
-ADEP **LFQQ**
-COORDATA
    -PTID **BILAG**
    -TO **1342**
    -TFL **F370**
-ADES **LCLK**
-ARCTYP **A330**

-ROUTE **N0430F370 LIMAM UL777 BOTOM**

13:22 ATS B sends a LAM message to ATS A and tries to correlate the received ABI with its system flight plans. The FDP identifies that the AFR178A flight plan has the BILAG point in its trajectory and associated the received ABI with this system plan.

13:31 ATS A sends an ACT message to ATS B.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **077**
-ARCID **AFR178**

-SSRCODE **A6742**
-ADEP **LFQQ**
-COORDATA
-PTID **BILAG**
-TO **1341**
-TFL **F370**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0430F370 LIMAM UL777 BOTOM**

13:31 ATS B sends a LAM message to ATS A and correlates the received ACT message with its system flight plan using the same principle as for the ABI message.

13:38 ATS B sends an ABI message to ATS C.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **015**
-ARCID **AFR178A**
-SSRCODE **A6742**
-ADEP **LFQQ**
-COORDATA
-PTID RODAR
-TO **1358**
-TFL **F370**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0430F370 LIMAM UL777 BOTOM**

13:38 ATS C sends a LAM message to ATS B. As the ABI message cannot be correlated with any system flight plan, it is presented to operator for manual handling.

13:39 The ATS C operator phones ATS B and understands that this is a re-entrant flight modified by ATS B. The operator manually associates the received ABI message to the system flight plan for flight AFR178.

13:41 Flight AFR178 is transferred to ATS B.

13:47 ATS B sends an ACT message to ATS C.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **022**
-ARCID **AFR178A**
-SSRCODE **A6742**
-ADEP **LFQQ**
-COORDATA
-PTID **RODAR**
-TO **1357**
-TFL **F370**
-ADES **LCLK**

-ARCTYP **A330**
-ROUTE **N0430F370 LIMAM UL777 BOTOM**

13:48 ATS C sends a LAM message to ATS B, as the ACT message cannot be correlated with system flight plan, it is presented to operator for manual handling. The operator is aware that this is a re-entrant flight and manually associates the received ACT message with the system flight plan.

13:51 ATS C sends an ABI message to ATS B.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSC**
    -RECVR -FAC **ATSB**
    -SEQNUM **118**
-ARCID **AFR178**
-SSRCODE **A6742**
-ADEP **LFQQ**
-COORDATA
    -PTID **MIGUM**
    -TO **1411**
    -TFL **F370**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0430F370 LIMAM UL777 BOTOM**

13:52 ATS B returns a LAM message to ATS C and tried to correlate the received ABI with system flight plans. FDP does identify that the flight plan AFR178B contains the MIGUM point in the trajectory and associates the received ABI message with this system plan.

13:57 Flight AFR178 is transferred to ATS C.

13:58 After reporting the RODAR point was overflown, the FDP of ATS B terminates the system flight plan AFR178A.

14:01 ATS C sends an ACT message to ATS B.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSC**
    -RECVR -FAC **ATSB**
    -SEQNUM **231**
-ARCID **AFR178**
-SSRCODE **A6742**
-ADEP **LFQQ**
-COORDATA
    -PTID **MIGUM**
    -TO **1411**
    -TFL **F370**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0430F370 LIMAM UL777 BOTOM**

14:01 ATS B sends a LAM message to ATS C and correlates the received ACT message using the same principle as for the ABI message.

14:06 ATS B sends an ABI message to ATS D.

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSD**
    -SEQNUM **011**
-ARCID **AFR178B**
-SSRCODE **A6742**
-ADEP **LFQQ**
-COORDATA
    -PTID **PRELA**
    -TO **1426**
    -TFL **F370**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0430F370 LIMAM UL777 BOTOM**

14:06 ATS D sends a LAM message to ATS B, as the ABI message cannot be correlated with a system flight plan, it is presented to the operator for manual handling.

14:08 The ATS D operator phones ATS B and understands that this is a re-entrant flight modified by ATS B. The operator manually associates the received ABI to the system flight plan for AFR178.

14:11 Flight AFR178 is transferred to ATS B.

14:16 ATS B sends an ACT message to ATS D.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSD**
    -SEQNUM **077**
-ARCID **AFR178B**
-SSRCODE **A6742**
-ADEP **LFQQ**
-COORDATA
    -PTID **PRELA**
    -TO **1426**
    -TFL **F370**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0430F370 LIMAM UL777 BOTOM**

14:17 ATS D sends a LAM message, as the ACT message cannot be correlated with a system flight plan and it is presented to the operator for manual handling. The operator is aware that this is a re-entrant flight and manually associates the received ACT message with the system flight plan.

14:26 Flight AFR178 is transferred to ATS D.

14:27 After flight AFR178 is reported to have overflown the PRELA point, the ATS B FDP terminates the system flight plan AFR178B.

7.1.3 System handling of re-entrant flight (AoI concept)

The Area of Interest (AoI) encapsulates the Area of Responsibility Airspace plus the buffer zones around AoR, which is of particular interest for the concerned ATS unit. The FDP of concerned ATS unit recognizes and accepts re-entrant flights (i.e. flights that leave the AoR but still within AoI and subsequently re-enter). Where the flight is re-entrant and remains within the AoI, one single system flight plan is generated for all the duration of the flight within the AoR/AoI. The FDP compiles a sequenced list of points corresponding to route elements in the flight plan that match elements defined in the AoI environment data. When a flight trajectory leaves and re-enters the AoR, the FDP establishes the sector sequence for each traversal of the AoR.

The system flight plan goes to notified state as soon as the flight exits the AoR. The FDP does not terminate the system flight plan when re-entrant flights left AoR. The system maintains the correlation when re-entrant flights leave AoR. The received notification messages (ABI, PAC) are ignored because the system flight plan remains in notified state. Distribution of system flight plan updates continues at least until such time that the flight has left the AoR and the control of the flight is released, and coordination for re-entry to AoR has not been initiated. After the reception of an ACT message, the system flight plan assumes the coordinated status. At this stage, the system flight plan is eligible to receive/send transfer of control messages with adjacent ATS unit, which assumed the control of re-entrant flight. The system flight plan is deleted a predefined time after leaving AoI.

In the case of a short traversal (less than 10 minutes), the handling of ACT for re-entrant flight needs to be bilaterally agreed. The timing of ACT might need to be reviewed, or ACT to be sent upon the assumption of control or ACT to be ignored by ATS unit handling the re-entrant flight.

7.1.3.1 Case study 2

Figure 44 44 - Flight Re-entry Case Study 2

The flight DLH1751 departed from Munich (EDDM) at 12:00 and it is planned to land at Larnaca (LCLK).

This case study elaborates the trajectory of DLH1751 within:

- Sofia ACC (LBSR)
- Makedonia ACC (LGMD), uses the same FDP as LGGG for OLDI message handling
- Ankara ACC (LTAA)
- Athens ACC (LGGG)
- Nicosia ACC (LCCC)

IFPS distributed the original FPL (FPL- DLH1751 -IS –A330/H-SRWY/C –EDDM1200 -N0440F370 EBEDA UL603 LATLO DIRSA PODET UL603 ZAG UN131 VAL UL863 OKANA L863 EVIVI UN133 PEREN UN128 LMO UN127 EXELA UM601 EVENO DCT PEDER DCT GENOS UM31LCA – LCLK0400 -DOF/180110).

The flight DLH1751 trajectory with the Makedonia/Athens ACC Area of Interest includes the following data items as:

EDIKA EVIVI PEREN LMP LMO ERESO RIKSO IMR ULKAN SONEN DAL BIRPU BENEM EXELA EVENO PEDER

The flight DLH1751 trajectory with Ankara ACC Area of Interest (AoI) includes the following data items as:

ERESO RIKSO IMR ULKAN SONEN DAL BIRPU BENEM EXELA

Makedonia and Athens ACC are co-located, and they use the same FDP. After receiving the flight plan for flight DLH1751, the FDP that serves Makedonia and Athens ACC flags the flight is being a re-entrant, not to be terminated after its first exit from AoR.

12:00 Flight DLH1751 departs from EDDM.

13:25 Sofia ACC (LBSR) sends an ABI message to Makedonia ACC (LGGG).

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **LBSR**
    -RECVR -FAC **LGGG**
    -SEQNUM **011**
-ARCID **DLH1751**
-SSRCODE **A6333**
-ADEP **EDDM**
-COORDATA
    -PTID **EVIVI**
    -TO **1345**
    -TFL **F350**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0440F370 VAL UL863 OKANA L863 EVIVI UN133 PEREN**

13:25 LGGG sends a LAM message to LBSR and associates the received ABI message with its system flight plans.

13:25 The Greek FDP recognises that flight DLH1751 is a re-entrant one and it is flagged not to be terminated after its first exit from AoR.

13:35 LBSR sends an ACT message to Makedonia ACC.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **LBSR**
    -RECVR -FAC **LGGG**
    -SEQNUM **052**
-ARCID **DLH1751**
-SSRCODE **A6333**
-ADEP **EDDM**
-COORDATA
    -PTID **EVIVI**
    -TO **1345**
    -TFL **F350**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0440F370 VAL UL863 OKANA L863 EVIVI UN133 PEREN**

13:35 Makedonia ACC sends a LAM message to LBSR.

13:45 Flight DLH1751 is transferred to Makedonia ACC.

13:48 Makedonia ACC sends an ABI message to Ankara ACC (LTAA).

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **LGGG**
    -RECVR -FAC **LTAA**
    -SEQNUM **122**
-ARCID **DLH1751**
-SSRCODE **A6333**
-ADEP **EDDM**
-COORDATA
    -PTID **RIKSO**
    -TO **1408**
    -TFL **F350**
-ADES **LCLK**
-ARCTYP **A330**

-ROUTE **N0440F370 L863 EVIVI UN133 PEREN UN128 LMO UN127 EXELA UM601 EVENO DCT PEDER DCT**

13:48 LTAA sends a LAM message to LGGG, and the ABI message is associated with a system flight plan.

13:57 Makedonia ACC sends an ACT message to LTAA.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **LGGG**
    -RECVR -FAC **LTAA**
    -SEQNUM **234**
-ARCID **DLH1751**

-SSRCODE **A6333**
-ADEP **EDDM**
-COORDATA
    -PTID **RIKSO**
    -TO **1407**
    -TFL **F350**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0440F370 L863 EVIVI UN133 PEREN UN128 LMO UN127 EXELA UM601 EVENO DCT PEDER DCT**

13:58 LTAA sends a LAM message to LGGG, and the ACT message is associated with the system flight plan.

14:07 Flight DLH1751 is transferred to LTAA.

14:08 Within Makedonia/Athens ACCs FDP, after reporting that flight DLH1751 has overflown the point RIKSO, the DLH1751 system flight plan is flagged as re-entrant and is still kept in the notification state.

14:10 LTAA sends an ABI message to Athens ACC (also LGGG).

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **LTAA**
    -RECVR -FAC **LGGG**
    -SEQNUM **523**
-ARCID **DLH1751**
-SSRCODE **A6333**
-ADEP **EDDM**
-COORDATA
    -PTID **BENEM**
    -TO **1430**
    -TFL **F350**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0440F370 ERESO UN127 EXELA**

14:11 The Greek FDP sends a LAM message to LTAA and associates the received ABI message with its system flight plans. As the flight plan is already in a notified state, the received ABI is disregarded.

14:15 Athens ACC sends an ABI message to Nicosia ACC (LCCC).

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **LGGG**
    -RECVR -FAC **LCCC**
    -SEQNUM **012**
-ARCID **DLH1751**
-SSRCODE **A6333**
-ADEP **EDDM**
-COORDATA
    -PTID **EVENO**
    -TO **1435**

-TFL **F350**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0440F370 EXELA UM601 EVENO DCT PEDER DCT**

14:15 LCCC send a LAM message to LGGG, and the system flight plan is updated with the ABI message content.

14:19 LTAA sends an ACT message to Athens ACC.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **LTAA**
-RECVR -FAC **LGGG**
-SEQNUM **565**
-ARCID **DLH1751**
-SSRCODE **A6333**
-ADEP **EDDM**
-COORDATA
-PTID **BENEM**
-TO **1429**
-TFL **F350**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0440F370 ERESO UN127 EXELA**

14:19 The Greek FDP sends a LAM message to LTAA and changes the system flight plan from a notified status to a coordinated status considering the content of the ACT message.

14:24 Athens ACC sends an ACT message to Nicosia ACC (LCCC).

-TITLE **ACT**
-REFDATA
-SENDER -FAC **LGGG**
-RECVR -FAC **LCCC**
-SEQNUM **589**
-ARCID **DLH1751**
-SSRCODE **A6333**
-ADEP **EDDM**
-COORDATA
-PTID **EVENO**
-TO **1434**
-TFL **F350**
-ADES **LCLK**
-ARCTYP **A330**
-ROUTE **N0440F370 EXELA UM601 EVENO DCT PEDER DCT**

14:25 LCCC sends a LAM message to LGGG, and the system flight plan is updated with the ACT message content.

14:29 Flight DLH1751 is transferred to Athens ACC

14:30 The system flight plan related to flight DLH1751 is terminated by the LTAA FDPS.

14:34 Flight DLH1751 is transferred to LCCC.

14:35 After reporting that flight DLH1751 has overflown the point EVENO, the Greek FDP terminates the system flight plan DLH1751.

7.1.4 System handling of re-entrant flight (Segment identification concept)

This concept is deemed to be the most advanced and therefore is recommended to be used as a reference one. Some systems can identify re-entrances in the AoR independently of whether the flight exits the AoI or not. That means that an exit from the AoI will not automatically mean the end of the flight.

The FDP will be able to handle several AoI segments composed by one or more AoR segments and upon reception of a message, it will be analysed by using environmental and adaptation data and also design parameters and then applied to the right boundary. The FDP will therefore manage one single system flight plan for these cases.

As in other options, the FDP will establish the sector sequence for each AoR segment.

The system flight plan will be maintained activated, even when the flight exits the AoR, and besides it will not terminate when re-entrant flights left AoR. Only when the last segment is overflown, the flight plan can start the transition to terminated state.

Regarding correlation, the system will be informed upon changes in the system in-between and will process them accordingly so that the correlation is kept.

7.1.4.1 Case study 3

Figure 45 45 - Flight Re-entry Case Study 3

This case study is based on the real ATS environment (airspace and flight plan data) illustrated in Figure 45, while the sequence of OLDI messages is fictitious.

Flight DLH5523 departed from Gothenburg (ESGG) at 14:00 and is planned to land at Roma Fiumicino (LIRF).

IFPS distributed the original FPL (FPL- DLH5523 -IS –A320/M-SRWY/C –ESGG1440 -N0430F370 LALIL L996 MAXUM M736 SALLO UM44 KOGIM UM725 OBANI UZ36 MAREM P31 RADUP UP31 DOSEL UM736 LIZUM N503 VIC L12 LUMAV M726 GARVA Z806 GIKIN N737 TORLI – LIRF0240 -DOF/180110) to ATC A, ATS B and ATS C.

The flight DLH5523 trajectory concerning Karlsruhe UAC Area of Interest (AoI) includes the following data items:

BALOX SALLO ARGAD KOGIM ABES MASOR UDAXI RODEP RAKIT RENKI GERGA TUVAK IDOBA OBANI POGAB SISGO BEBKU PIKIB MAREM PEMEL RADUP BARIX BAMTA DEGIN DOSEL EBEDA MANAL TULSI BERAS MIMVI LIZUM LIKDA BAKOR

The flight DLH5523 trajectory concerning Prague ACC AoI includes the following data items:

PIKIB MAREM PEMEL RADUP BARIX BAMTA

Karlsruhe FDP calculates two segments for the flight DLH5523.

14:02 DLH5523 departs from Gothenburg (ESGG).

14:15 Malmo ACC (ESMM) sends an ABI message to Karlsruhe UAC (EDUU).

-TITLE **ABI**
-REFDATA
    -SENDER -FAC **ESMM**
    -RECVR -FAC **EDUU**
    -SEQNUM **082**
-ARCID **DLH5523**
-SSRCODE **A7421**
-ADEP **ESGG**
-COORDATA
    -PTID **SALLO**
    -TO **1435**
    -TFL **F340**
-ADES **LIRF**
-ARCTYP **A320**
-ROUTE **N0430F370 LALIL L996 MAXUM M736 SALLO UM44**

14:16 EDUU sends a LAM message to ESMM and:

- Identifies that the affected segment is the first one;
- Processes the received coordination data for the affected flight plan. The first segment becomes active, but it is not yet coordinated.

14:25 Malmo ACC (ESMM) sends an ACT message to Karlsruhe UAC (EDUU).

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ESMM**
    -RECVR -FAC **EDUU**
    -SEQNUM **098**
-ARCID **DLH5523**
-SSRCODE **A7421**
-ADEP **ESGG**
-COORDATA
    -PTID **SALLO**
    -TO **1435**
    -TFL **F340**
-ADES **LIRF**
-ARCTYP **A320**
-ROUTE **N0430F370 LALIL L996 MAXUM M736 SALLO UM44**

14:25 EDUU sends a LAM message to ESMM and:

- Identifies that the affected segment is the first one;
- Processes the received coordination data for the affected flight plan. The first segment becomes coordinated.

14:36 Flight DLH5523 is transferred to EDUU.

14:41 EDUU sends an ABI message to Prague ACC (LKAA).

-TITLE **ABI**
-REFDATA

-SENDER -FAC **EDUU**
-RECVR -FAC **LKAA**
-SEQNUM **117**
-ARCID **DLH5523**
-SSRCODE **A7421**
-ADEP **ESGG**
-COORDATA
-PTID **MAREM**
-TO **1501**
-TFL **F360**
-ADES **LIRF**
-ARCTYP **A320**
-ROUTE **N0430F370 M736 SALLO UM44 KOGIM UM725 OBANI UZ36 MAREM P31**

14:41 LKAA send a LAM message to EDUU, and the received ABI message is correlated with its system flight plan.

14:52 EDUU sends an ACT message to LKAA.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **EDUU**
-RECVR -FAC **LKAA**
-SEQNUM **198**
-ARCID **DLH5523**
-SSRCODE **A7421**
-ADEP **ESGG**
-COORDATA
-PTID **MAREM**
-TO **1502**
-TFL **F360**
-ADES **LIRF**
-ARCTYP **A320**
-ROUTE **N0430F370 M736 SALLO UM44 KOGIM UM725 OBANI UZ36 MAREM P31**

14:52 LKAA sends a LAM message to EDUU, and the ACT message is correlated with its system flight plan.

14:54 LKAA sends an ABI message to EDUU.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **LKAA**
-RECVR -FAC **EDUU**
-SEQNUM **009**
-ARCID **DLH5523**
-SSRCODE **A7421**
-ADEP **ESGG**
-COORDATA
-PTID **BARIX**
-TO **1513**
-TFL **F360**
-ADES **LIRF**
-ARCTYP **A320**
-ROUTE **N0430F370 UZ36 MAREM P31 RADUP UP31**

14:54 EDUU sends a LAM message to LKAA and:

- Identifies that the affected segment is the second one;
- Processes the received coordination data for the affected flight plan. The second segment becomes active, not yet coordinated.

15:01 Flight DLH5523 is transferred to LKAA.

15:03 LKAA sends an ACT message to EDUU.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **LKAA**
-RECVR -FAC **EDUU**
-SEQNUM **052**
-ARCID **DLH5523**
-SSRCODE **A7421**
-ADEP **ESGG**
-COORDATA
-PTID **BARIX**
-TO **1513**
-TFL **F360**
-ADES **LIRF**
-ARCTYP **A320**
-ROUTE **N0430F370 UZ36 MAREM P31 RADUP UP31**

15:03 EDUU sends a LAM message to LKAA and

- Identifies that the affected segment is the second one;
- Processes the received coordination data for the affected flight plan. The second segment becomes coordinated.

15:13 Flight DLH5523 is transferred to EDUU.

15:14 The system flight plan related to flight DLH5523 is terminated by the LKAA FDPS.

15:16 EDUU sends an ABI message to Padova ACC (LIPP).

-TITLE **ABI**
-REFDATA
-SENDER -FAC **EDUU**
-RECVR -FAC **LIPP**
-SEQNUM **231**
-ARCID **DLH5523**
-SSRCODE **A7421**
-ADEP **ESGG**
-COORDATA
-PTID **LIKDA**
-TO **1536**
-TFL **F360**
-ADES **LIRF**
-ARCTYP **A320**
-ROUTE **N0430F370 UP31 DOSEL UM736 LIZUM N503 VIC**

15:16 LIPP sends a LAM message to EDUU, and the system flight plan is updated with the ABI message content.

15:27 EDUU sends an ACT message to LIPP.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **EDUU**
    -RECVR -FAC **LIPP**
    -SEQNUM **325**
-ARCID **DLH5523**
-SSRCODE **A7421**
-ADEP **ESGG**
-COORDATA
    -PTID **LIKDA**
    -TO **1537**
    -TFL **F360**
-ADES **LIRF**
-ARCTYP **A320**
-ROUTE **N0430F370 UP31 DOSEL UM736 LIZUM N503 VIC**

15:27 LIPP sends a LAM message to EDUU, and the system flight plan is updated with the ACT message content.

15:37 Flight DLH5523 is transferred to LIMM.

15:38 An adaptable time parameter after the boundary point is overflown, EDUU FDP terminates the system flight plan for DLH5523.

8 Exchange of Sectorisation and Frequency plan (SFP message)

8.1. SFP Case study

The purpose of this chapter is to provide additional explanations about the utilization of Sector and Frequency Plan (SFP) message.

There are several pre-requites to deploy the SFP message as:

- Complete awareness and availability within the FDPS of the horizontal definitions of the elementary sectors of the adjacent ATS unit(s).
- FDPS upgrade for automatic pre-filling of SFP messages content with elementary sector, frequencies and ATC sectors;
- FDPS upgrade for processing and handling the received elementary sectors (including different division FLs), frequencies and ATC sectors;
- Bilateral agreement with adjacent ATSU(s) concerning the content of the SFP (complete sectorization of ATSU or only those sectors that are on boundary between two ATSUs) including the timely provision of any modification of the sectorisation.

The SFP message needs to be considered only as a vehicle to exchange the datum listed above, while the content of the message needs to be addressed by the pre-requisite listed above.

In case that SFP message is exchanged by both partner on specific interface, it might make redundant the use of TIM and FDM messages for frequency exchanges for this specific interface. Therefore, it is recommended to deploy only one mechanism to exchange frequency data with the same partner. Note that SFP is a non-flight-centric message which provides sectors and their associated frequency, while FDM (or optionally ROF) provides the frequency for a specific flight crossing the boundary.

8.2. Context

This case study addresses the bilaterally agreed principles of SFP exchanges between ATSU A and adjacent ATS units.

The airspace volume of ATSU A divided into 4 vertical layers as:

- Lower airspace layer is the airspace within ATSU A AoR between FL 190 and FL 315;
- Middle airspace layer is the airspace within ATSU A AoR between FL315 and FL 355;
- Upper airspace layer is the airspace within ATSU A AoR between FL355 and FL 395;
- Top upper airspace layer is the airspace within ATSU A AoR between FL395 and FL 460;

Figure 46 - ATSU A sectorisation vertical view

Each airspace layer is further divided into 16 elementary sectors, therefore in total there are 64 elementary sectors that can be combined vertically and horizontally.

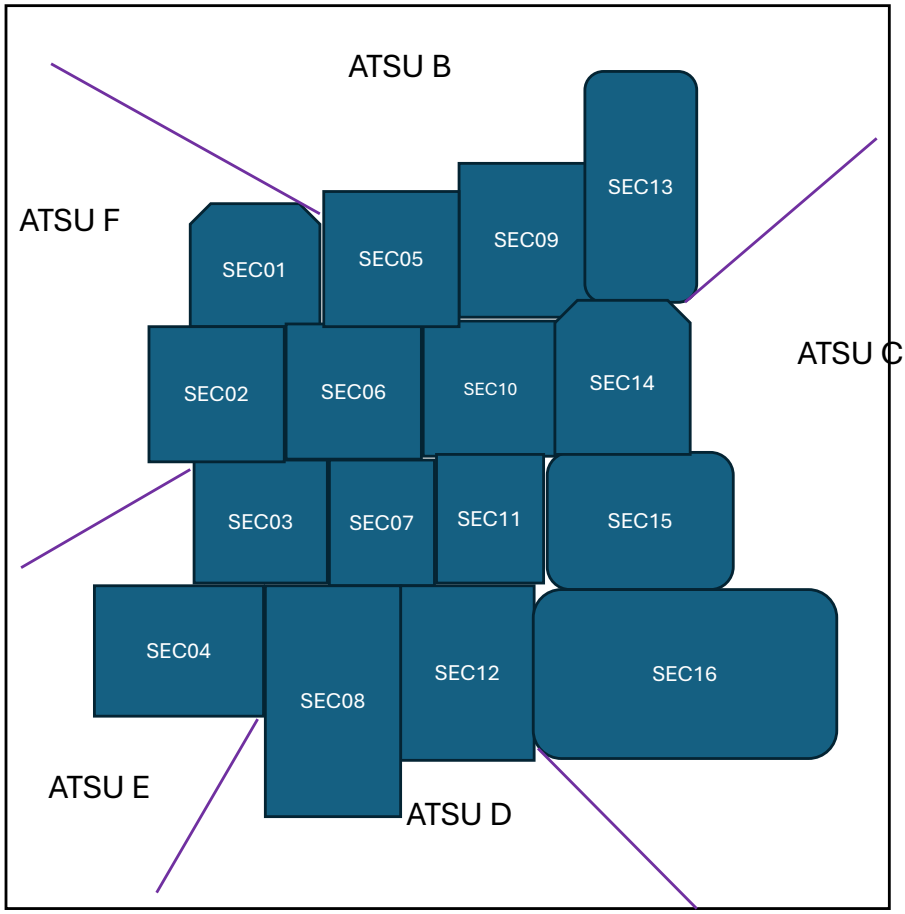


Figure 47 - ATSU A sectorisation horizontal view

ATSU bilaterally agreed to exchange:

- All available ATC sectors, elementary sectors that compose the assigned ATC sector and frequencies with ATSU B and ATSU E
- With ATSU C, it has been agreed to exchange the SFP messages only for the boundary sectors between ATSU A and ATSU C
- With ATSU D and ATSU F, there are no exchanges of SFP message as their system does support the reception of SFP message.

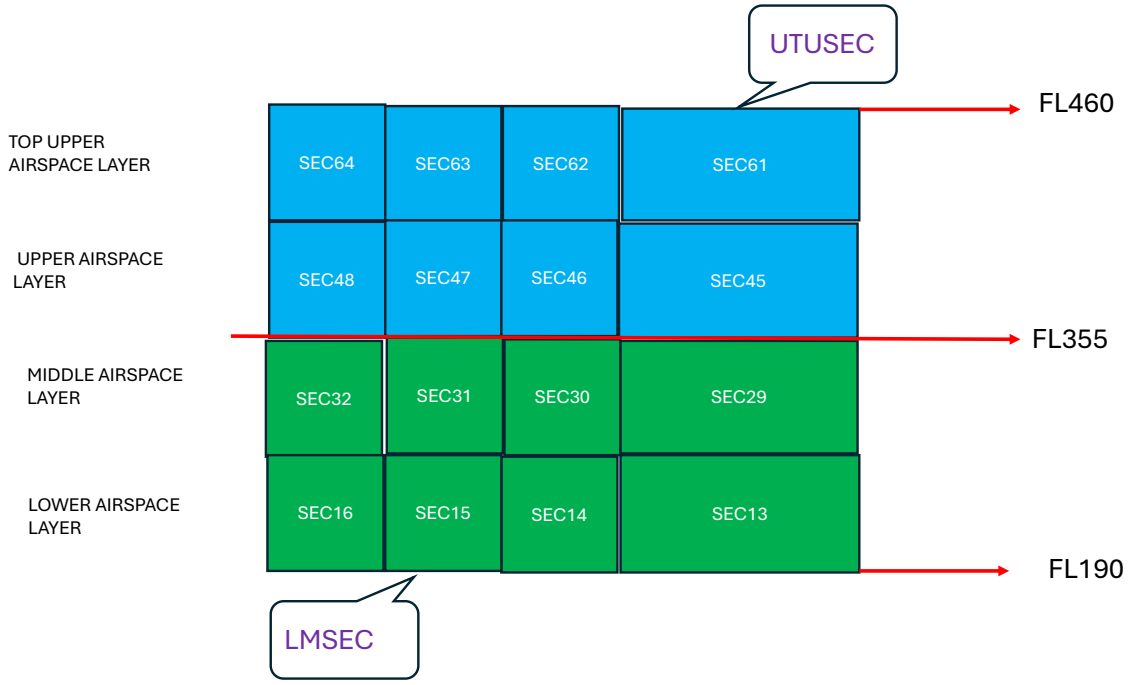


Figure 48 - ATSU A sectorisation night shift

During the night, ATSU A works with two ATC sectors. The first ATC sector encompasses all elementary sectors of lower and middle airspace layers (32 elementary sectors) within FL band of 190-355. The second ATC sector encompasses all elementary sectors of upper and top upper airspace layers (32 elementary sectors) within FL band of 355-460.

8.3. SFP exchanges

8.3.1 Use Case 1

At 07:15, the ATC supervisor of ATSU A decided to open an additional sector to cater to the incoming traffic demand. The upper and top upper airspace layer previously collapsed into a single ATC sectors are split into two vertical sectors. The configuration of lower and middle airspace layer remains unchanged.

3 ATC sectors are as:

- ATC lower and middle encompassing 32 elementary sectors of lower and middle airspace layer;
- ATC upper encompassing 16 elementary sectors of upper airspace layer;
- ATC top upper encompassing 16 elementary sectors of top upper airspace layer;

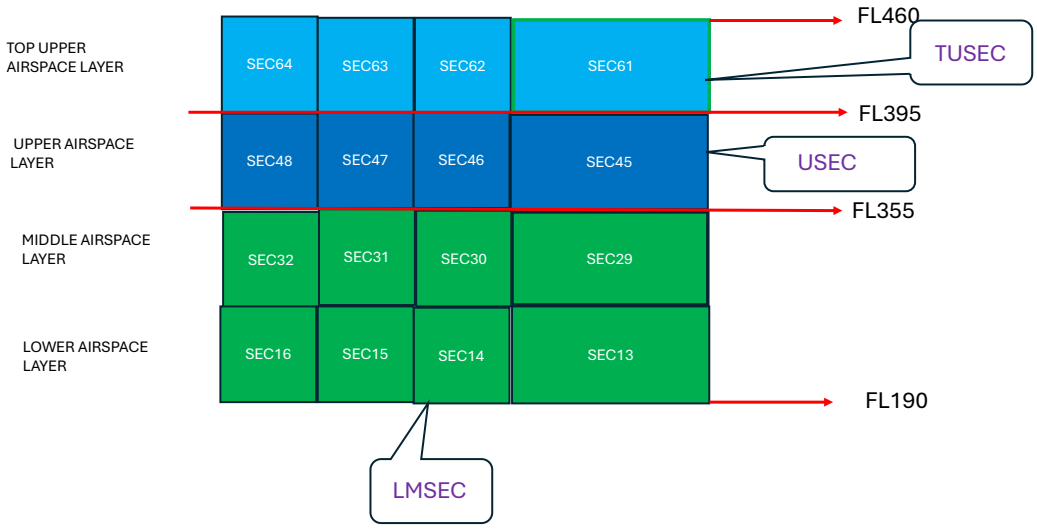


Figure 49 - ATSU A sectorisation early morning

The SFP message is send to ATSU B and ATSU E for all three assigned ATC sectors and to ATSU C because all three sectors are adjacent to ATSU C.

The following SFP message is sent to ATSU B as:

TITLE **SFP**
-REFDATA
-SENDER -FAC **A**
-RECVR -FAC **C**
-SEQNUM **078**
-BEGIN **SECLIST**
-ASEC
-SECTOR **LMSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC01**
-FLBLOCK -**FL190** -**FL355**
-FREQ **119725**
-ESEC
-SECID **SEC02**
-FLBLOCK -**FL190** -**FL355**
-FREQ **119725**
……. (all elementary sectors)
…….
-ESEC
-SECID **SEC32**
-FLBLOCK – **FL190** -**FL355**
-FREQ **119725**
-END **ESLIST**
-ASEC
-SECTOR **USEC**
-BEGIN **ESLIST**
-ESEC

-SECID **SEC33**
-FLBLOCK -**FL355 -FL395**
-FREQ **131275**
-ESEC
-SECID **SEC34**
-FLBLOCK **-FL355 -FL395**
-FREQ **131275**
…… (all elementary sectors)
……
-ESEC
-SECID **SEC48**
-FLBLOCK **-FL355 -FL395**
-FREQ **131275**
-END **ESLIST**
-ASEC
-SECTOR **TUSEC**
-BEGIN **ESLIST**
-ESEC
- SECID **SEC49**
- FLBLOCK -**FL395 -FL460**
-FREQ **121025**
-ESEC
-SECID **SEC50**
-FLBLOCK -**FL395 -FL460**
-FREQ **121025**
…
….. (List of all elementary sectors)
-ESEC
-SECID **SEC64**
-FLBLOCK -**FL395 -FL460**
-FREQ **121025**
-END **ESLIST**
-END **SECLIST**

The SFP message with the same content is send to ATSU E and ATSU C.

8.3.2 Use Case 2

To accommodate high traffic demand for the Upper Sector, at 08:30, the ATC supervisor of ATSU A decides to change the division FL between middle and upper airspace layer from FL355 to FL 345 and to open an additional sector. The lower and middle airspace layer previously collapsed into a single ATC sector is split into two vertical sectors. The configuration of top upper airspace layer remains unchanged.

4 ATC sectors are as:

- ATC lower encompassing 16 elementary sectors of lower airspace layer;
- ATC middle encompassing 16 elementary sectors of middle airspace layer with a change of division FL to FL345;
- ATC upper encompassing 16 elementary sectors of upper airspace layer and the division flight level with middle sector was altered to FL 345;

ATC top upper encompassing 16 elementary sectors of top upper airspace layer;

Figure 50 - ATSU A sectorisation at 08:30

The SFP message is send to ATSU B and ATSU E for all Four assigned ATC sectors and to ATSU C because all four sectors are adjacent to ATSU C.

The following SFP message is sent to ATSU B as:

TITLE **SFP**
-REFDATA
-SENDER -FAC **A**
-RECVR -FAC **C**
-SEQNUM **078**
-BEGIN **SECLIST**
-ASEC
-SECTOR **LSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC01**
-FLBLOCK -**FL190** -**FL315**
-FREQ **119725**
-ESEC
-SECID **SEC02**
-FLBLOCK -**FL190** -**FL315**
-FREQ **119725**
……. (all elementary sectors)
…….
-ESEC
-SECID **SEC16**
-FLBLOCK – **FL190** -**FL315**

-FREQ **119725**
-END **ESLIST**
-ASEC
-SECTOR **MSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC01**
-FLBLOCK -**FL315** -**FL345**
-FREQ **120525**
-ESEC
-SECID **SEC02**
-FLBLOCK -**FL315** -**FL345**
-FREQ **120525**
……. (all elementary sectors)
…….
-ESEC
-SECID **SEC16**
-FLBLOCK – **FL315** -**FL345**
-FREQ **120525**
-END **ESLIST**
-ASEC
-SECTOR **USEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC33**
-FLBLOCK -**FL345 -FL395**
-FREQ **131275**
-ESEC
-SECID **SEC34**
-FLBLOCK **-FL345 -FL395**
-FREQ **131275**

…… (all elementary sectors)
……
-ESEC
-SECID **SEC48**
-FLBLOCK **-FL345 -FL395**
-FREQ **131275**
-END **ESLIST**
-ASEC
-SECTOR **TUSEC**
-BEGIN **ESLIST**
-ESEC
- SECID **SEC49**
- FLBLOCK -**FL395 -FL460**
-FREQ **121025**
-ESEC
- SECID **SEC50**
-FLBLOCK -**FL395 -FL460**
-FREQ **121025**

…..
….. (List of all elementary sectors)
-ESEC
-SECID **SEC64**
-FLBLOCK -**FL395 -FL460**
-FREQ **121025**
-END **ESLIST**
-END **SECLIST**

The SFP message with the same content is send to ATSU E and ATSU C.

8.3.3 Use Case 3

At 9:30, the ATC supervisor of ATSU A decides to open 3 additional ATC sectors to cater for the increasing traffic demand. He returned the division flight between the middle and upper airspace layer to FL 355 and horizontally split the middle and upper airspace layers into the west and east section. The configuration of top upper airspace layer remains unchanged.

6 ATC sectors are assigned as:

- ATC Lower encompassing 16 elementary sectors of lower airspace layer;
- ATC East Middle encompassing 8 elementary sectors of middle airspace layer, Division FL back to FL 355;
- ATC West Middle encompassing 8 elementary sectors of middle airspace layer, Division FL back to FL 355;
- ATC East Upper encompassing 8 elementary sectors of upper airspace layer, Division FL back to FL 355;
- ATC West Upper encompassing 8 elementary sectors of middle airspace layer, Division FL back to FL 355;
- ATC top upper encompassing 16 elementary sectors of top upper airspace layer;

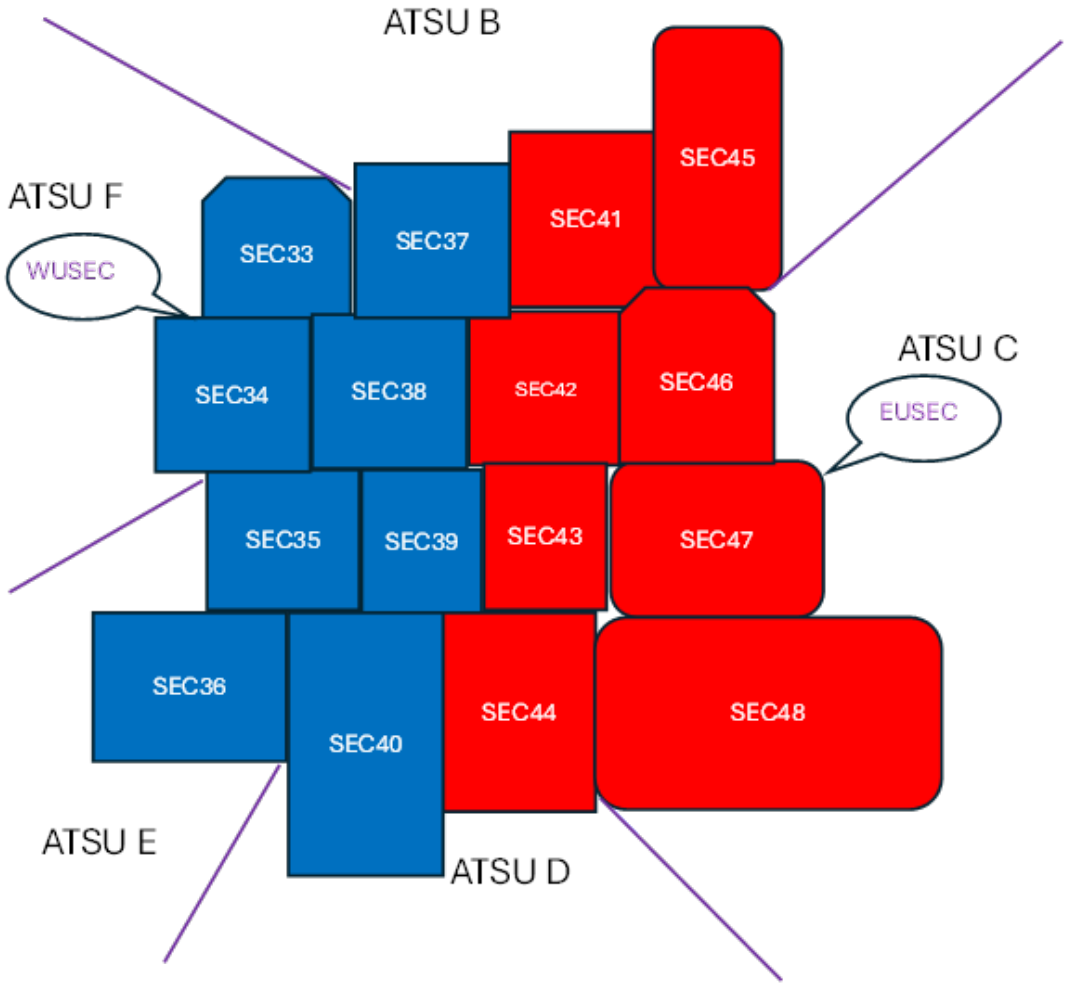


Figure 51 - ATSU A sectorisation at 09:30

The SFP message is sent to ATSU B and ATSU E for all six assigned ATC sectors. The SFP message to ATSU C contains only 4 sectors that interface ATSU C (ATC Lower, ATC Top Upper, ATC East Middle and ATC East Upper).

The following SFP message is sent to ATSU B as:

-TITLE **SFP**
-REFDATA
-SENDER -FAC **A**
-RECVR -FAC **B**
-SEQNUM **255**
-BEGIN **SECLIST**
-ASEC
-SECTOR **LSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC01**
-FLBLOCK -**FL190** -**FL315**
-FREQ **119725**
-ESEC
- SECID **SEC02**

-FLBLOCK -**FL190** -**FL315**
-FREQ **119725**
……. (all elementary sectors)
…….
-ESEC
- SECID **SEC16**
-FLBLOCK – **FL190** -**FL315**
-FREQ **119725**
-END **ESLIST**
-ASEC
-SECTOR **WMSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC17**
-FLBLOCK -**FL315** -**FL355**
-FREQ **120525**
-ESEC
- SECID **SEC18**
-FLBLOCK -**FL315** -**FL355**
-FREQ **120525**
……. (all elementary sectors)
…….
-ESEC
-SECID **SEC24**
-FLBLOCK – **FL315** -**FL355**
-FREQ **120525**
-END **ESLIST**
-ASEC
-SECTOR **EMSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC25**
-FLBLOCK -**FL315** -**FL355**
-FREQ **123625**
-ESEC
- SECID **SEC26**
-FLBLOCK -**FL315** -**FL355**
-FREQ **123625**
……. (all elementary sectors)
…….
-ESEC
-SECID **SEC32**
-FLBLOCK – **FL315** -**FL355**
-FREQ **123625**
-END **ESLIST**
-ASEC
-SECTOR **WUSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC33**
-FLBLOCK -**FL355** -**FL395**

-FREQ **131275**
-ESEC
-SECID **SEC34**
-FLBLOCK **-FL355 -FL395**
-FREQ **131275**
…… (all elementary sectors)
……
-ESEC
-SECID **SEC40**
-FLBLOCK **-FL355 -FL395**
-FREQ **131275**
-END **ESLIST**
-ASEC
-SECTOR **EUSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC41**
-FLBLOCK -**FL355 -FL395**
-FREQ **121033**
-ESEC
-SECID **SEC42**
-FLBLOCK **-FL355 -FL395**
-FREQ **121033**
…… (all elementary sectors)
……
-ESEC
-SECID **SEC48**
-FLBLOCK **-FL355 -FL395**
-FREQ **121033**
-END **ESLIST**
-ASEC
-SECTOR **TUSEC**
-BEGIN **ESLIST**
-ESEC
- SECID **SEC49**
- FLBLOCK -**FL395 -FL460**
-FREQ **121025**
-ESEC
-SECID **SEC50**
-FLBLOCK -**FL395 -FL460**
-FREQ **121025**
…..
….. (List of all elementary sectors)
-ESEC
-SECID **SEC64**
-FLBLOCK -**FL395 -FL460**
-FREQ **121025**
-END **ESLIST**
-END **SECLIST**

The SFP message with the same content is sent to ATSU E.

The SFP message to ATSU C encompasses 4 assigned ATC sectors, the west-middle and west-upper sectors with their elementary sectors are not included.

-TITLE **SFP**
-REFDATA
-SENDER -FAC **A**
-RECVR -FAC **C**
-SEQNUM **335**
-BEGIN **SECLIST**
-ASEC
-SECTOR **LSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC01**
-FLBLOCK -**FL190** -**FL315**
-FREQ **119725**
-ESEC
- SECID **SEC02**
-FLBLOCK -**FL190** -**FL315**
-FREQ **119725**
……. (all elementary sectors)
…….
-ESEC
- SECID **SEC16**
-FLBLOCK – **FL190** -**FL315**
-FREQ **119725**
-END **ESLIST**
-ASEC
-SECTOR **EMSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC25**
-FLBLOCK -**FL315** -**FL355**
-FREQ **123625**
-ESEC
- SECID **SEC26**
-FLBLOCK -**FL315** -**FL355**
-FREQ **123625**
……. (all elementary sectors)
…….
-ESEC
-SECID **SEC32**
-FLBLOCK – **FL315** -**FL355**
-FREQ **123625**
-END **ESLIST**
-ASEC
-SECTOR **EUSEC**
-BEGIN **ESLIST**

-ESEC
-SECID **SEC41**
-FLBLOCK -**FL355 -FL395**
-FREQ **121033**
-ESEC
-SECID **SEC42**
-FLBLOCK **-FL355 -FL395**
-FREQ **121033**
…… (all elementary sectors)
……
-ESEC
-SECID **SEC48**
-FLBLOCK **-FL355 -FL395**
-FREQ **121033**
-END **ESLIST**
-ASEC
-SECTOR **TUSEC**
-BEGIN **ESLIST**
-ESEC
- SECID **SEC49**
- FLBLOCK -**FL395 -FL460**
-FREQ **121025**
-ESEC
- SECID **SEC50**
-FLBLOCK -**FL395 -FL460**
FREQ **121025**
…..
….. (List of all elementary sectors)
-ESEC
-SECID **SEC64**
-FLBLOCK -**FL395 -FL460**
-FREQ **121025**
-END **ESLIST**
-END **SECLIST**

8.3.4 Use Case 4

At 10:30, due to the increase of traffic demand for the top upper airspace layer and the specificity of incoming traffic flow, the ATC supervisor decides to split horizontally the top upper ATC sector and assign 5 sectors to East Top Upper, while 11 elementary sectors are assigned to West Top Upper. The remaining ATC sectors are unaltered.

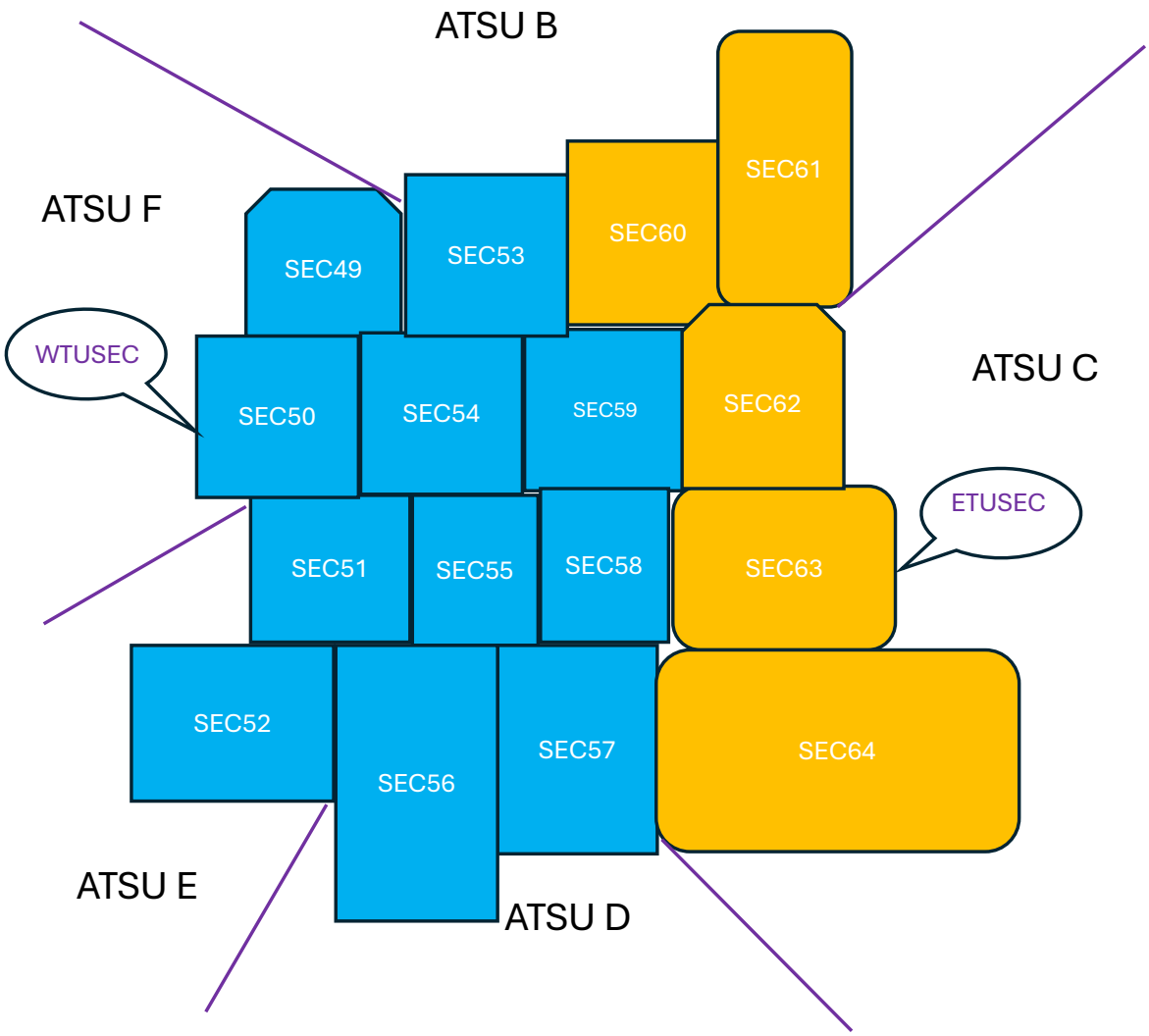


Figure 52 - ATSU A sectorisation at 10:30

7 ATC sectors are assigned as:

- ATC Lower encompassing 16 elementary sectors of lower airspace layer;
- ATC East Middle encompassing 8 elementary sectors of middle airspace layer;
- ATC West Middle encompassing 8 elementary sectors of middle airspace layer;
- ATC East Upper encompassing 8 elementary sectors of upper airspace layer;
- ATC West Upper encompassing 8 elementary sectors of middle airspace layer;
- ATC East top upper encompassing 11elementary sectors of top upper airspace layer;
- ATC West top upper encompassing 5 elementary sectors of top upper airspace layer;

The SFP message is send to ATSU B and ATSU E for all seven assigned ATC sectors. The SFP message to ATSU C contains only 4 sectors that interface ATSU C (ATC Lower, ATC East Middle, ATC East Upper and ATC East Top Upper).

The following SFP message is sent to ATSU B as:

-TITLE **SFP**
-REFDATA
-SENDER -FAC **A**
-RECVR -FAC **B**
-SEQNUM **255**
-BEGIN **SECLIST**
-ASEC
-SECTOR **LSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC01**
-FLBLOCK -**FL190** -**FL315**
-FREQ **119725**
-ESEC
- SECID **SEC02**
-FLBLOCK -**FL190** -**FL315**
-FREQ **119725**
……. (all elementary sectors)
…….
-ESEC
- SECID **SEC16**
-FLBLOCK – **FL190** -**FL315**
-FREQ **119725**
-END **ESLIST**
-ASEC
-SECTOR **WMSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC17**
-FLBLOCK -**FL315** -**FL355**
-FREQ **120525**
-ESEC
- SECID **SEC18**
-FLBLOCK -**FL315** -**FL355**
-FREQ **120525**
……. (all elementary sectors)
…….
-ESEC
-SECID **SEC24**
-FLBLOCK – **FL315** -**FL355**
-FREQ **120525**
-END **ESLIST**
-ASEC
-SECTOR **EMSEC**

-BEGIN **ESLIST**
-ESEC
-SECID **SEC25**
-FLBLOCK -**FL315** -**FL355**
-FREQ **123625**
-ESEC
- SECID **SEC26**
-FLBLOCK -**FL315** -**FL355**
-FREQ **123625**
……. (all elementary sectors)
…….
-ESEC
-SECID **SEC32**
-FLBLOCK – **FL315** -**FL355**
-FREQ **123625**
-END **ESLIST**

-ASEC
-SECTOR **WUSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC33**
-FLBLOCK -**FL355** -**FL395**
-FREQ **131275**
-ESEC
-SECID **SEC34**
-FLBLOCK **-FL355** -**FL395**
-FREQ **131275**
…… (all elementary sectors)
……
-ESEC
-SECID **SEC40**
-FLBLOCK **-FL355** -**FL395**
-FREQ **131275**
-END **ESLIST**

-ASEC
-SECTOR **EUSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC41**
-FLBLOCK -**FL355** -**FL395**
-FREQ **121033**
-ESEC
-SECID **SEC42**
-FLBLOCK **-FL355** -**FL395**
-FREQ **121033**
…… (all elementary sectors)
……
-ESEC
-SECID **SEC48**
-FLBLOCK **-FL355** -**FL395**
-FREQ **121033**

```
            -END ESLIST
        -ASEC
            -SECTOR WTUSEC
            -BEGIN ESLIST
                -ESEC
                    - SECID SEC49
                    - FLBLOCK -FL395 -FL460
                     -FREQ 121025
                -ESEC
                    - SECID SEC50
                    -FLBLOCK -FL395 -FL460
                     FREQ 121025
                    …..
                    ….. (List of all elementary sectors)
                -ESEC
                    -SECID SEC59
                    -FLBLOCK -FL395 -FL460
                    -FREQ 121025
            -END ESLIST
        -ASEC
            -SECTOR ETUSEC
            -BEGIN ESLIST
                -ESEC
                    - SECID SEC60
                    - FLBLOCK -FL395 -FL460
                     -FREQ 122833
                -ESEC
                    - SECID SEC61
                    -FLBLOCK -FL395 -FL460
                     FREQ 122833
                    …..
                    ….. (List of all elementary sectors)
                -ESEC
                    -SECID SEC64
                    -FLBLOCK -FL395 -FL460
                    -FREQ 122833
            -END ESLIST
-END SECLIST
```

The SFP message with the same content is send to ATSU E.

The SFP message to ATSU C encompasses 4 Assigned ATC sectors, the west-middle, west-upper, and west top upper sectors with their elementary sectors are not included.

```
-TITLE SFP
-REFDATA
        -SENDER -FAC A
        -RECVR -FAC C
        -SEQNUM 653
-BEGIN SECLIST
        -ASEC
```

-SECTOR **LSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC01**
-FLBLOCK -**FL190** -**FL315**
-FREQ **119725**
-ESEC
- SECID **SEC02**
-FLBLOCK -**FL190** -**FL315**
-FREQ **119725**
……. (all elementary sectors)
…….
-ESEC
- SECID **SEC16**
-FLBLOCK – **FL190** -**FL315**
-FREQ **119725**
-END **ESLIST**
-ASEC
-SECTOR **EMSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC25**
-FLBLOCK -**FL315** -**FL355**
-FREQ **123625**
-ESEC
- SECID **SEC26**
-FLBLOCK -**FL315** -**FL355**
-FREQ **123625**
……. (all elementary sectors)
…….
-ESEC
-SECID **SEC32**
-FLBLOCK – **FL315** -**FL355**
-FREQ **123625**
-END **ESLIST**
-ASEC
-SECTOR **EUSEC**
-BEGIN **ESLIST**
-ESEC
-SECID **SEC41**
-FLBLOCK -**FL345 -FL395**
-FREQ **121033**
-ESEC
-SECID **SEC42**
-FLBLOCK **-FL345 -FL395**
-FREQ **121033**
…… (all elementary sectors)
……
-ESEC
-SECID **SEC48**
-FLBLOCK **-FL345 -FL395**

-FREQ **121033**
-END **ESLIST**
-ASEC
-SECTOR **ETUSEC**
-BEGIN **ESLIST**
-ESEC
- SECID **SEC60**
- FLBLOCK -**FL395 -FL460**
-FREQ **122833**
-ESEC
- SECID **SEC61**
-FLBLOCK -**FL395 -FL460**
FREQ **122833**
…..
….. (List of all elementary sectors)
-ESEC
-SECID **SEC64**
-FLBLOCK -**FL395 -FL460**
-FREQ **122833**
-END **ESLIST**
-END **SECLIST**

9 Civil - Military Co-ordination – Airspace Crossing

9.1. Context

The set of Civil-Military co-ordination and airspace crossing messages has been part of the OLDI Specification for more than 25 years. However, these messages have never been operationally deployed by any civil or military ANSP. It should be noted that several ANSPs procured this message set, so they are technically available in their systems, but military partners have not implemented them yet.

Since OLDI Specification edition 6.0, the OLDI group decided to move the complete content of these messages from the OLDI Specification into the OLDI Guidance Material and the considerations contained below are not best practices of OLDI implementation, but the requirements to implement this set of messages.

9.2. General

9.2.1 Description of Requirement

This section describes facilities applicable for the co-ordination of airspace crossing between civil and military agencies.

9.2.1.1 Airspace Crossing

The airspace crossing function consists of a message exchange triggered by the controller who has the option either to notify the other unit that a flight under his control is intending to cross the airspace controlled by that unit, or to request the permission to cross that airspace. In the second case the controller in the second unit will be expected to make an input to trigger an operational reply to the crossing request.

This reply can either be an acceptance of the request, or a counter proposal, or a rejection. A counter proposal requires an approval or a rejection from the controller who was the originator of the original request.

A previously sent notification can be amended by the controller in charge of the flight.

Agreed crossing details can be amended by the controller in charge of the flight and by the controller in charge of the airspace to be crossed.

9.2.1.2 Acknowledgement

All flight data exchange and airspace crossing functions are acknowledged automatically if they can be correctly received and processed in the addressed unit.

9.2.2 Implementation

OLDI-MIL-10-M If airspace crossing facilities are implemented based on bilateral agreement the rules described in this section **shall** be applied.

9.3. Crossing Intention Notification Message (XIN)

9.3.1 Purpose

The purpose of the XIN message is to forward the intention to cross an airspace controlled by a civil unit with a flight controlled by military unit or vice versa.

The XIN message may be used to update an XIN message sent earlier on the same flight.

9.3.2 Message Contents

OLDI-XIN-10-M The XIN message **shall** contain the following items of data:

- Message Type;
- Message Number;
- Message Reference (if the message is updating an earlier XIN message);
- Aircraft Identification;
- SSR Mode and Code;
- Number and Type of Aircraft;
- Sector Identifier;
- Route Points.

Note: *The Sector Identifier item contains the identifier of the sector responsible for the flight.*

OLDI-XIN-20-M If bilaterally agreed, the XIN message **shall** contain any of the following items of data:

- Departure Aerodrome;
- Destination Aerodrome;
- Other Flight Plan Data.

9.3.3 Processing

9.3.3.1 General

OLDI-XIN-30-M The Route Points element **shall** contain a description of the crossing route including at least two points.

OLDI-XIN-40-M Times and flight levels **shall** be included for each point.

OLDI-XIN-50-O In the case of climb or descend, a supplementary flight level **may** be included in addition to flight level information.

OLDI-XIN-60-M In the case of formation flights, a flight level block **shall** be used instead of a single flight level.

OLDI-XIN-70-M In all other cases, only a flight level **shall** be provided.

OLDI-XIN-80-M When used to update an earlier XIN message, the Message Reference **shall** contain the Message Number of the first message.

OLDI-XIN-90-M The unit sending the XIN **shall** make sure the flight stays on the shortest route between the consecutive points.

9.3.3.2 In the Sending Unit

OLDI-XIN-100-M The message **shall** be initiated at the controller's discretion or automatically, as described in the LoA.

OLDI-XIN-110-O Multiple XIN messages **may** be sent for the same flight.

Note: *The points included in the route element of a XIN do not need to be outside of the airspace to be crossed.*

9.3.3.3 In the Receiving Unit

OLDI-XIN-120-M If the message can be correctly processed, the system receiving the XIN **shall** return an acknowledgement.

OLDI-XIN-130-M If the message can be correctly processed, the system receiving the XIN, the data **shall** be made available to the controller immediately.

OLDI-XIN-140-M If the message cannot be correctly processed, no acknowledgement **shall** be returned.

9.3.4 Acknowledgement

OLDI-XIN-150-M The message **shall** be acknowledged by a LAM message.

OLDI-XIN-160-M If no LAM has been received within a specified time, a warning **shall** be displayed at the appropriate position.

9.3.5 Operational Reply

There is no operational reply required to the XIN message.

9.3.6 Message Example

-TITLE **XIN**
-REFDATA
    -SENDER -FAC **EBSZZXZQ**
    -RECVR -FAC **EBBUZXZQ**
    -SEQNUM **009**
-ARCID **AL25**
-SSRCODE **A2151**
-ARCTYP **F16**
-NBARC **1**
-SECTOR **WEST**
-ADEP **EBBE**
-ADES **EGUN**
-BEGIN RTEPTS
    -PT
        -PTID **GEO01**
        -TO **150500**
        -FL **F230**
    -PT
        -PTID **GEO02**
        -TO **150600**
        -FL **F230**
-END RTEPTS
-GEO
    -GEOID **GEO01**
    -LATTD **512500N**
    -LONGTD **0030000E**
-GEO
    -GEOID **GEO02**
    -LATTD **513400N**
    -LONGTD **0030300E**
-MSGREF

-SENDER -FAC **EBSZZXZQ**
-RECVR -FAC **EBBUZXZQ**
-SEQNUM **007**
-FLTRUL **I**

9.4. Crossing Clearance Request Message (XRQ)

9.4.1 Purpose

The purpose of the XRQ message is to forward a request to cross an airspace controlled by a civil unit with a flight controlled by military unit or vice versa.

The XRQ message may be used by the unit that has obtained an agreed crossing to modify that agreement.

9.4.2 Message content

OLDI-XRQ-10-M The XRQ message **shall** contain the following items of data:

- Message Type;
- Message Number;
- Message Reference (if modifying an earlier agreed crossing);
- Aircraft Identification;
- SSR Mode and Code;
- Number and Type of Aircraft;
- Route Points;
- Sector Identifier.

Note: *The Sector Identifier item contains the identifier of the sector responsible for the flight.*

OLDI-XRQ-20-M If bilaterally agreed, the XRQ message **shall** contain the following items of data:

- Departure Aerodrome;
- Destination Aerodrome;
- Equipment Capability and Status;
- Other Flight Plan Data.

9.4.3 Processing

9.4.3.1 General

OLDI-XRQ-30-M The Route Points element **shall** contain a description of the crossing route including at least two points.

OLDI-XRQ-40-M Times and flight levels **shall** be included for each point.

OLDI-XRQ-50-O In the case of climb or descent, an SFL **may** be included in addition to FL information.

OLDI-XRQ-60-M In the case of formation flights, a flight level block **shall** be used instead of a single FL.

OLDI-XRQ-70-M If not a case of climb, or descent, or formation flights, only a FL **shall** be provided.

OLDI-XRQ-80-M A second XRQ for the same flight and for the same crossing **shall not** be sent until the initiated dialogue has been concluded.

OLDI-XRQ-90-M The use of an XRQ to modify an earlier agreed crossing **shall** be subject to bilateral agreement.

Note: *If the modification of an earlier agreed crossing is allowed, the modification dialogue can be started either by a XRQ message sent by the controller in charge of the flight or by an XAP message sent by the controller in charge of the airspace to be crossed by this flight. Both controllers may try to initiate the modification dialogue simultaneously. In that case, only the dialogue initiated by the controller in charge of the flight shall be considered.*

OLDI-XRQ-100-M A bilateral agreement to include Equipment Capability and Status or Other Flight Plan Data **shall** also include those elements that are to be included.

Note: *In respect of the XRQ message, the above statement replaces that in the Data Insertion Rules section of the OLDI.*

OLDI-XRQ-110-M Such data fields **shall** include only those items bilaterally agreed.

Note: *In respect of the XRQ message, the above statement replaces that in the Data Insertion Rules section of the OLDI.*

9.4.3.2 In the Sending Unit

OLDI-XRQ-120-M The message **shall** be initiated at the controller's discretion, in accordance with the conditions specified in the LoA.

9.4.3.3 In the Receiving Unit

OLDI-XRQ-130-M If the message can be correctly processed, the system receiving the XRQ **shall** return an acknowledgement.

OLDI-XRQ-140-M If the message can be correctly processed, the data **shall** be made available to the controller immediately.

OLDI-XRQ-150-M If the message cannot be correctly processed, no acknowledgement **shall** be returned.

9.4.4 Acknowledgement

OLDI-XRQ-160-M XRQ messages **shall** be acknowledged by a SBY message.

OLDI-XRQ-170-M If no SBY message has been received within a specified time, a warning **shall** be displayed at the appropriate position.

9.4.5 Operational Reply

OLDI-XRQ-180-M An XRQ **shall** be replied to by

- an ACP accepting the proposed route/area crossing details;
- an XAP counter-proposing different route/area crossing details; or
- an RJC rejecting the proposed route/area crossing details.

OLDI-XRQ-190-O When no operational reply is received, a verbal co-ordination **may** be initiated.

OLDI-XRQ-200-O When no operational reply is received and a verbal co-ordination is initiated, if necessary, an XCM **may** be sent by the unit in charge of the flight to indicate that the current system dialogue is terminated.

9.4.6 Message Example

-TITLE **XRQ**

-REFDATA
-SENDER -FAC **EBSZZXZQ**
-RECVR -FAC **EBBUZXZQ**
-SEQNUM **012**
-ARCID **DEUCE22**
-SSRCODE **A1240**
-ARCTYP **F111**
-NBARC **3**
-SECTOR **SOUTH**
-BEGIN RTEPTS
-PT
-PTID **GEO01**
-TO **163000**
-FLBLOCK -FL **F245** -FL **F255**
-PT
-PTID **GEO02**
-TO **163100**
-FLBLOCK -FL **F255** -FL F**265**
-END RTEPTS
-GEO
-GEOID **GEO01**
-LATTD **500000N**
-LONGTD **0051000E**
-GEO
-GEOID **GEO02**
-LATTD **500000N**
-LONGTD **0051500E**
-ADEP **EBBE**
-ADES **EGUN**
-MSGREF
-SENDER -FAC **EBSZZXZQ**
-RECVR -FAC **EBBUZXZQ**
-SEQNUM **007**
-FLTRUL **I**
-BEGIN **EQCST**
-EQPT **W/EQ**
-EQPT **Y/NO**
-END **EQCST**

9.5. Crossing Alternate Proposal Message (XAP)

9.5.1 Purpose

The purpose of the XAP message is to transmit a counterproposal by a controller to the route/area crossing details proposed by another controller.

If bilaterally agreed, the XAP message may be used by the controller in charge of the airspace to be crossed to propose a modification to agreed route/area crossing details.

9.5.2 Message content

OLDI-XAP-10-M The XAP message **shall** contain the following items of data:

- Message Type;
- Message Number;
- Message Reference;
- Aircraft Identification;
- Route Points.

OLDI-XAP-20-M If bilaterally agreed, the XAP message **shall** contain the following item of data:

- Other Flight Plan Data.

9.5.3 Processing

9.5.3.1 General

OLDI-XAP-30-M The counterproposal **shall** include a proposed new flight level for at least one point mentioned either in the XRQ message to which it is replying for, or in the agreed route/area crossing details it aims to modify.

OLDI-XAP-40-O Only flight levels (FL, SFL, Flight Level Block) **may** be changed.

OLDI-XAP-50-O If, as for XRQ, the initiation of a new dialogue to modify an earlier agreed crossing is bilaterally agreed, the controller in charge of the airspace to be crossed **may** initiate a new dialogue by sending an XAP.

Note: *The modification dialogue can also be initiated by a XRQ message sent by the controller in charge of the flight. Both controllers may try to initiate the modification dialogue simultaneously. In that case, only the dialogue initiated by the controller in charge of the flight shall be considered.*

9.5.3.2 In the sending unit

OLDI-XAP-60-M The XAP message **shall** be triggered by the manual input of a proposed new flight level by the controller.

9.5.3.3 In the receiving unit

OLDI-XAP-70-M The system receiving the XAP **shall** attempt association with the corresponding message.

OLDI-XAP-80-M If that message is found and there is no discrepancy that would inhibit correct processing, an acknowledgement **shall** be returned.

OLDI-XAP-90-M If that message is found and there is no discrepancy that would inhibit correct processing, the content of the XAP **shall** made available to the controller immediately.

OLDI-XAP-100-M If the message cannot be correctly processed or it cannot be associated with the corresponding message, no acknowledgement **shall** be returned.

9.5.4 Acknowledgement

OLDI-XAP-110-M The XAP **shall** be acknowledged by a SBY message.

OLDI-XAP-120-M If no acknowledgement has been received within a specified time, a warning **shall** be displayed at the appropriate position.

9.5.5 Operational Reply

OLDI-XAP-130-M An XAP message **shall** be replied to by

- an ACP message when the proposed route/area crossing details are accepted.
- a RJC message when the proposed route/area crossing details are rejected.

Note: *Both replies terminate the dialogue.*

OLDI-XAP-140-O When no operational reply is received, a verbal co-ordination **may** be initiated.

OLDI-XAP-150-O When no operational reply is received and if necessary, an XCM **may** be sent by the unit in charge of the airspace to indicate that the current system dialogue is terminated.

9.5.6 Message Example

-TITLE **XAP**
-REFDATA
    -SENDER -FAC **EBBUZXZQ**
    -RECVR -FAC **EBSZZXZQ**
    -SEQNUM **014**
-MSGREF
    -SENDER -FAC **EBSZZXZQ**
    -RECVR -FAC **EBBUZXZQ**
    -SEQNUM **012**
-ARCID **DEUCE22**
-BEGIN RTEPTS
    -PT
        -PTID **GEO01**
        -TO **163000**
        -FL **F230**
    -PT
        -PTID **GEO02**
        -TO **163100**
        -FL **F230**
-END RTEPTS
-FLTRUL **I**

9.6. Crossing Cancellation Message (XCM)

9.6.1 Purpose

An XCM message is used to indicate to the addressed unit that the notification or co-ordination previously effected for a flight is being abrogated.

The XCM is not a replacement for a Cancellation (CNL) message defined by ICAO and therefore shall not be used to erase the basic flight plan data.

9.6.2 Message contents

OLDI-XCM-10-M The XCM message **shall** contain the following items of data:

- Message Type;
- Message Number;
- Message Reference;
- Aircraft Identification.

OLDI-XCM-20-M If bilaterally agreed, the XCM message **shall** contain any of the following items of data:

- Departure Aerodrome;
- Destination Aerodrome.

9.6.3 Processing

9.6.3.1 General

OLDI-XCM-30-M An XCM **shall** be sent by the unit responsible for the flight when one of the following occurs:

- the flight will not enter the addressed unit's airspace after a BFD/CFD;
- the crossing will not be executed on the route expressed in the XIN;
- the crossing will not be executed according to the conditions under negotiation or according to the conditions agreed after an airspace crossing dialogue.

OLDI-XCM-40-O An XCM **may** be sent by the unit responsible for the flight when no operational reply has been received to an acknowledged XRQ to indicate that the current system dialogue is terminated.

OLDI-XCM-50-O An XCM **may** be sent by the unit responsible for the airspace when no operational reply has been received to an acknowledged XAP to indicate that the current system dialogue is terminated.

OLDI-XCM-60-M The message reference **shall** contain the message number of the BFD, XIN, XRQ or XAP message transmitted and acknowledged for the flight, it intends to abrogate.

9.6.3.2 In the sending unit

OLDI-XCM-70-M The XCM **shall** be triggered automatically or manually by a controller input.

OLDI-XCM-80-M An XCM **shall** be triggered manually when it is sent to terminate the dialogue after the failure to receive an operational reply.

9.6.3.3 In the receiving unit

OLDI-XCM-90-M If the message can be associated with the corresponding message or flight plan and can be processed, an acknowledgement **shall** be returned.

OLDI-XCM-100-M If the message can be associated with the corresponding message or flight plan and can be processed, the content of the message **shall** be made available to the controller immediately.

OLDI-XCM-110-M If the message can be associated with the corresponding message or flight plan and can be processed, the relevant data **shall** be deleted.

OLDI-XCM-120-M If the message cannot be associated with a corresponding flight plan or message, or it cannot be correctly processed, the acknowledgement **shall** be inhibited.

9.6.4 Acknowledgement

OLDI-XCM-130-M The message **shall** be acknowledged by a LAM message.

OLDI-XCM-140-M If no LAM is received in response to an XCM within a specified time, a warning **shall** be displayed at the appropriate position.

OLDI-XCM-150-M In such cases a verbal abrogation of co-ordination **shall** be effected by the unit that has initiated the XCM message.

9.6.5 Operational Reply

There is no operational reply required for the XCM.

9.6.6 Message Example

-TITLE **XCM**
-REFDATA
    -SENDER -FAC **EBSZZXZQ**
    -RECVR -FAC **EBBUZXZQ**
    -SEQNUM **015**
-MSGREF
    -SENDER -FAC **EBSZZXZQ**
    -RECVR -FAC **EBBUZXZQ**
    -SEQNUM **012**
-ARCID **DEUCE22**
-ADEP **EBBE**
-ADES **EGUN**

10 Negotiations in advanced of coordination and transfer conditions

10.1. Objective

With the new ATC Concepts, in particular the extended ATC planner and INAP (Integrated Network and ATC Planner), there is a need to negotiate the optimum trajectory with all applicable constraints well in advance between ATS unit still not in control of the flight. This section addresses the mechanism to support the coordination in advance using specific exchanges designed for this purpose as:

- Advanced Negotiation Proposal (ANP);
- Advanced Negotiation Request (ANR);
- Advanced Negotiation Notification (ANN);

The exchange mechanism was developed in the context of drafting the OLDI Specification Edition 6.0, but as the consensus within the OLDI group was that the operational concept was not sufficiently mature to include these messages in Edition 6.0, it was decided to place them in the OLDI GM and reconsider them in the next update of the OLDI specification.

10.2. Use Cases

The following pre-conditions are applicable:

- Three ATC units are involved as:
    - ATSU A (ATSU currently controlling the flight);
    - ATSU B (downstream ATSU);
    - ATSU C (further downstream ATSU);
    - Negotiation is done between ATSU B and ATSU C;
- The flight does not need to be assumed by any of the ATSUs to start the negotiation of coordination conditions and trajectory modifications.
- The subject of negotiation is the flight trajectory, in particular direct routing requests, Estimated Flight Level (EFL) over specific point and transfer conditions.
- The initiation of ANR/ANP proposal is manual on specific request of the transferring or accepting ATCO.
- Like for other dialogue messages a standby message (SBY) will be generated and the transferring or accepting ATS units can either accept (ACP) or reject (RJC) the request/proposal for an amendment of trajectory or transfer conditions.
- Counter-proposal (CDN) is not foreseen.
- Notification of successful ANP/ANR dialogue closure is provided to ATSU A via an ANN message.

- The ANN message updates the system flight plan of ATSU A, ensuring the coordination messages send by ATSU A to ATSU B contain the agreed trajectory and coordination conditions between ATSU B and ATSU C.
- The results of this negotiation dialogue need to be confirmed by an ACT message when the ATSU B will assume the flight and the timing for the ACT is due.
-

10.2.1 ATSU B proposes DCT re-routing

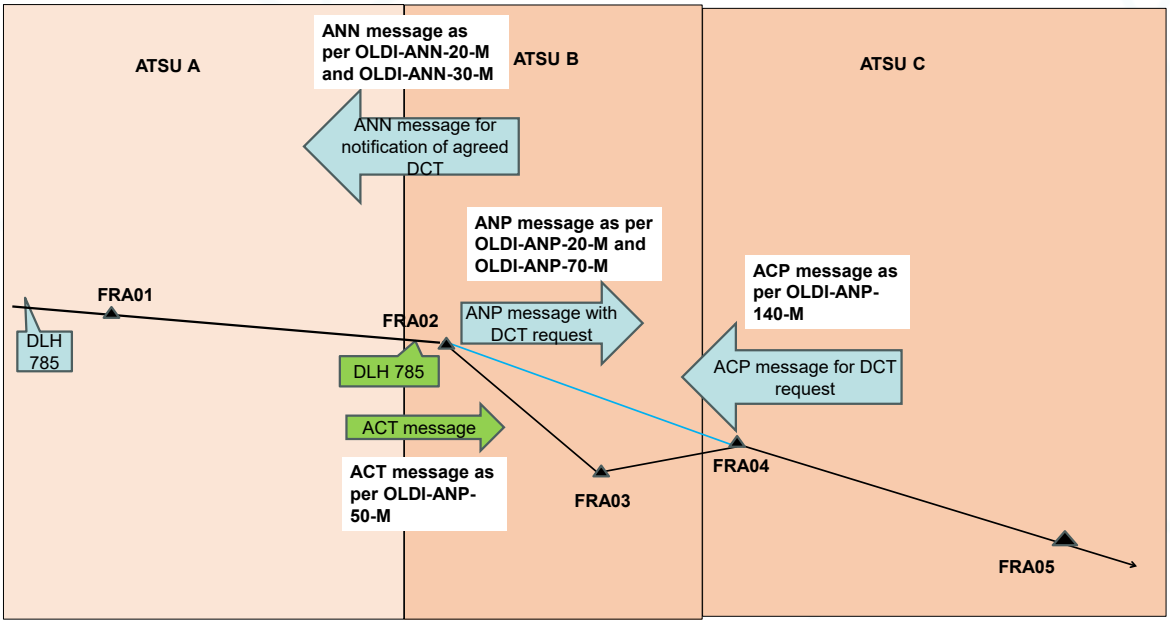


Figure 53 - Advanced negotiations DCT rerouting

Scenario:

Flight DLH785 is planned to cross three ATSU (A, B and C) via route FRA01 DCT FRA02 DCT FRA03 DCT FRA04 DCT FRA05

The route contained in FDPS of ATSU A is FRA01 FRA02 FRA03 FRA04, according to the ATSU A definition of AoI.

The route contained in FDPS of ATSU B is FRA01 FRA02 FRA03 FRA04 FRA05, according to the ATSU B definition of AoI.

The route contained in FDPS of ATSU C is FRA02 FRA03 FRA04 FRA05, according to the ATSU A definition of AoI.

10:21 DLH785 is assumed by ATSU A.

10:23 While flight is under control of ATSU A, and ATSU B initiate the DCT proposal to ATSU C (route FRA02 DCT FRA04). This DCT change the boundary conditions instead gate GAT10, the flight DLH785 is planned to exist over gate GAT11.

10:23 DCT proposal for the flight that is not in coordinated state triggers the sending of ANP. ATSU B sends ANP message to ATSU C.

TITLE **ANP**
-REFDATA
-SENDER -FAC **ATSU B**

-RECVR -FAC **ATSU C**
-SEQNUM **233**
-ARCID **DLH785**
-ADEP **EDDF**
-ADES **LTFM**

-BEGIN RTEPTS
-PT
-PTID **FRA01**
-TO **1031**
-FL **F350**

-PT
-PTID **FRA02**
-TO **1045**
-FL **F350**

-PT
-PTID **FRA03**
-TO **1051**
-FL **F350**

-PT
-PTID **FRA04**
-TO **1059**
-FL **F350**

-PT
-PTID **FRA05**
-TO **1108**
-FL **F350**

-DCT **FRA02 FRA04**

-COORDATA
-GID **GAT11**
-TO **1106**
-TFL **F350**

10:23 ATSU C receives ANP message and reply with SBY message.

-TITLE **SBY**
-REFDATA
-SENDER -FAC **ATSU C**
-RECVR -FAC **ATSU B**
-SEQNUM **876**
-MSGREF
-SENDER -FAC **ATSU B**
-RECVR -FAC **ATSU C**
-SEQNUM **233**

10:24 ATCO staffing the relevant sector of ATSU C reviews the DCT proposal contained in ANP message and accepts the proposal sending ACP message to ATSU B.

-TITLE **ACP**
-REFDATA
-SENDER -FAC **ATSU C**
-RECVR -FAC **ATSU B**
-SEQNUM **887**

-MSGREF
-SENDER -FAC **ATSU C**
-RECVR -FAC **ATSU B**
-SEQNUM **233**

10:24 After the reception of ACP message**,** the dialogue is closed, ATSU B returns a LAM message and updates the SFPL with the ANP content, the flight trajectory is amended and the coordination conditions agreed.

10:24 ATSU B automatically sends ANN message to ATSU A notifying about the agreed DCT between ATSU B and ATSU C.

TITLE **ANN**
-REFDATA
-SENDER -FAC **ATSU B**
-RECVR -FAC **ATSU A**
-SEQNUM **544**
-ARCID **DLH785**
-ADEP **LDDF**
-ADES **LTFM**

-BEGIN RTEPTS
-PT
-PTID **FRA01**
-TO **1031**
-FL **F290**

-PT
-PTID **FRA02**
-TO **1045**
-FL **F310**

-PT
-PTID **FRA04**
-TO **1059**
-FL **F310**

-PT
-PTID **FRA05**
-TO **1108**
-FL **F310**

-END RTEPTS

10:24 ATSU A receives ANN message, sends LAM back to ATSU A, route is updated considering the content of ANN message, FRA03 point is removed.

10:25 ATSU A sends ABI message from ATSU B,

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSU A**
-RECVR -FAC **ATSU B**
-SEQNUM **765**
-ARCID **DLH785**
-SSRCODE **A4455**
-ADEP **EDDF**
-COORDATA
-GID **GAT07**

-TO **1045**
-TFL **F350**
-ADES LTFM
-ARCTYP **A321**

-ROUTE **N0440F350 FRA01 DCT FRA02 DCT FRA04**

10:25 ATSU B receives ABI message from ATSU A, gate GAT07 is indicated, and route does not contain the point FRA03 as agreed between ATSU B and ATSU C with ANP dialogue. The LAM message is returned to ATSU A

10:35 ATSU A sends ACT message to ATSU B, the ACT content is aligned with agreed DCT.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSU A**
-RECVR -FAC **ATSU B**
-SEQNUM **797**
-ARCID **DLH785**
-SSRCODE **A4455**
-ADEP **EDDF**
-COORDATA
-GID **GAT07**
-TO **1045**
-TFL **F350**
-ADES **LTFM**
-ARCTYP **A321**

-ROUTE **N0440F350 FRA01 DCT FRA02 DCT FRA04**

10:35 ATSU B receives ABI message from ATSU A, the gate and route are identical as per ABI. The LAM message is returned to ATSU A

10:44 The flight is transferred to ATSU B.

10:47 ATSU B sends an ABI message for DLH785 to ATSU C with agreed trajectory.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSU B**
-RECVR -FAC **ATSU C**
-SEQNUM **432**
-ARCID **DLH785**
-SSRCODE **A4455**
-ADEP **EDDF**
-COORDATA
-GID **GAT11**
-TO **1107**
-TFL **F350**
-ADES **LTFM**
-ARCTYP **A321**

-ROUTE N0440F350 FRA01 DCT FRA02 DCT FRA04 DCT FRA05

10:47 ATSU C receives ABI message from ATSU B, the boundary conditions and route are identical to those agreed via ANP. The LAM message is returned to ATSU B.

10:56 ATSU B sends an ACT message for DLH785, no need for RAP as the agreed trajectory changes with ANP mechanisms are integrated in ACT message content.

-TITLE **ACT**

-REFDATA
-SENDER -FAC **ATSU B**
-RECVR -FAC **ATSU C**
-SEQNUM **457**
-ARCID **DLH785**
-SSRCODE **A4455**
-ADEP **EDDF**
-COORDATA
-GID GAT11
-TO **1106**
-TFL **F350**
-ADES **LTFM**
-ARCTYP **A321**

-ROUTE **N0440F350** FRA01 DCT FRA02 DCT FRA04 DCT FRA05

10:56 ATSU C receives ACT message from ATSU B with almost no change compared with previously received ABI, except slight change of estimated boundary time. The LAM message is returned to ATSU B.

10.2.2 ATSU C Requests change of TFL over MAVAR point

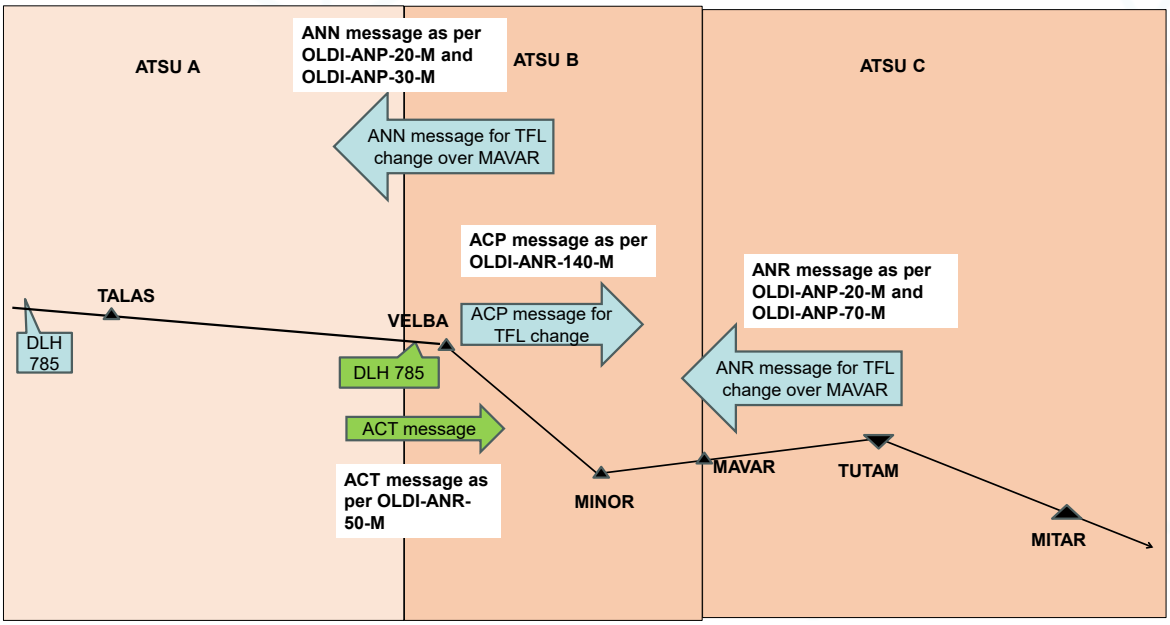


Figure 54 - Advanced negotiations TFL over point

Scenario:

Flight THY433 is planned to cross three ATSU (A, B and C) via route TALAS DCT VELBA DCT MINOR DCT MAVAR DCT TUTAM, DCT MITAR, at the cruising conditions at FL360.

The route contained in FDPS of ATSU A is TALAS VELBA MINOR MAVAR, according to the ATSU A definition of AoI.

The route contained in FDPS of ATSU B is TALAS VELBA MINOR MAVAR TUTAM, according to the ATSU B definition of AoI.

The route contained in FDPS of ATSU C is VELBA MINOR MAVAR TUTAM, MITAR, according to the ATSU A definition of AoI.

09:41 THY433 is assumed by ATSU A.

09:45 While flight is under control of ATSU A, and ATSU C starts the dialogue for the change of TFL over MAVAR point from FL360 to FL340.

09:45 The TFL change for the flight that is not in coordinated state triggers the sending of ANR message, ATSU C sends ANR message to ATSU B.

-TITLE **ANR**
-REFDATA
-SENDER -FAC **ATSU C**
-RECVR -FAC **ATSU B**
-SEQNUM **677**
-ARCID **THY433**
-ADEP **LIRF**
-ADES **LATI**

-COORDATA

-BEGIN RTEPTS
-PTID **MAVAR**
-TO **1029**
-TFL **F340**

-BEGIN RTEPTS

-PT
-PTID **VELBA**
-TO **1023**
-FL **F360**

-PT
-PTID **MINOR**
-TO **1026**
-FL **F360**

-PT
-PTID **MAVAR**
-TO **1029**
-FL **F360**

-PT

-PTID **TUTAM**
-TO **1033**
-FL **F360**

-PT
-PTID **MITAR**
-TO **1037**
-FL **F360**

-END RTEPTS

09:45 ATSU B receives ANR message and reply with SBY message.

-TITLE **SBY**
-REFDATA
-SENDER -FAC **ATSU B**
-RECVR -FAC **ATSU C**
-SEQNUM **811**

-MSGREF
-SENDER -FAC **ATSU B**
-RECVR -FAC **ATSU C**
-SEQNUM **677**

09:46 ATCO staffing the relevant sector of ATSU B reviews the TFL change request contained in ANR message and accepts the proposal sending ACP message to ATSU B.

-TITLE **ACP**
-REFDATA
-SENDER -FAC **ATSU B**
-RECVR -FAC **ATSU C**
-SEQNUM **823**
-MSGREF
-SENDER -FAC **ATSU C**
-RECVR -FAC **ATSU B**
-SEQNUM **811**

09:46 After the reception of ACP message**,** the dialogue is closed, ATSU C returns a LAM message and updates the SFPL with the ANP content, the flight trajectory is amended and the coordination conditions agreed.

09:46 ATSU B automatically sends ANN message to ATSU A notifying about the agreed TFL between ATSU B and ATSU C.

TITLE **ANN**
-REFDATA
-SENDER -FAC **ATSU B**
-RECVR -FAC **ATSU A**
-SEQNUM **089**
-ARCID **THY433**
-ADEP **LIRF**
-ADES **LATI**

-BEGIN RTEPTS
-PT
-PTID **TALAS**
-TO **1015**
-FL **F360**

-PT
-PTID **VELBA**
-TO **1023**
-FL **F360**

-PT
-PTID **MINOR**
-TO **1026**
-FL **F360**

-PT

-PTID **MAVAR**
-TO **1029**
-FL **F340**

PT

-PTID **TUTAM**

-TO **1033**
-FL **F340**

-END RTEPTS

09:46 ATSU A receives ANN message from ATSU B, sends LAM back to ATSU A, TFL over MAVAR point is updated.

10:01 ATSU A sends ABI message from ATSU B:

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSU A**
-RECVR -FAC **ATSU B**
-SEQNUM **546**
-ARCID **THY433**
-SSRCODE **A0024**
-ADEP **LIRF**
-COORDATA
-GID **GOSTI**
-TO **1021**
-TFL **F360**
-ADES **LATI**
-ARCTYP **A321**

-ROUTE **N0450F360 TALAS DCT VELBA DCT MINOR DCT MAVAR**

10:01 ATSU B receives ABI message from ATSU A, boundary point GOSTI is indicated, and route contain the point MAVAR without indication of FL over this point. The LAM message is returned to ATSU A.

10:09 ATSU B sends an ABI message for THY433 to ATSU C.

-TITLE **ABI**
-REFDATA
-SENDER -FAC **ATSU B**
-RECVR -FAC **ATSU C**
-SEQNUM **875**
-ARCID **THY433**
-SSRCODE **A0024**
-ADEP **LIRF**
-COORDATA
-GID **MAVAR**
-TO **1029**
-TFL **F340**
-ADES **LIRF**
-ARCTYP **A321**

-ROUTE **N0440F350 TALAS DCT VELBA DCT MINOR DCT MAVAR DCT TUTAM**

10:09 ATSU C receives ABI message from ATSU B, the boundary conditions and route are identical to those agreed via ANR. The LAM message is returned to ATSU B.

10:12 ATSU A sends ACT message to ATSU B, the ACT content is identical to the previously sent ABI, except slight change of timing over GOSTI.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSU A**
-RECVR -FAC **ATSU B**
-SEQNUM **565**

-ARCID **THY433**
-SSRCODE **A0024**
-ADEP **LIRF**
-COORDATA
    -GID **GOSTI**
    -TO **1022**
    -TFL **F360**
-ADES **LATI**
-ARCTYP **A321**

-ROUTE **N0440F350 TALAS DCT VELBA DCT MINOR DCT MAVAR**

10:12 ATSU B receives ACT message from ATSU A, the boundary conditions and route are identical as per ABI, only slight time change of GOSTI point, The trajectory within ATSU B is updated and LAM message is returned to ATSU A

10:19 ATSU B sends an ACT message for THY433, no need for RAP as the agreed trajectory changes with ANR mechanisms are integrated in ACT message content.

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSU B**
    -RECVR -FAC **ATSU C**
-SEQNUM **911**
-ARCID **THY433**
-SSRCODE **0024**
-ADEP **LIRF**
-COORDATA
    -GID **MAVAR**
    -TO **1029**
    -TFL **F340**
-ADES **LATI**
-ARCTYP **A321**

-ROUTE **N0440F350 TALAS DCT VELBA DCT MINOR DCT MAVAR DCT TUTAM**

10:22 The flight is transferred from ATSU A to ATSU B.

10.3. Advanced Negotiation Request Message (ANR)

10.3.1 Purpose

The Advanced Negotiation Request (ANR) message is intended to support coordination in advance between downstream and upstream ATS units, in cases that neither of these ATS unit control the flight.

The ANR message is sent by the downstream ATS unit to the upstream ATS unit to co-ordinate in advance the flight trajectory, direct routing request, estimated flight levels and transfer conditions. The upstream ATS unit that is involved in this co-ordination may not yet be in control of flight. The content of the ANR message needs to be confirmed with ACT coordination messages, depending on transfer conditions.

10.3.2 Message Contents

OLDI-ANR-10-M The ANR message **shall** contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- Departure Aerodrome;
- Destination Aerodrome;
- Trajectory Points.

OLDI-ANR-20-M The ANR message **shall** contain at least one of the following items of data, if applicable:

- Estimate Data;
- Direct Routing Request;
- Estimated Flight Level.

10.3.3 Rules of Application

OLDI-ANR-30-M The revision of trajectory and co-ordination conditions contained in ANR **shall** become agreed upon the acceptance by the transferring ATS unit.

OLDI-ANR-40-M Data included in a subsequent ANR message as defined in OLDI-ANR-20-M for the same flight, **shall**:

- supersede the equivalent item(s) of data transmitted in the previous ANP message(s), or
- add item(s) of data not included in previous ANR message(s).

OLDI-ANR-50-M The agreed trajectory and co-ordination data modification **shall** be confirmed by sending ACT with the new agreed trajectory when trigger for ACT sending is due.

OLDI-ANR-60-M The ACT message **shall** include the trajectory points agreed with ANR.

OLDI-ANR-70-M After sending ACT, the ANP/ANR mechanism **shall** be inhibited, and further revisions will follow REV/RRV/CDN stream.

10.3.4 Downstream ATS Unit

OLDI-ANR-80-M The ANR message **shall** be sent to the downstream ATS unit on manual initiation by the upstream ATS unit controller.

10.3.5 Upstream ATS Unit

OLDI-ANR-90-M If a corresponding system flight plan can be found, an acknowledgement **shall** be sent.

OLDI-ANR-100-M The operational content **shall** be displayed immediately to the transferring sector position.

OLDI-ANR-110-M The proposed conditions (TFL and COP/Gate contained in estimate data, EFL, Direct Routing Request) triggering ANR message **shall** be clearly indicated at the appropriate working position.

10.3.6 Acknowledgement of ANR

OLDI-ANR-120-M The ANR message **shall** be acknowledged by a SBY message.

OLDI-ANR-130-R If no acknowledgement has been received within a specified time, a warning **shall** be displayed to the sector who initiated the ANR message.

10.3.7 Operational Reply to ANR

OLDI-ANR-140-M The upstream ATS unit controller **shall** either accept or reject the proposed changes of trajectory or transfer conditions.

OLDI-ANR-150-M When the upstream ATS unit controller elects to accept the proposed changes contained in ANR message, an ACP message **shall** be returned.

OLDI-ANR-160-M When the upstream ATS unit controller elects to reject the proposed changes contained in ANR message, a RJC message **shall** be returned.

OLDI-ANR-170-M As soon as an ACP has been received by the upstream ATS unit, the ANR message data **shall** become operationally binding to both ATS units.

OLDI-ANR-180-M As soon as an ACP has been received from the upstream ATS unit, the content of the ANR **shall** update the system flight plan.

OLDI-ANR-190-M If no operational reply is received by the upstream ATS unit within a parameter time, a warning **shall** be displayed at the appropriate ATC position.

10.3.8 Examples

Example of an ANR message for a request to change the TFL between downstream and upstream ATS units, and application of EFL:

-TITLE **ANR**
-REFDATA
    -SENDER -FAC **LBSR**
    -RECVR -FAC **LWSS**
    -SEQNUM **114**
-ARCID **THY4532**
-ADEP **LIRF**
-ADES **LATI**

-COORDATA
    -PTID **MAVAR**

-TO **1029**
-TFL **F340**

-BEGIN RTEPTS
-PT
-PTID **TALAS**
-TO **1020**
-FL **F360**

-PT
-PTID **VELBA**
-TO **1023**
-FL **F360**

-PT
-PTID **MINOR**
-TO **1026**
-FL **F360**

-PT
-PTID **MAVAR**
-TO **1029**
-FL **F360**

-PT

-PTID **TUTAM**
-TO **1033**
-FL **F360**

-PT
-PTID **MITAR**
-TO **1037**
-FL **F360**

-END RTEPTS

-EFL
-FL **F350**
-PTID **MINOR**

Example of ANR message with a request for direct routing request and changing TFL:

-TITLE **ANR**
-REFDATA
-SENDER -FAC **LBSR**
-RECVR -FAC **LWSS**
-SEQNUM **145**
-ARCID **THY567**
-ADEP **LATI**
-ADES **LTFM**

-BEGIN RTEPTS
-PT
-PTID **TALAS**
-TO **2012**

-FL **F350**

-PT

-PTID **VELBA**

-TO **2015**

-FL **F350**

-PT

-PTID **MINOR**

-TO **2019**

-FL **F350**

-PT

-PTID **MAVAR**

-TO **2024**

-FL **F350**

-PT

-PTID **TUTAM**

-TO **2029**

-FL **F350**

-PT

-PTID **MITAR**

-TO **2033**

-FL **F350**

-END RTEPTS

-DCT VELBA **MITAR**

-COORDATA

-GID GAT12

-TO 2025

-TFL **F370**

10.4. Advanced Negotiation Proposal (ANP)

10.4.1 Purpose

The Advanced Negotiation Proposal (ANP) message is intended to support coordination in advance between upstream and downstream ATS units, in cases that neither of these ATS unit control the respective flight.

The ANP message is sent by the upstream ATS unit to the downstream ATS unit to co-ordinate in advance the flight trajectory, direct routing request, estimated flight levels and transfer conditions. The upstream unit that starts this co-ordination may not yet be in control of the flight. The content of the ANP message needs to be confirmed with ACT coordination messages, depending on transfer conditions.

10.4.2 Message Contents

OLDI-ANP-10-M The ANP message **shall** contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- Departure Aerodrome;
- Destination Aerodrome.
- Trajectory Points.

OLDI-ANP-20-M The ANP message **shall** contain at least one of the following items of data, if applicable:

- Estimate Data;
- Direct Routing Request;
- Estimated Flight Level.

10.4.3 Rules of Application

10.4.3.1 General

OLDI-ANP-30-M The revision of trajectory and co-ordination conditions contained in ANP **shall** become agreed upon the acceptance by the accepting ATS unit.

OLDI-ANP-40-M Data included in a subsequent ANP message as defined in OLDI-ANP-20-M for the same flight, **shall**:

- supersede the equivalent item(s) of data transmitted in the previous ANP message(s), or
- add item(s) of data not included in previous ANP message(s).

OLDI-ANP-50-M The agreed trajectory and co-ordination data modification **shall** be confirmed by sending ACT when the upstream ATS unit assumes the flight and the trigger for ACT sending is due.

OLDI-ANR-60-M The ACT message **shall** be include the trajectory points agreed with ANP.

OLDI-ANP-70-M After sending ACT, the ANP/ANR mechanism **shall** be inhibited, and further revisions will follow REV/RRV/CDN stream.

10.4.3.2 Upstream ATS Unit

OLDI-ANP-80-M The ANP message **shall** be sent to the downstream ATS unit on manual initiation by the upstream ATS unit controller.

10.4.3.3 Downstream ATS Unit

OLDI-ANP-90-M If a corresponding system flight plan can be found, an acknowledgement **shall** be sent.

OLDI-ANP-100-M The operational content **shall** be displayed immediately to the accepting sector position.

OLDI-ANP-110-M The proposed conditions (TFL and COP contained in estimate data, EFL, Direct Routing Request) triggering an ANP message **shall** be clearly indicated at the appropriate working position.

10.4.4 Acknowledgement of ANP

OLDI-ANP-120-M The ANP message **shall** be acknowledged by a SBY message.

OLDI-ANP-130-R If no acknowledgement has been received within a specified time, a warning **should** be displayed to the sector who initiated the ANP message.

10.4.5 Operational Reply to ANP

OLDI-ANP-140-M The downstream ATS unit controller **shall** either accept or reject the proposed changes of trajectory or transfer conditions.

OLDI-ANP-150-M When the downstream ATS unit controller elects to accept the proposed changes contained in ANP message, an ACP message **shall** be returned.

OLDI-ANP-160-M When the downstream ATS unit controller elects to reject the proposed changes contained in ANP message, a RJC message **shall** be returned.

OLDI-ANP-170-M As soon as an ACP has been received by the upstream ATS unit, the ANP message data **shall** become operationally binding to both ATS units.

OLDI-ANP-180-M As soon as an ACP has been received from the downstream ATS unit, the content of the ANP **shall** update the system flight plan.

OLDI-ANP-190-M If no operational reply is received by the downstream ATS unit within a parameter time, a warning **shall** be displayed at the appropriate ATC position.

10.4.6 Examples

Example of an ANP message with a proposal to change the TFL between upstream and downstream ATS units, early start of climb and application of EFL:

-TITLE **ANP**
-REFDATA
    -SENDER -FAC **LWSS**
    -RECVR -FAC **LBSR**
    -SEQNUM **762**
-ARCID **THY5344**
-ADEP **LIRF**
-ADES **LTFM**

-COORDATA
    -**GID GAT05**
    -TO **1029**
    -TFL **F350**

-BEGIN RTEPTS
-PT
-PTID **FRA01**
-TO **1015**
-FL **F290**
-PT
-PTID **FRA02**
-TO **1019**
-FL **F310**
-PT
-PTID **FRA03**
-TO **1027**
-FL **F310**
-PT
-PTID **FRA04**
-TO **1029**
-FL **F330**
-PT
-PTID **FRA05**
-TO **1033**
-FL **F350**
-END RTEPTS
-EFL
-FL **F330**
-PTID **FRA03**

Example of an ANP message with a proposal for direct routing request without changing TFL

-TITLE **ANP**
-REFDATA
-SENDER -FAC **LWSS**
-RECVR -FAC **LBSR**
-SEQNUM **778**
-ARCID **THY8172**
-ADEP **LIRF**
-ADES **LTFM**

-BEGIN RTEPTS
-PT
-PTID **FRA01**
-TO **1015**
-FL **F290**
-PT
-PTID **FRA02**
-TO **1019**
-FL **F310**
-PT
-PTID **FRA03**
-TO **1022**
-FL **F310**

-PT

-PTID **FRA04**
-TO **1029**
-FL **F310**

-PT

-PTID **FRA05**
-TO **1033**
-FL **F310**

-END RTEPTS

-DCT **FRA02 FRA04**

10.5. Advanced Negotiation Notification Message (ANN)

10.5.1 Purpose

The Advanced Negotiation Notification Message (ANN) is sent by the upstream ATS unit to the ATS unit further upstream to notify this unit about flight trajectory, direct routing request, estimated flight levels and transfer conditions agreed with the downstream ATS unit.

10.5.2 Message Contents

OLDI-ANN-10-M The ANN message **shall** contain the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- Departure Aerodrome;
- Destination Aerodrome;
- Trajectory Points.

10.5.3 Rules of Application

10.5.3.1 General

OLDI-ANN-20-M The ANN message **shall** be automatically transmitted by the upstream ATS unit to the further upstream ATS unit that control the flight.

OLDI-ANN-30-M An ANN message **shall** be only transmitted after successful closure of advanced negotiation dialogue (initiated ANP or ANR messages) and the trajectory changes and transfer conditions are agreed between upstream and downstream ATS units.

OLDI-ANN-40-M The revision of trajectory and coordination conditions as result of subsequent ANP/ANR dialogue **shall** trigger an automatic transmission of revised ANN messages.

OLDI-ANN-50-M The trajectory points field **shall** contain the list of agreed trajectory points after the finalisation of ANP/ANR dialogue.

10.5.3.2 Processing on Receipt of an ANN Message

OLDI-ANN-60-M The ATS unit receiving an ANN message **shall** attempt association with the corresponding system flight plan.

OLDI-ANN-70-M If the ANN message can be unambiguously associated with a system flight plan, it **shall** be acknowledged.

OLDI-ANN-80-M If the ANN message can be unambiguously associated with a system flight plan, the operational content **shall** update the system flight plan, including trajectory points data items.

Note: The ACT and/or REV messages sent by the further upstream ATS units contain the route/trajectory info aligned with content of received ANN messages.

OLDI-ANN-90-M If the ANN message cannot be associated with a system flight plan, the transmission of a LAM message **shall** be inhibited.

OLDI-ANN-100-R If the ANN message cannot be associated with a system flight plan, a warning **should** be displayed at an appropriate position.

10.5.4 Acknowledgement of ANN

OLDI-ANN-110-M The ANN message **shall** be acknowledged by the generation and transmission of a LAM message.

OLDI-ANN-120-R If no acknowledgement has been received within a specified time, a warning **should** be displayed to the sector who initiated the ANP message.

10.5.5 Example

ANN message to LATR, when LWSS and LBSR agreed direct routing FRA02 DCT FRA04.

TITLE **ANN**
-REFDATA
-SENDER -FAC **LWSS**
-RECVR -FAC **LATR**
-SEQNUM **657**
-ARCID **THY876**
-ADEP **LIRF**
-ADES **LTFM**

-BEGIN RTEPTS
-PT
-PTID **FRA01**
-TO **1015**
-FL **F290**
-PT
-PTID **FRA02**
-TO **1019**
-FL **F310**
-PT
-PTID **FRA04**
-TO **1029**
-FL **F310**
-PT
-PTID **FRA05**
-TO **1033**
-FL **F310**
-END RTEPTS

11 Explanatory notes of SKIP mechanism

11.1. Objective

The skip mechanism underwent a substantial change and enhancement in the OLDI Specification Edition 6.0. This update was driven by the operational requirement to enable the skipping of communications with an entire ATS unit, beyond the previously supported capability of skipping only the first sector of the downstream unit.

To address this operational need, the Skip Communication Message (SCO) was extended to support the skipping of communications with an entire ATS Unit. Similarly, the Skip Cancellation Message (SKC) was amended to enable the reversal of this action, thereby reinstating the previously skipped unit into the communication sequence.

In addition to these changes, two new complementary messages were introduced to support the expanded skip mechanism:

- **Skip Notification (SKN):** The SKN message notifies its downstream unit that communication with the flight will be transferred directly from a further upstream ATS unit.
- **Bypass Proposal (BYP):** The BYP message is sent to the downstream unit to propose that communication with the flight should pass directly to next ATS unit in the sequence.

Furthermore, the transfer of communication messages, including the ROF, COF and MAS messages, were updated to accommodate the capability of skipping an entire ATS Unit. Similarly, the LOF and NAN messages were adapted to support air-ground datalink operations in scenarios where an ATS Unit is skipped.

Together, these modifications and additions form a comprehensive message set that significantly improves the operational capabilities of the skip mechanism, extending its ability of skipping entire ATS Units.

11.2. Assumptions

To ensure clarity and consistency in the description of use cases related to the skip mechanism, the following definitions are established:

- **Transferring ATS Unit:** The ATS unit currently maintaining communication with the flight. It is positioned upstream of the ATS Unit to be skipped. (ATSU A)
- **Skipped ATS Unit:** The ATS unit whose communications with the flight are skipped as part of the skip procedure. (ATSU B)
- **Accepting ATS Unit:** The downstream unit that receives communication with the flight directly from the transferring unit instead of the skipped unit. (ATSU C)

11.3. Sector Skip Use Case

The **Sector Skip** use case describes an operational scenario in which communication with the first sector or multiple sectors of ATSU B are skipped, allowing the flight to be handed over directly to a downstream sector within the same ATS Unit. This mechanism provides the flexibility to both initiate the skip of the first or multiple sectors within the same unit using the SCO message and revert the skip using the SKC message.

11.3.1 Sector Skip – SCO Message

Figure 55 illustrates the **Sector Skip** use case in which the first sector of the accepting unit (ATSU B – Sector 1) is skipped, and communication with the flight is transferred directly to a downstream sector (ATSU B – Sector 2).

Following the establishment of coordination (steps 1 to 2) between the ATSU A and ATSU B,

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **389**
-ARCID **WZZ876**
-SSRCODE **A5571**
-ADEP **LGAT**
-COORDATA
    -PTID **FRA03**
    -TO **1241**
    -TFL **F330**
-ADES **EDDF**
-ARCTYP **A320**
-ROUTE **N0460F330 FRA01DCT FR02 DCT FRA03 DCT FRA04**

ATSU B manually initiates an SCO message (step 3).

-TITLE **SCO**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **548**
-ARCID **WZZ876**
-ADES **LGAT**
-ADEP **EDDF**
-FREQ **127875**
-SECTOR **SECTOR2**

The SCO message specifies the *frequency* and *sector identifier* of the downstream sector (Sector 2) to which the flight shall be instructed to establish direct communication. ATSU A needs to instruct the flight to contact the designated downstream sector (sector 2) of ATSU B, as indicated in the SCO message.

It is the responsibility of ATSU B to ensure that the SCO message is transmitted in a timely manner, allowing the ATCO of ATSU A sufficient time to process the information and execute the transfer of communication accordingly. To support this, it is recommended to inhibit the transmission of SCO messages within a predefined time window prior to the transfer of communication.

Successful establishment of the skip communication procedure is confirmed upon the receipt of a LAM message in response to the SCO message (step 4). At this point, the contents of the SCO message become operationally binding for both the transferring and accepting ATS units.

The coordination conditions agreed upon between ATSU A and ATSU B need to be respected. Upon the revision of coordination conditions outside of the LoA provisions, an SKC message is automatically sent from ATSU B to ATSU A to cancel the established skip in communication (see Section 11.3.3).

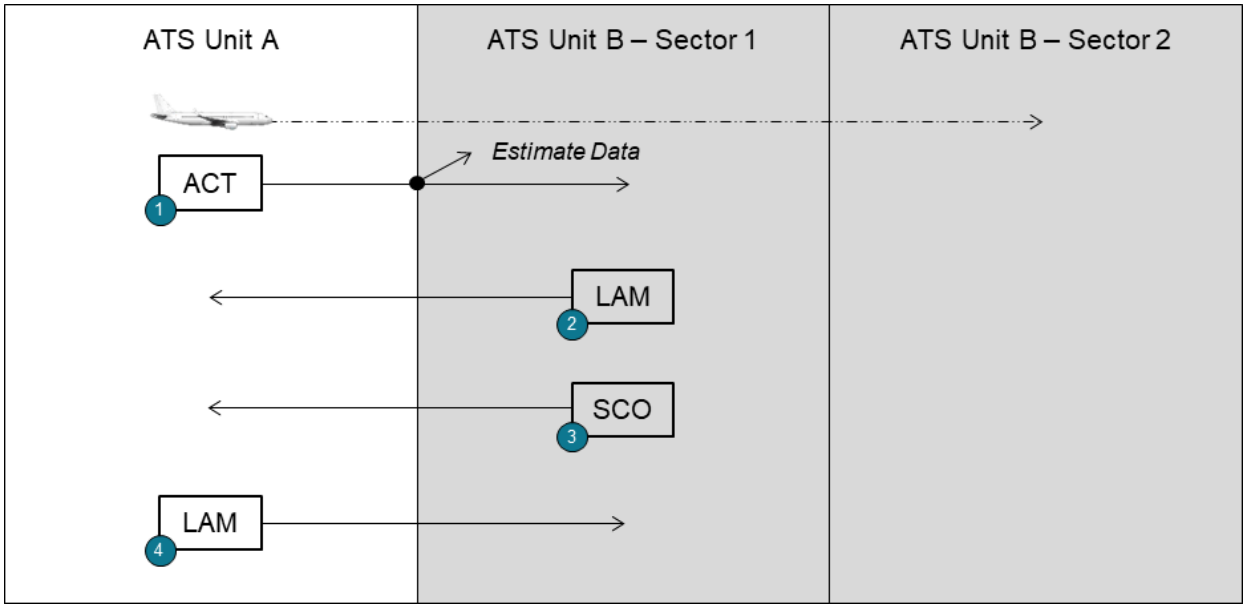


Figure 55 - Sector Skip – Skip Communication Message (SCO)

11.3.2 Multi Sector Skip – SCO Message

Figure 56 indicates the **Multi Sector Skip** use case in which multiple sectors of the downstream unit (ATS Unit B) are skipped (Sectors 1 and 2) and communication with the flight is transferred directly to a further downstream sector (Sector 3).

Following the establishment of coordination (steps 1 to 2) between the ATSU A and ATSU B,

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **389**
-ARCID **WZZ876**
-SSRCODE **A5571**
-ADEP **LGAT**
-COORDATA
    -PTID **FRA03**
    -TO **1241**
    -TFL **F330**
-ADES **EDDF**
-ARCTYP **A320**
-ROUTE **N0460F330 FRA01DCT FR02 DCT FRA03 DCT FRA04**

ATSU B manually initiates an SCO message (step 3).

-TITLE **SCO**
-REFDATA

-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **548**
-ARCID **WZZ876**
-ADES **LGAT**
-ADEP **EDDF**
-FREQ **127876**
-SECTOR **SECTOR3**

The multi-sector skip use case is identical to the Sector Skip use case, with the sole distinction being that the *frequency* and *sector identifier* included in the SCO message correspond to Sector 3 of ATSU B.

Following the receipt of the SCO message, the transferring unit (ATSU A) needs to instruct the aircraft to contact the designated downstream sector (ATSU B – Sector 3) as specified in the SCO message.

It is important to note that internal coordination between Sector 1 and Sector 2, as well as between Sector 2 and Sector 3 within the accepting unit (ATSU B), remains the responsibility of the accepting unit (ATSU B) and it is suggested to be agreed prior to the transmission of the SCO message.

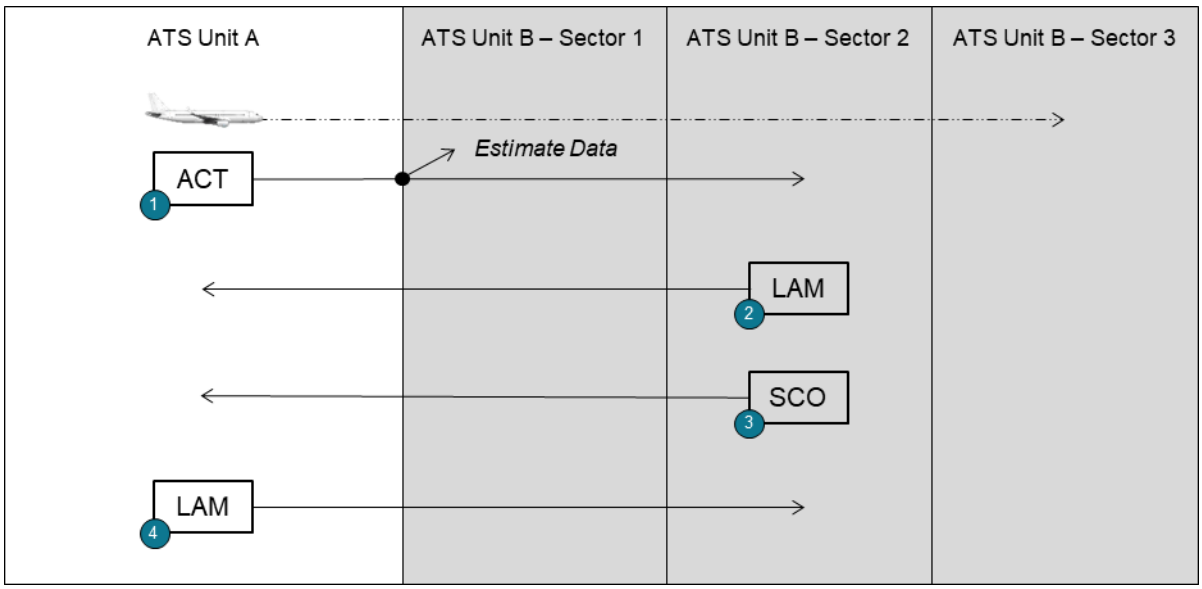


Figure 56 - Multi-Sector Skip – Skip Communication Message (SCO)

11.3.3 Sector Skip – SKC Message

Figure 57 illustrates the **Sector Skip Cancellation** use case, wherein the first sector of the accepting unit (ATSU B – Sector 1) is initially skipped, and the accepting unit (ATSU B) performs a skip cancellation. It is important to note that only the ATS unit that originally initiated the skip (ATSU B) through the SCO message retains the authority to transmit an SKC message. Upon the revision of coordination conditions outside of the LoA provisions, an SKC message is automatically sent.

Following a successful skip of communications (steps 1 to 4),

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSA**

-RECVR -FAC **ATSB**
-SEQNUM **765**
-ARCID **DLH786**
-SSRCODE **A1165**
-ADEP **LBSF**
-COORDATA
-PTID **FRA03**
-TO **1241**
-TFL **F330**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0460F330 FRA01 DCT FR02 DCT FRA03 DCT FRA04**

-TITLE **SCO**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **674**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **127875**
-SECTOR **SECTOR2**

the accepting unit (ATSU B – Sector 1) may initiate a cancellation of the skip procedure by transmitting an SKC message to the transferring unit (ATSU A).

-TITLE **SKC**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **678**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-MSGREF
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **674**

Upon receipt of the SKC message, the transferring unit reverts to the original transfer *frequency* and *sector identifier*, instructing the flight to contact the first sector of the accepting unit (ATS Unit B – Sector 1), as initially planned.

The coordination conditions agreed upon between ATSU A and ATSU B (steps 1 to 2) need to be respected. Upon the revision of coordination conditions outside of the LoA provisions, an SKC message is automatically sent from ATSU B to ATSU A to cancel the established skip in communication. Internal coordination between Sector 1 and Sector 2 remains the responsibility of ATSU A.

ATSU A changes the boundary point and TFL. Due to non-standard conditions of this revision that are outside the provisions of LoA, ATSU A sends an RRV message to ATSU B.

-TITLE **RRV**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **897**

-MSGREF
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **765**
-ARCID **DLH786**
-ADEP **LBSF**
-COORDATA
    -PTID **REF01**
    -TO **1243**
    -TFL **F370**
-ADES **EDDM**
-REF
    -REFID **REF01**
    -PTID **FRA02**
    -BRNG **030**
    -DISTNC **025**

ATSU B replies with a SBY message, followed by acceptance of the modified transfer conditions contained in CDN message (ACP message)

-TITLE **SBY**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **701**
-MSGREF
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **897**

-TITLE **ACP**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **709**
-MSGREF
    -SENDER -FAC **ATSC**
    -RECVR -FAC **ATSB**
    -SEQNUM **897**

Upon the receipt of the ACP message, the new transfer conditions between ATSU A and ATSU B are considered agreed (non-standard conditions) and ATSU B sends an automatic SKC message to ATSU A.

-TITLE **SKC**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **696**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**

-MSGREF
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **674**

It is the responsibility of the accepting ATS unit to ensure that the SKC message is transmitted with sufficient lead time, allowing the transferring controller to process the update and execute the communication transfer accordingly. To support this, it is recommended to inhibit SKC message transmission within a predefined time window prior to the communication handover. This restriction should be determined based on the boundary where the SCO message exchange occurs.

In the Sector Skip Cancellation use case, the downstream sector ATSU B – Sector 2 needs to be notified of the cancellation. Following this notification, any internal coordination between ATSU B Sector 1 and Sector 2 may be abrogated, subject to the accepting unit's local inter-sector coordination procedures.

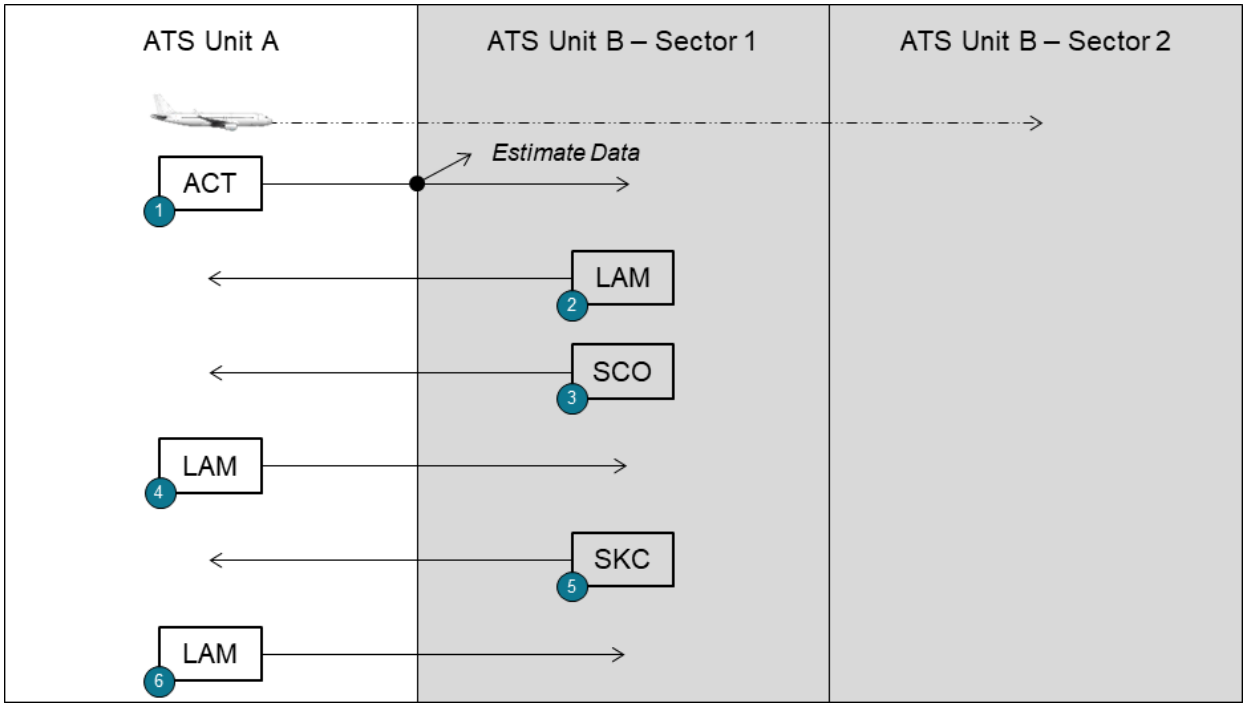


Figure 57 - Sector Skip Cancellation – Skip Cancellation Message (SKC)

11.4. ATS Unit Skip Use Case

The **ATS Unit Skip** use case describes an operational scenario in which communication with the entire accepting ATS unit is skipped (ATSU B), allowing the flight to be handed over directly to a downstream unit (ATSU C), which then assumes the role of the new accepting unit. This

mechanism provides the flexibility to both the initiation of the skip via the SCO message and its reversal through the SKC (Skip Cancellation) message.

Complementary messages, such as BYP (Bypass Proposal) and SKN (Skip Notification), further support this process. The BYP message allows a unit to propose the bypass of the next ATS unit in sequence, while the SKN message serves to notify the new accepting unit that the previous unit has been skipped. The revised ROF, COF, MAS, LOF and NAN messages support the ATS unit skip use case.

In the development of the ATS Unit Skip use cases, the assumption that no OLDI connection exists between the transferring and accepting ATS units was explicitly considered. This approach ensures that the skip mechanism comprehensively addresses all possible operational scenarios, both in the presence and absence of an OLDI connection.

11.4.1 ATS Unit Skip – SCO Message

Figure 58 illustrates the **ATS Unit Skip** use case in which an SCO message is sent by the unit to be skipped (ATSU B) to the to the transferring unit (ATSU A) to indicate that the flight is to be passed directly to the downstream unit (ATSU C). Consequently, communication with the flight is directed to the downstream unit, which then becomes the accepting unit.

Prior to initiating an ATS Unit Skip, coordination must be fully established between the transferring unit (ATSU A), the unit to be skipped (ATSU B), and the downstream accepting unit (ATSU C) (steps 1 to 4).

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **765**
-ARCID **DLH786**
-SSRCODE **A1165**
-ADEP **LBSF**
-COORDATA
    -PTID **FRA02**
    -TO **1241**
    -TFL **F330**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0460F330 FRA01DCT FR02 DCT FRA03 DCT FRA04**

If the ACT message has not yet been transmitted by ATSU B to ATSU C, ATSU B transmits a forced ACT message to ATSU C. This action is performed to expedite the skip process

-TITLE **ACT**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **076**
-ARCID **DLH786**
-SSRCODE **A1165**
-ADEP **LBSF**
-COORDATA
    -PTID **FRA03**

-TO **1257**
-TFL **F330**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0460F330 FRA01DCT FR02 DCT FRA03 DCT FRA04 DCT FRA05 DCT FRA06**

Once the coordination's conditions are established, an SCO message is manually initiated by ATSU B and transmitted to ATSU A).

-TITLE **SCO**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **087**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **127325**
-SECTOR **ATSCSEC4**

-COORDATA
-PTID **FRA03**
-TO **1257**
-TFL **F330**

-UNITID **LWSS**

Strict adherence to the coordination conditions between:

- ATSU A and ATSU B, and
- ATSU B and ATSU C

is essential for two key reasons:

1. **Inclusion of Accurate Estimate Data:** The estimated data agreed upon between the skipped unit (ATSU B) and the accepting unit (ATSU C) needs to be incorporated into the SCO message. This ensures that the transferring controller (ATSU A) has the necessary information to clear the flight toward the correct boundary point before transferring communications to ATSU C.
2. **Situational Awareness for the Skipped Unit:** ATSU B must have precise awareness of flight's entry and exit points of the flight within its Area of Responsibility (AoR), even though it is not directly involved in communication with the aircraft. This requirement is essential for maintaining situational awareness and ensuring the safety of air traffic control operations.

If coordination between the skipped unit (ATSU B) and the accepting unit (ATSU C) has not been completed, the SCO message must not be transmitted. In such cases, the transferring controller (ATSU A) is responsible for ensuring that the required coordination is established before proceeding (steps 3 and 4). Without this coordination, the estimated boundary data between ATSU B and ATSU C cannot be included in the SCO message. As a result, the message would be incomplete and therefore cannot be transmitted.

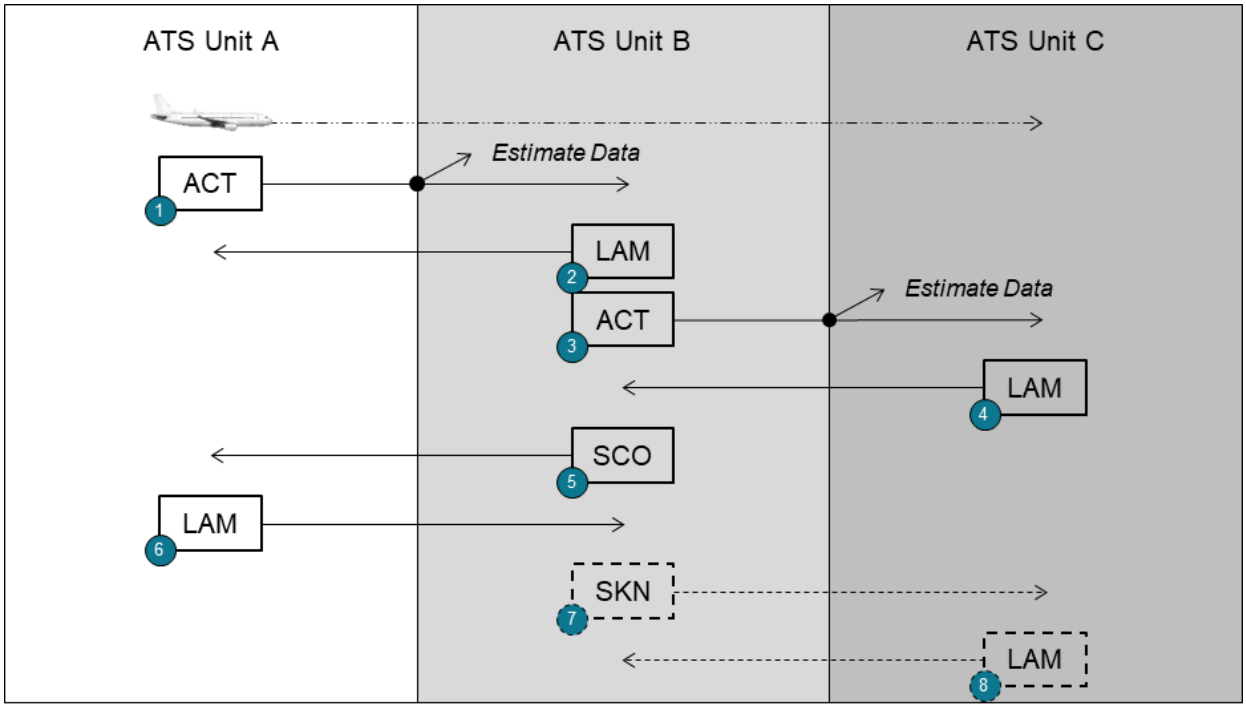


Figure 58 - ATS Unit Skip – Skip Communication Message (SCO) and Skip Notification Message (SKN)

Changes to agreed coordination conditions during an active ATS unit skip of communications can lead to one of three possible outcomes:

1. **Automatic Cancellation of the Skip:** The skip is automatically cancelled when the revised coordination conditions, introduced via a REV message or proposed through an accepted RRV or CDN message, are outside the provisions of the LoA (see Section 10.4.3).

   In such cases:

   - An SKC message is automatically transmitted by the skipped unit to ATSU A, cancelling the skip established by the SCO message.
   - If the SKN message is implemented, an additional SKC message is sent to ATSU C to reflect the updated communication path.

2. **Revision of the Skip:** If the revised coordination conditions between ATSU B and ATSU C remain within the provisions of the LoA, the skip state is maintained but updated. In this case a revised SCO message is automatically transmitted by ATSU B to ATSU A (see Section 10.4.4).

   Such revisions may result from:

   - A REV message transmitted from ATSU B to ATSU C.
   - An accepted RRV message transmitted from ATSU B to ATSU C.
   - An accepted CDN message transmitted from ATSU C to ATSU B.

3. **No Automatic Message Transmission:** No automatic message is transmitted when the revision of the transfer conditions between ATSU A and ATSU B is within the provisions of the LoA, and does not affect the coordination at the downstream boundary between ATSU B and ATSU C.

   Such revisions may result from:

   - A REV message transmitted from ATSU A to ATSU B.

- An accepted RRV message transmitted from ATSU A to ATSU B.
- An accepted CDN message transmitted from ATSU B to ATSU A.

11.4.2 ATS Unit Skip – SKN Message

Figure 58 illustrates the role of the SKN (Skip Notification) message in complementing the ATS Unit Skip mechanism. The SKN message is transmitted from ATSU B to the ATSU C to inform that communication with the aircraft will be transferred directly from ATSU A, skipping ATSU B.

The SKN message includes:

- The *Frequency* and *Sector Identification* of ATSU C), indicating where the aircraft is expected to establish contact.
- The *Skipped Frequency* and *Skipped Sector Identification* of ATSU B), providing reference data in case reversion to the skipped unit becomes necessary.

For the same flight DLH786, ATSU B sends the SKN message to ATSU C, after the transmission of the SCO message to ATSU A.

-TITLE **SKN**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**

-SEQNUM **030**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **120525**
-SECTOR **ATSASEC1**

-SKFREQ **130925**

-SKSEC **ATSUBSEC3**

This information enables ATSU C to anticipate earlier-than-usual contact from the aircraft, due to the absence of communication with the skipped unit (ATSU B). Additionally, if ATSU B requests a cancellation of the skip after handover has occurred, the SKN message ensures that ATS Unit C can provide the correct frequency to the aircraft. This is critical, as pilots typically revert to the last known frequency, which in skip scenarios would not correspond to the skipped unit.

11.4.3 ATS Unit Multi-Sector Skip – SCO Message

Figure 59 illustrates the **ATS Unit Multi-Sector Skip** use case, in which a flight traverses multiple sectors within the skipped unit (ATS Unit B). This use case is identical to the ATS Unit Skip use case described previously, with the primary distinction being the scope of the skip across multiple sectors instead of a single one.

The Estimated Data included in the SCO message reflects the boundary between the last sector of skipped unit (ATSU B – Sector 2), and the accepting unit (ATSU C). Accordingly, the Skipped *frequency* and Skipped *sector identifier* included in the complementary SKN message, if implemented, also correspond to Sector 2 of ATSU B.

-TITLE **SCO**
-REFDATA
-SENDER -FAC **ATSB**

-RECVR -FAC **ATSA**
-SEQNUM **087**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **127325**
-SECTOR **ATSCSEC4**

-COORDATA
-PTID **FRA03**
-TO **1257**
-TFL **F330**

-UNITID **LWSS**

-TITLE **SKN**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**

-SEQNUM **030**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **120525**
-SECTOR **ATSASEC2**

-SKFREQ **130926**

-SKSEC **ATSUBSEC3**

It is important to note that internal coordination between Sector 1 and Sector 2 within ATSU B remains the responsibility of the skipped unit. This internal coordination is transparent to both the transferring unit (ATSU A) and the accepting unit (ATSU C) and does not affect the external coordination procedures defined by the skip mechanism.

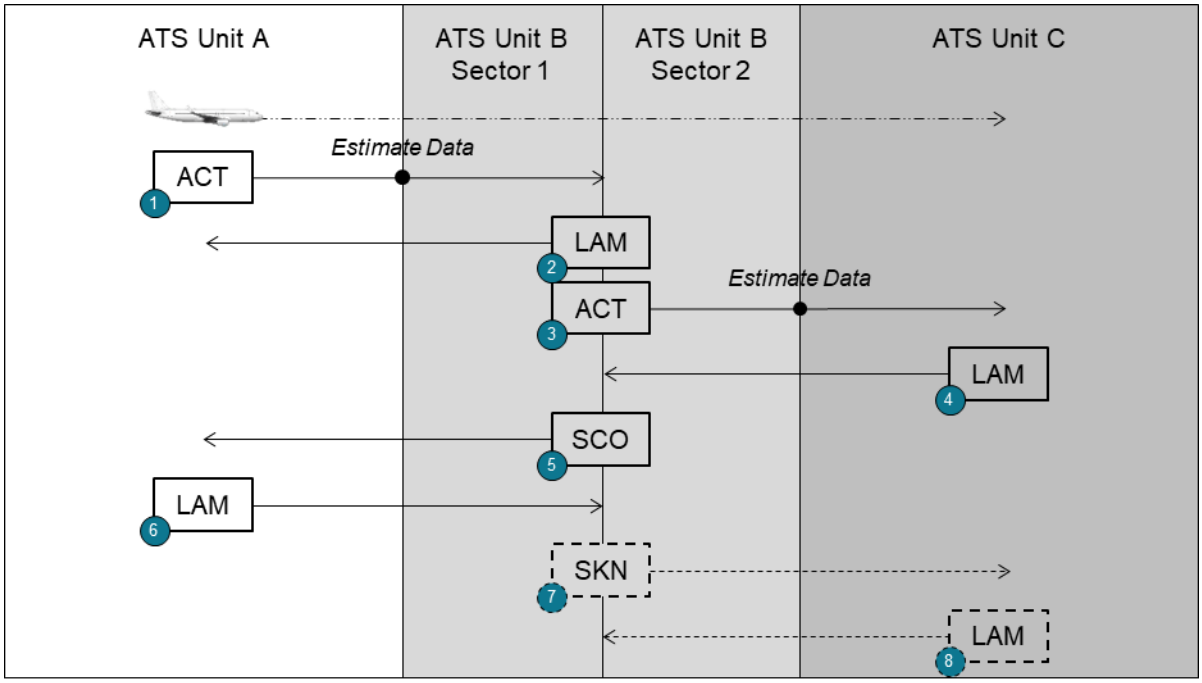


Figure 59 - ATS Unit Multi-Sector Skip – Skip Communication Message (SCO) and Skip Notification Message (SKN)

11.4.3.1 **Manual SKC**

Figure 60 illustrates the Manual ATS Unit Skip Cancellation use case. In this scenario, the previously issued SCO message is cancelled, thereby reinstating the skipped unit (ATSU B) as the next unit in the communication sequence. As a result, the flight will establish contact with ATSU B instead of contacting ATSU C directly.

The initial communication skip is established through steps 1 to 6. Subsequently, ATSU B may manually initiate the cancellation by transmitting an SKC message to ATSU A (steps 9 and 10). Upon receipt of the SKC message, ATSU A updates the next unit in the sequence and when the time comes instructs the flight to contact ATSU B as initially planned.

-TITLE **SKC**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **135**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**

-MSGREF

-SENDER -FAC **ATSB**

-RECVR -FAC **ATSA**
-SEQNUM **112**

If the SKN message is implemented (steps 7 to 8), an SKC message is automatically sent from ATSU B to ATSU C, notifying that communication with the flight will now be transferred from ATSU B, instead of ATSU A as previously established by the SCO message. (steps 11 to 12).

-TITLE **SKC**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **067**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**

-MSGREF

-SENDER -FAC **ATSB**

-RECVR -FAC **ATSC**
-SEQNUM **030**

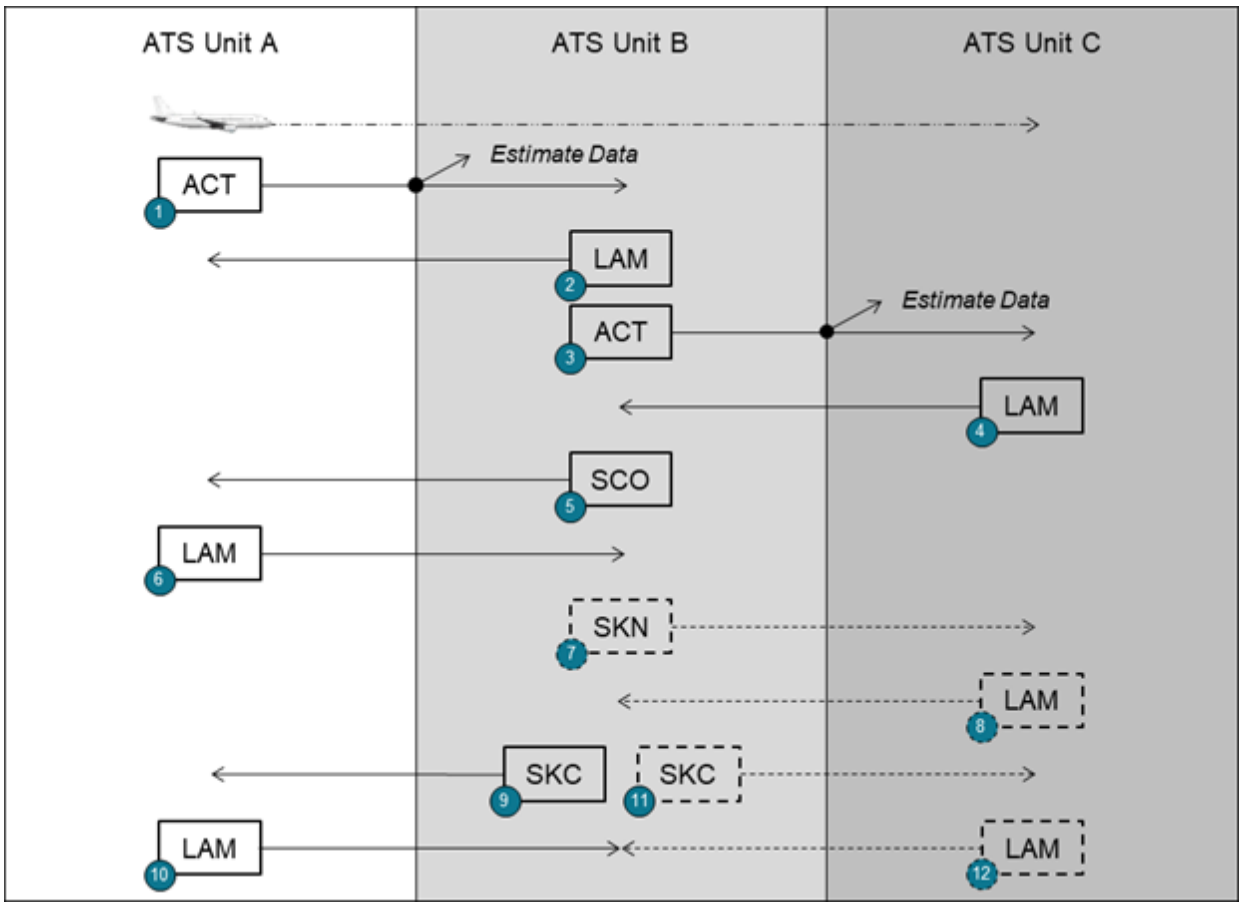


Figure 60 - ATS Unit Skip Cancellation – Skip Cancellation Message (SKC)

In all scenarios, the coordination conditions agreed between:

- The transferring unit (ATSU A) and the skipped unit (ATSUB), and
- The skipped unit (ATSU B) and the accepting unit (ATSU C)

must be respected.

Should any revision of coordination conditions at either boundary being outside the provisions of the applicable LoA, an SKC message is automatically triggered, cancelling the SCO message. If the SKN message is implemented, an additional SKC message is automatically transmitted to ATSU C to reflect the updated communication path (steps 11 to 12).

Two use cases with transfer conditions revised at a different boundary in each are explored in this section due to their complexity, but it must be noted that there are more use cases triggering an automatic skip:

- When a referred revised coordination outside the provisions of the applicable LoA via an RRV message from ATSU A to ATSU B is accepted (Figure 42);
- When a coordination outside the provisions of the applicable LoA is established through an accepted CDN message from ATSU C to ATSU B (Figure 43).

11.4.3.2 **Automatic SKC – RRV Outside the Provisions of the LoA**

Figure 61 illustrates an **Automatic ATS Unit Skip Cancellation** use case triggered by an RRV message. In this scenario, the coordination parameters between the transferring unit (ATSU A) and the skipped unit (ATSU B) are revised through the transmission of an RRV message. The revised coordination conditions are outside the provisions specified in the LoA between the two units.

The skip in communications is established through steps 1 to 6. Subsequently, ATSU A initiates a revision of the coordination conditions by transmitting an RRV message (step 9). The RRV message refers a modification in the boundary crossing parameters between ATSU A and ATSU B, such as a transfer level to FL370, that is outside the provisions of the LoA.

-TITLE RRV
-REFDATA
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **085**
-MSGREF
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **554**

-ARCID **DLH786**
-ADEP **LBSF**
-COORDATA
    -PTID **FRA03**
    -TO **1256**
    -TFL **F370**
-ADES **EDDM**

ATSU B replies with a SBY message (step 10), followed by an acceptance of the modified transfer conditions contained in RRV message (ACP message) (step 11)

-TITLE **SBY**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **554**
-MSGREF
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **085**

-TITLE **ACP**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **559**
-MSGREF
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **085**

Upon receipt of the ACP message, the new transfer conditions between ATSU A and ATSU B are considered agreed (non-standard conditions) and ATSU B automatically transmits an SKC message to ATSU A.

-TITLE **SKC**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **145**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**

-MSGREF

-SENDER -FAC **ATSB**

-RECVR -FAC **ATSA**
-SEQNUM **112**

An automatic SKC message is transmitted to ATSU C cancelling the SKN message. (step14)

-TITLE **SKC**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **097**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**

-MSGREF

-SENDER -FAC **ATSB**

-RECVR -FAC **ATSC**
-SEQNUM **030**

If the RRV message is rejected by the skipped unit (ATSU B), the previously established skip in communications remains in effect. In this case, no SKC messages are transmitted by the skipped unit (ATSU B) to either the transferring unit (ATSU A) or the accepting unit (ATSU C), provided that an SKN message had been sent earlier.

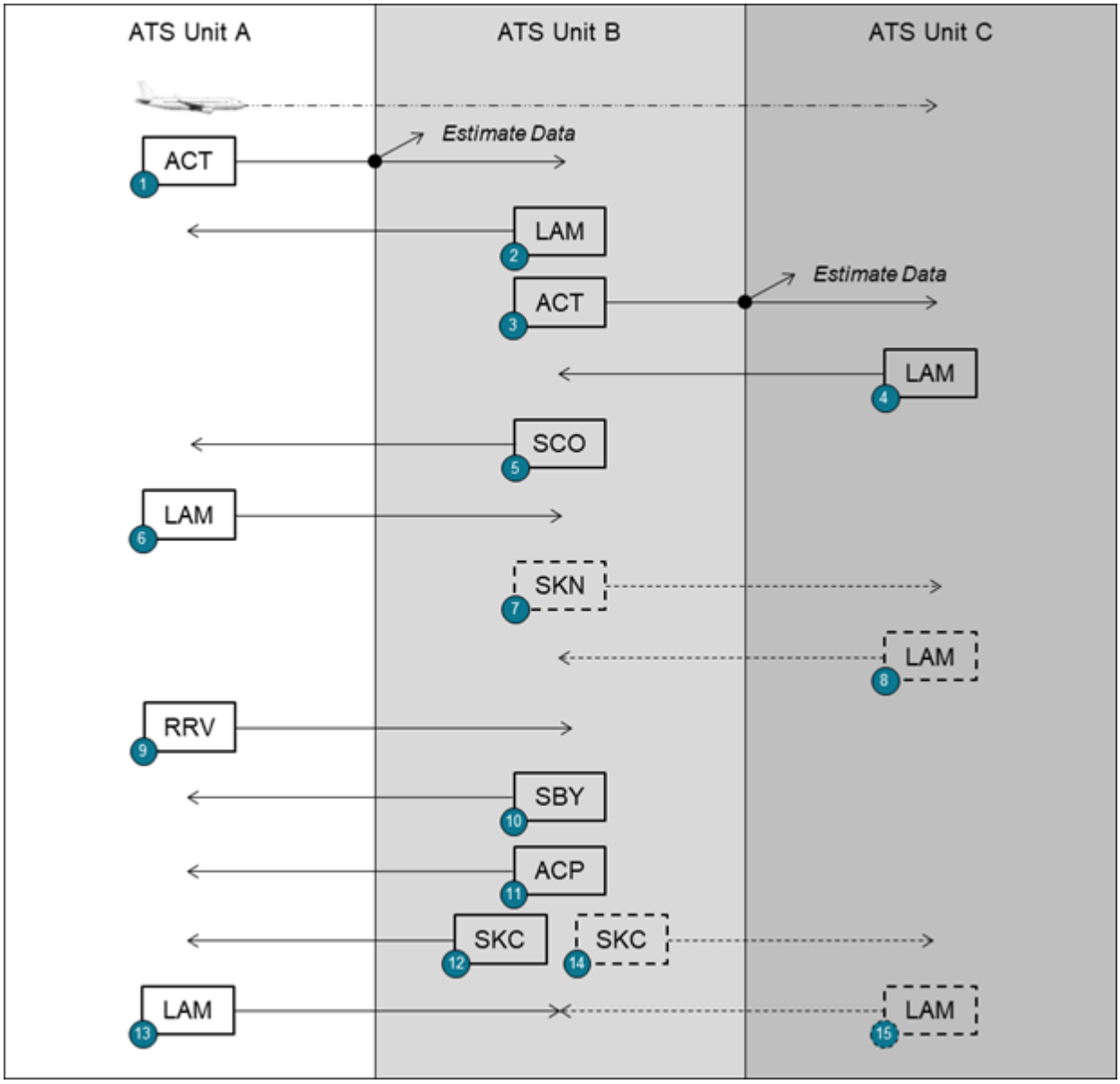


Figure 61 - ATS Unit Skip Cancellation – Skip Cancellation Message (SKC) triggered by an RRV message

11.4.3.3 Automatic SKC – CDN Outside the Provisions of the LoA

Figure 62 illustrates the **Automatic ATS Unit Skip Cancellation** use case triggered by a CDN message. In this scenario, the coordination parameters between the skipped unit (ATSU B) and the accepting unit (ATSU C) are updated through the transmission of a CDN message. The proposed coordination conditions are outside the provisions specified in the LoA between the two units.

The skip in communications is established through steps 1 to 6. Subsequently, ATSU C proposes a revision of the coordination conditions by transmitting a CDN message (step 9). The CDN message proposes a modification in the boundary crossing parameters between ATSU B and ATSU C, such as a transfer level to FL370, that is outside the provisions of the LoA.

-TITLE **CDN**
-REFDATA
    -SENDER -FAC **ATSC**
    -RECVR -FAC **ATSB**
    -SEQNUM **779**
-MSGREF
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **076**
-ARCID **DLH786**
-ADEP **LBSF**
-ADES **EDDM**
-PROPFL
    -TFL **F370**

ATSU B replies with a SBY message (step 10), followed by an acceptance of the modified transfer conditions contained in the CDN message (ACP message) (step 11).

-TITLE **SBY**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **097**
-MSGREF
    -SENDER -FAC **ATSC**
    -RECVR -FAC **ATSB**
    -SEQNUM **779**

-TITLE **ACP**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **099**
-MSGREF
    -SENDER -FAC **ATSC**
    -RECVR -FAC **ATSB**
    -SEQNUM **779**

Upon receipt of the ACP message, the new transfer conditions between ATSU B and ATSU C are considered agreed (non-standard conditions) and ATSU B automatically transmits an SKC message to ATSU A.

-TITLE **SKC**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **145**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-MSGREF

-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **112**

An automatic SKC message is transmitted to ATSU C cancelling the SKN message (step 14).

-TITLE **SKC**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **097**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-MSGREF
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **030**

If the CDN message is rejected by the skipped unit (ATSU B), the previously established skip in communications remains in effect. In this case, no SKC messages are transmitted by the skipped unit (ATSU B) to either the transferring unit (ATSU A) or the accepting unit (ATSU C), provided that an SKN message had been sent earlier.

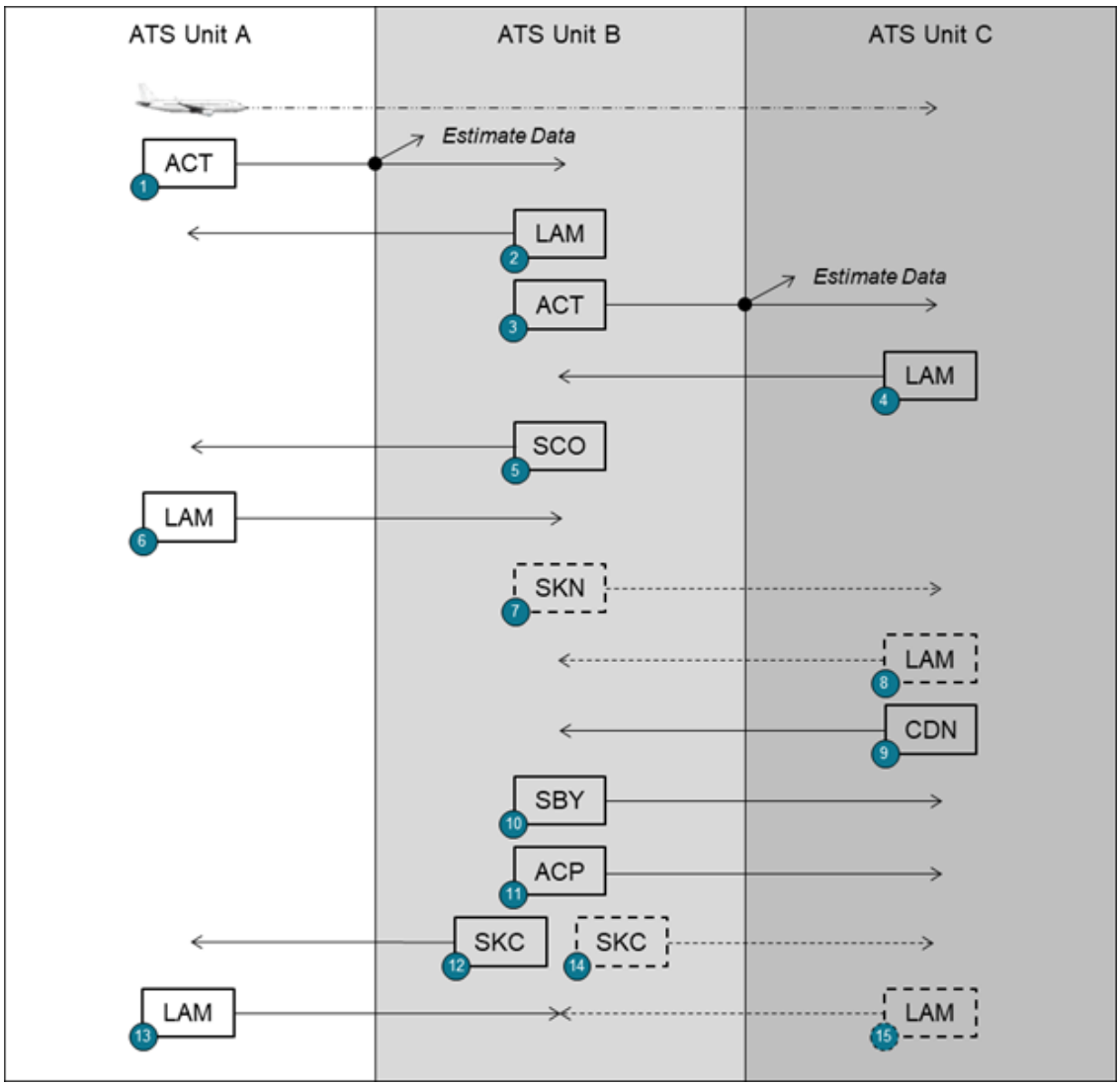


Figure 62 - ATS Unit Skip Cancellation – Skip Cancellation Message (SKC) triggered by a CDN message

11.4.4 ATS Unit Skip – Revised SCO Message

Figures 63,64,65 and 66 illustrate the **Revised ATS Unit Skip** use case, in which a previously transmitted SCO message is subject to revision. Such a revision is only permissible after the initial establishment of the skip of communications via the SCO message (steps 1 to 6), and may occur under two specific conditions:

1. **Revision of Coordination Conditions:** When the coordination parameters between the skipped unit (ATSU B) and the accepting unit (ATSU C) are updated, provided these revisions remain within the provisions of the applicable LoA. In this scenario, the updated *Estimated Data* for the boundary between the skipped and accepting units must be made available to the transferring unit (ATSU A). This ensures that the ATCO of the transmitting unit (ATSU A) is informed of the most updated *Estimated Data* to clear the flight to.

   A revised SCO message can be generated as a result of updated coordination conditions under the following circumstances:

- When a revised coordination is initiated through a REV message from ATSU B to ATSU C (Figure 44);
- When a referred revised coordination within the provisions of the applicable LoA via an RRV message from ATSU B to ATSU C is accepted (Figure 45);
- When a coordination within the provisions of the applicable LoA is established through an accepted CDN message from ATSU C to ATSU B (Figure 46).

2. **Change in Accepting Frequency:** When the accepting unit (ATSU C) issues an FDM message due to a change in its communication frequency, a revised SCO message needs to be sent to the transferring unit (ATSU A). This revised message includes the updated frequency, which ATSUA will instruct the aircraft to contact upon transfer (Figure 47).

Revisions to SCO messages are only permitted up to a locally predefined time threshold prior to the boundary crossing and the transfer of communications to the accepting unit (ATSU C). Beyond this threshold, any necessary updates must be communicated verbally to ensure operational continuity and safety.

11.4.4.1 Revised SCO – REV Message

Figure 63 illustrates the **Revised ATS Unit Skip** use case triggered by a REV message. In this scenario, the coordination parameters between the skipped unit (ATSU B) and the transferring unit (ATSU C) are revised through the transmission of a REV message.

The skip in communications is established through steps 1 to 6. Once this process is complete, ATSU B revises the coordination conditions at the boundary between the ATSU B and ATSU C by transmitting a REV message (step 9).

-TITLE **REV**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **085**
-MSGREF
    -SENDER -FAC **ATSA**
    -RECVR -FAC **ATSB**
    -SEQNUM **554**
-ARCID **DLH786**
-ADEP **LBSF**
-COORDATA
    -PTID **FRA03**
    -TO **1256**
    -TFL **F350**
-ADES **EDDM**

A revised SCO message (step 11) is transmitted to the transferring unit (ATSU A) and includes the updated coordination conditions applicable at the boundary between the skipped unit (ATSU B) and the accepting unit (ATSU C).

-TITLE **SCO**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **112**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **120525**
-SECTOR **ATSCSEC2**
-COORDATA
    -PTID **FRA03**
    -TO **1256**
    -TFL **F350**
-UNITID **LWSS**
-MSGREF
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **087**

When the transferring unit (ATSU A) transmits a REV message to the skipped unit (ATSU B) to revise the coordination conditions at their common boundary, if the revision falls with the LoA provisions, no revised SCO message needs to be transmitted back to ATSU A. This is because ATSU A, as the initiator of the revision, is already aware of the updated coordination conditions. A revision of the SCO message is only necessary if the change impacts the downstream boundary between ATSU B and ATSU C.

Furthermore, when a REV message is received by the skipped unit (ATSU B), the revision must be clearly indicated to the responsible ATCO at ATSU B. This is essential to ensure situational awareness and to enable the ATCO to assess whether the skip remains operationally valid under the revised conditions. This evaluation is required even when the revised conditions comply with the provisions of the LoA, as the revision can create circumstances that necessitate a manual cancellation of the skip through the transmission of an SKC message.

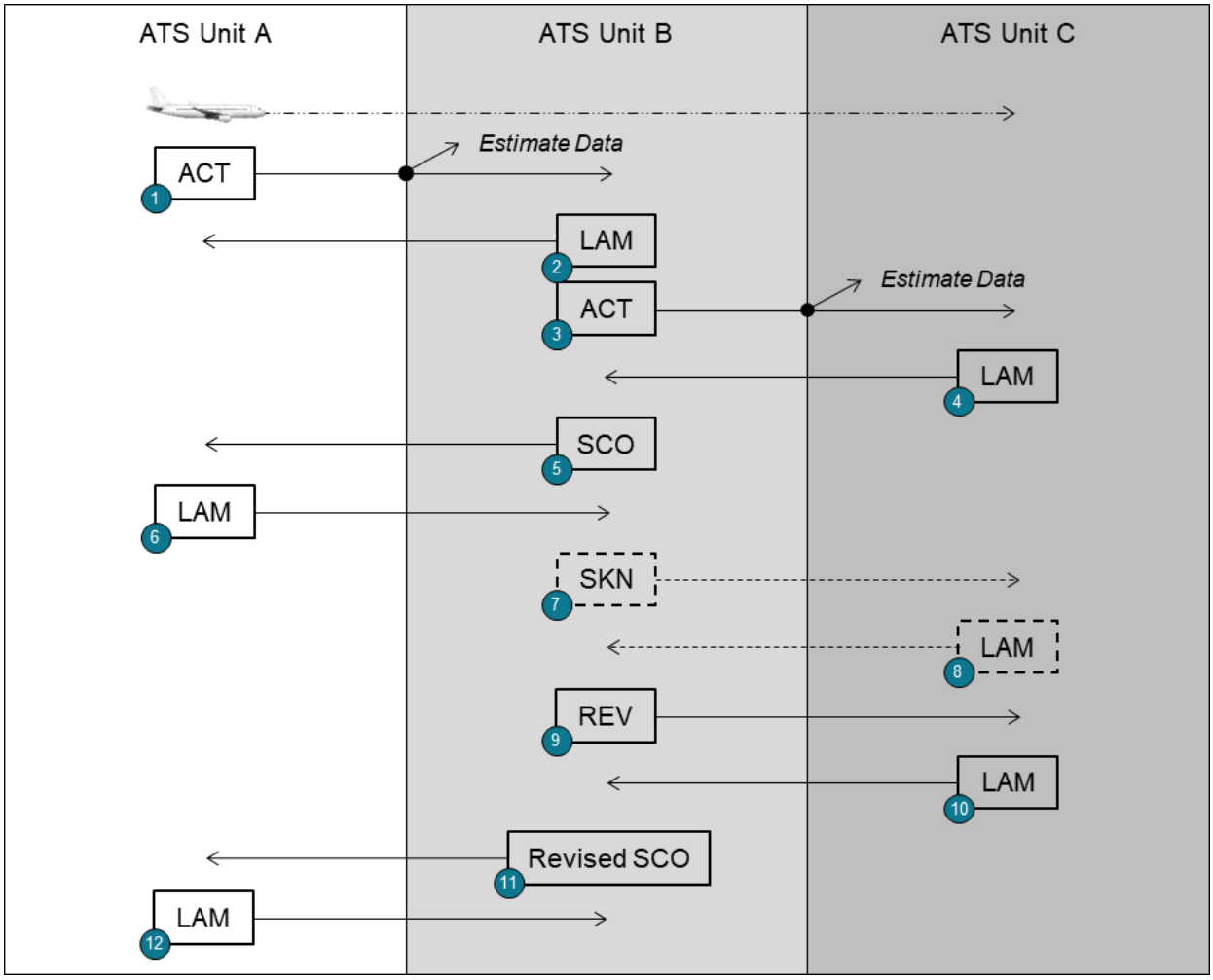


Figure 63 - ATS Unit Skip – Revised Skip Communication Message (SCO) triggered by a REV message

11.4.4.2 Revised SCO – RRV Within the Provisions of the LoA

Figure 64 illustrates the **Revised ATS Unit Skip** use case triggered by an RRV message. In this scenario, the coordination parameters between the skipped unit (ATSU B) and the accepting unit (ATSU C) are revised through the transmission of an RRV message. The revised coordination conditions are within the provisions specified in the LoA between the two units.

The skip in communications is initially established through steps 1 to 6. Subsequently, ATSU B initiates a revision of the coordination conditions by transmitting an RRV message (step 9). The RRV message refers a modification in the boundary crossing parameters between ATSU B and ATSU C, such as a transfer level to FL350, that is within the provisions of the LoA.

-TITLE **RRV**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **085**
-REFDATA
    -SENDER -FAC **ATSB**

-RECVR -FAC **ATSC**
-SEQNUM **997**
-ARCID **DLH786**
-ADEP **LBSF**
-COORDATA
-PTID **FRA03**
-TO **1256**
-TFL **F350**
-ADES **EDDM**

ATSU C replies with a SBY message (step10), followed by an acceptance of modified transfer conditions contained in the RRV message (ACP message) (step 11).

-TITLE **SBY**
-REFDATA
-SENDER -FAC **ATSC**
-RECVR -FAC **ATSB**
-SEQNUM **667**
-MSGREF
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **085**

-TITLE **ACP**
-REFDATA
-SENDER -FAC **ATSC**
-RECVR -FAC **ATSB**
-SEQNUM **675**
-MSGREF
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSV**
-SEQNUM **085**

Upon receipt of the ACP message, the new transfer conditions between ATSU B and ATSU C are considered agreed (standard conditions). Following this, ATSU B automatically transmits a revised SCO message to ATSU A (step 12). This message includes the updated coordination conditions applicable at the boundary between the skipped unit (ATSU B) and the accepting unit (ATSU C).

-TITLE **SCO**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **112**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **120525**
-SECTOR **ATSCSEC2**

-COORDATA
-PTID **FRA03**
-TO **1256**
-TFL **F350**
-UNITID **LWSS**
-MSGREF
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **087**

A revised SCO message is not transmitted following an RRV message, provided the proposed coordination conditions are within the provisions of the LoA, under the following circumstances:

- RRV Rejection: If the RRV message is rejected by the accepting unit (ATSU C), the previously established skip of communications remains in effect. In this case, ATSU B does not transmit any further revised SCO messages to the transferring unit (ATSU A).
- RRV between ATSU A and ATSU B: If ATSU A transmits an RRV message to ATSU B and the message is accepted, no revised SCO message is transmitted to ATSU A. A revision is only required if the change impacts the downstream boundary between ATSU B and ATSU C.

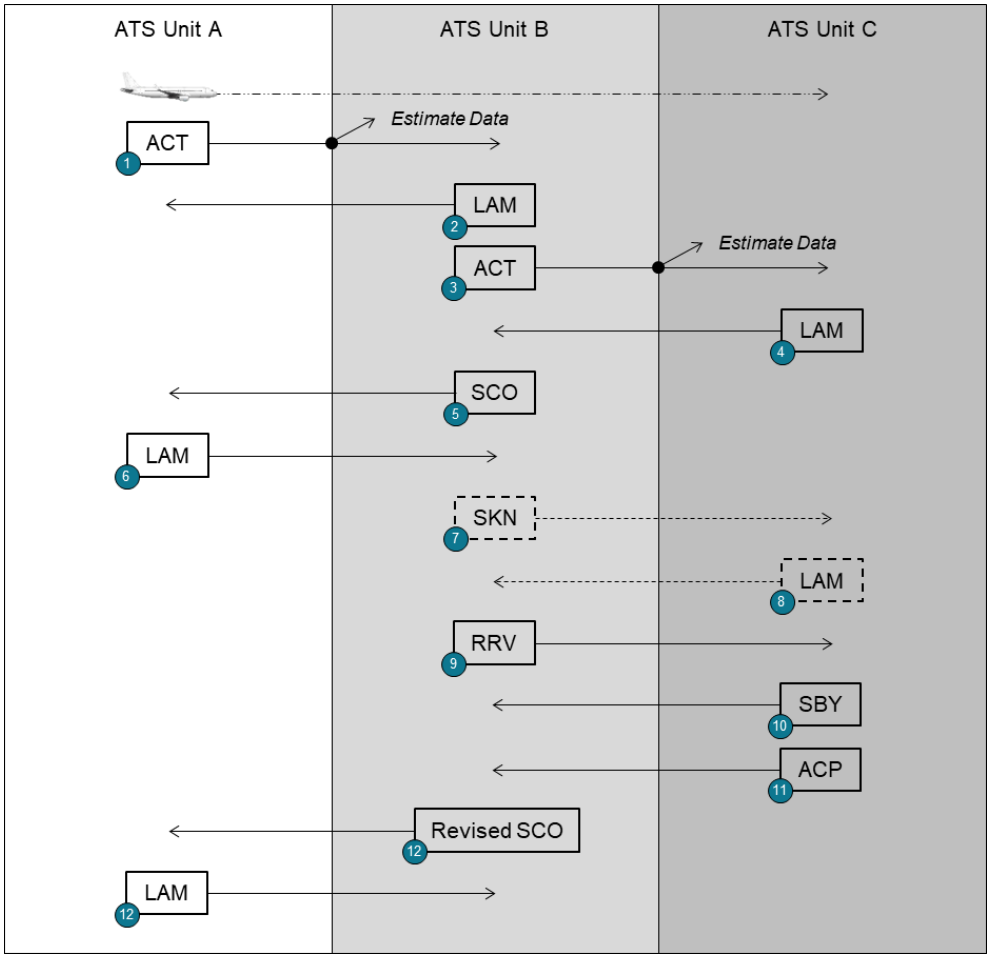


Figure 64 - ATS Unit Skip – Revised Skip Communication Message (SCO) triggered by an RRV message

11.4.4.3 Revised SCO – CDN within the provisions of the LoA

Figure 65 illustrates the **Revised ATS Unit Skip** use case triggered by a CDN message. In this scenario, the coordination parameters between the skipped unit (ATSU B) and the accepting unit (ATSU C) are updated through the transmission of a CDN message. The proposed coordination conditions are within the provisions specified in the LoA between the two units.

The skip in communications is initially established through steps 1 to 6. Subsequently, ATSU C proposes a revision of the coordination conditions by transmitting a CDN message (step 9). The CDN message proposes a modification in the boundary crossing parameters between ATSU B and ATSU C, such as a transfer level to FL350, that is within the provisions of the LoA.

-TITLE **CDN**
-REFDATA
    -SENDER -FAC **ATSC**
    -RECVR -FAC **ATSB**
    -SEQNUM **779**
-MSGREF
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **076**
-ARCID **DLH786**
-ADEP **LBSF**
-ADES **EDDM**
-PROPFL
    -TFL **F350**

ATSU B replies with a SBY message (step 10), followed by an acceptance of modified transfer conditions contained in the CDN message (ACP message) (step 11).

-TITLE **SBY**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **097**
-MSGREF
    -SENDER -FAC **ATSC**
    -RECVR -FAC **ATSB**
    -SEQNUM **779**

-TITLE **ACP**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSC**
    -SEQNUM **099**
-MSGREF
    -SENDER -FAC **ATSC**
    -RECVR -FAC **ATSB**
    -SEQNUM **779**

Upon receipt of the ACP message, the new transfer conditions between ATSU B and ATSU C are considered agreed (standard conditions). Following this, ATSU B automatically transmits a revised SCO message to ATSU A (step 12). This message includes the updated coordination conditions applicable at the boundary between the skipped unit (ATSU B) and the accepting unit (ATSU C).

-TITLE **SCO**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **112**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **127325**
-SECTOR **ATSCSEC4**
-COORDATA
    -PTID **REF02**
    -TO **1257**
    -TFL **F330**
-REF
    -REFID **REF02**
    -PTID **FRA03**
    -BRNG **010**
    -DISTNC **012**
-UNITID **LWSS**
-MSGREF
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **087**

A revised SCO message is not transmitted following a CDN message, provided the proposed coordination conditions are within the provisions of the LoA, under the following circumstances:

- CDN Rejection: If the CDN message is rejected by the skipped unit (ATSU B), the previously established skip of communications remains in effect. In this case, ATSU B does not transmit any further revised SCO messages to the transferring unit (ATSU A).
- CDN between ATSU A and ATSU B: If ATSU B transmits a CDN message to ATSU A and the message is accepted, no revised SCO message is transmitted to ATSU A. A revision is only required if the change impacts the downstream boundary between ATSU B and ATSU C.

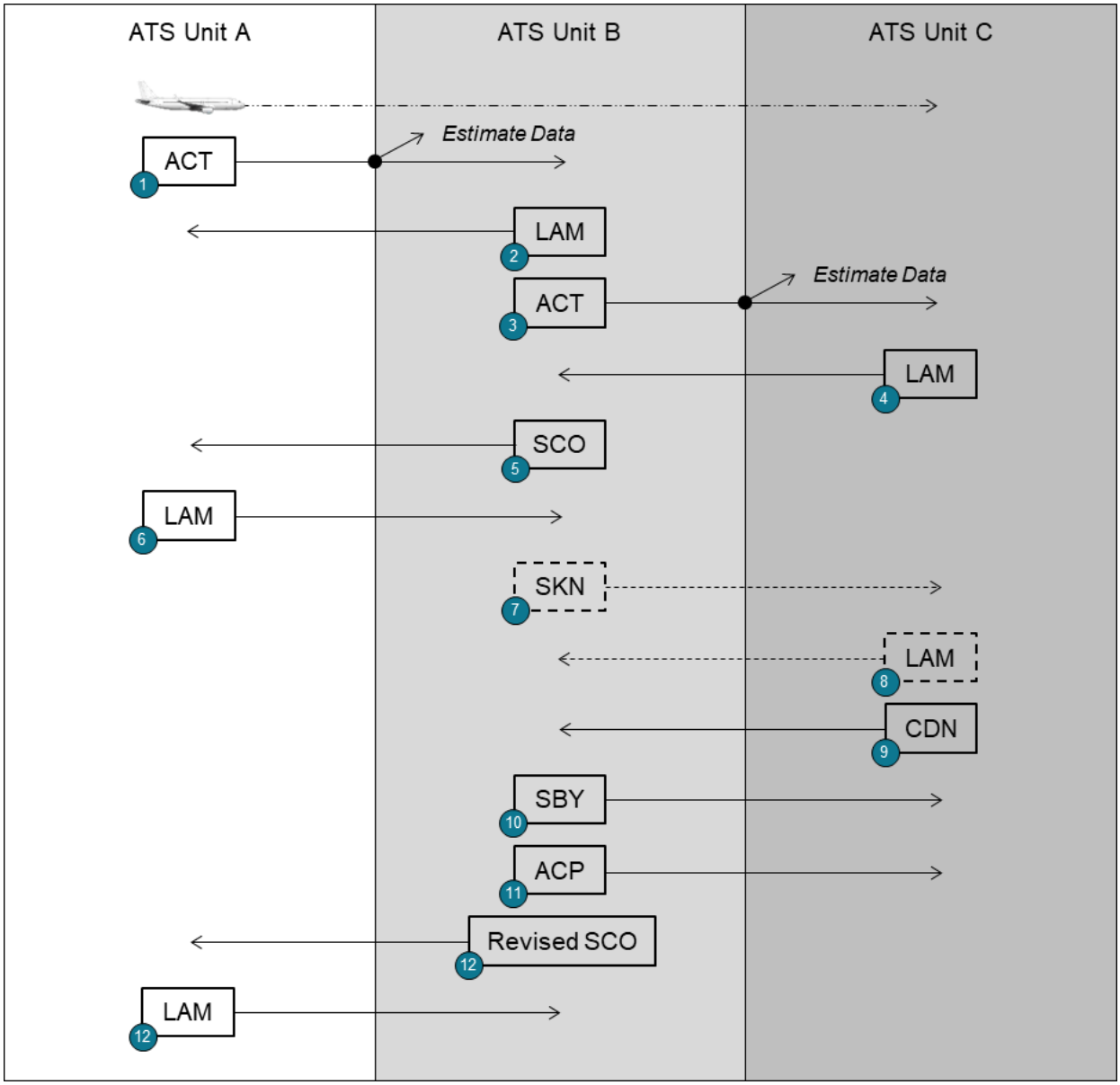


Figure 65 - ATS Unit Skip – Revised Skip Communication Message (SCO) triggered by an CDN message

11.4.4.4 Revised SCO – FDM Message

Figure 66 illustrates the **Revised ATS Unit Skip** use case triggered by an FDM message. In this scenario, the accepting unit (ATSU C) transmits an FDM message to the skipped unit (ATSU B) to notify it of the radio telephony frequency to which the flight is to be transferred.

The initial establishment of the communication skip is completed through steps 1 to 6. Subsequently, ATSU C transmits an FDM message to ATSU B (step 9) to ensure that the flight is transferred to the correct frequency.

-TITLE **FDM**
-REFDATA
    -SENDER -FAC **ATSC**
    -RECVR -FAC **ATSB**
    -SEQNUM **087**

-ARCID **DLH786**
-FREQ **120525**
-SECTOR **ATSCSEC2**

A revised SCO message (step 11) is transmitted to the transferring unit (ATSU A) and includes the updated frequency of the accepting unit (ATSU C).

-TITLE **SCO**
-REFDATA
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **112**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **120525**
-SECTOR **ATSCSEC2**
-COORDATA
    -PTID **REF02**
    -TO **1257**
    -TFL **F330**
-REF
    -REFID **REF02**
    -PTID **FRA03**
    -BRNG **010**
    -DISTNC **012**
-UNITID **LWSS**
-MSGREF
    -SENDER -FAC **ATSB**
    -RECVR -FAC **ATSA**
    -SEQNUM **087**

The revised SCO message ensures that the transferring unit (ATSU A) possesses the correct and most up-to-date radio telephony frequency of the accepting unit (ATSU C), to which the flight will be transferred.

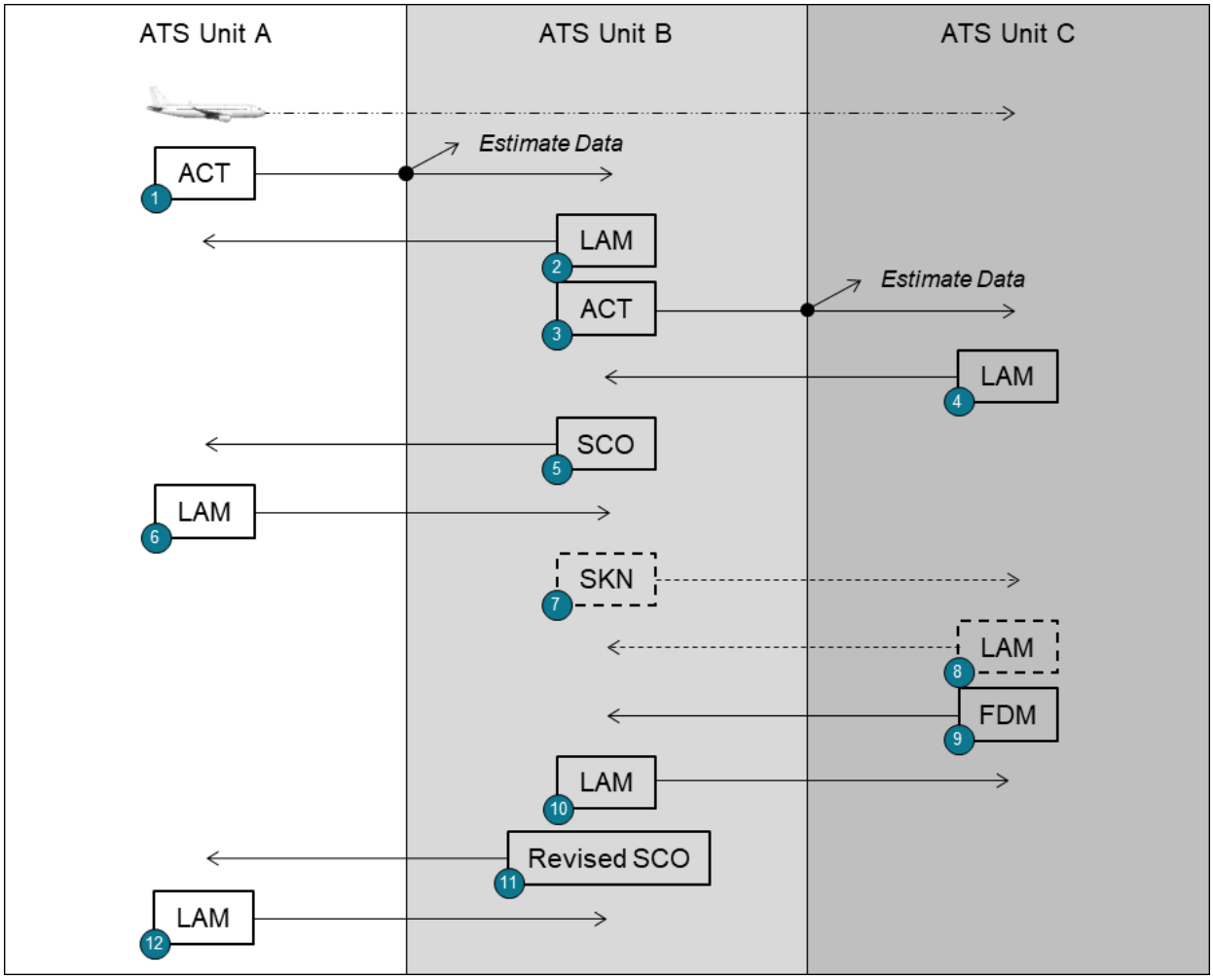


Figure 66 - ATS Unit Skip – Revised Skip Communication Message (SCO) triggered by an FDM message ATS Unit Skip – BYP Message

11.4.5 ATS Unit Skip – BYP Message

Figure 67 illustrates the Bypass Proposal of an ATS Unit use case. In this scenario, the transferring unit (ATSU A) initiates a proposal to bypass communications with its immediate downstream unit (ATSU B) and transfer communications directly to the next unit in sequence (ATSU C). This proposal is executed through the transmission of a BYP message, which functions as a complementary mechanism to the standard skip procedure.

Following coordination between the transferring unit (ATSU A) and the unit proposed to be bypassed (ATSU B), the ATCO in ATSU A may propose the bypass through the transmission of a BYP message.

TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **765**
-ARCID **DLH786**
-SSRCODE **A1165**
-ADEP **LBSF**
-COORDATA

-PTID **FRA02**
-TO **1241**
-TFL **F330**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0460F330 FRA01DCT FR02 DCT FRA03 DCT FRA04**

-TITLE **BYP**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **787**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**

Upon receipt of the BYP message, ATSU B responds with a SBY message (Step 4) to ATSU A, indicating that the proposal is under consideration while the flight is still on frequency with the transferring unit.

-TITLE **SBY**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **678**
-MSGREF
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **787**

The decision to accept or reject the bypass proposal lies with the ATCO of ATSU B. If an ACT message has already been transmitted from ATSU B to ATSU C, the acceptance of the BYP message results in the automatic transmission of an SCO message from ATSU B to ATSU A. The SCO message serves as the operational acceptance of the BYP message, as illustrated in Figure 49.

Conversely, if the bypass proposal is accepted and no ACT message has been previously transmitted from ATSU B to ATSU C, as shown in Figure 68, an ACT message, or a forced ACT message, is sent to ATSU C. Subsequently, an SCO message is automatically transmitted to ATSU A, confirming acceptance of the bypass proposal and providing the estimated data of ACT message transmission (steps 3, 4, and 7).

Forced ACT to ATSU C.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **354**
-ARCID **DLH786**
-SSRCODE **A1165**
-ADEP **LBSF**
-COORDATA

-PTID **FRA03**
-TO **1257**
-TFL **F330**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0460F330 FRA01DCT FR02 DCT FRA03 DCT FRA04 DCT FRA05 DCT FRA06**

Once these co-ordinations are in place, an SCO message is automatically initiated by the ATSU B and transmitted to ATSU A.

-TITLE **SCO**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **087**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **127325**
-SECTOR **ATSCSEC4**
-COORDATA
-PTID **FRA03**
-TO **1257**
-TFL **F330**
-UNITID **LWSS**

Following acceptance of the bypass proposal (Step 7), an SKN message may be transmitted from the skipped unit (ATSU B) to the accepting unit (ATSU C).

Conversely, if the proposal is rejected, a RJC message is sent from ATSU B to ATSU A.

-TITLE **RJC**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **690**
-MSGREF
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **787**

The method by which acceptance or rejection is handled at the HMI level is subject to local implementation. However, the procedural outcome is consistently communicated via the SCO or RJC message.

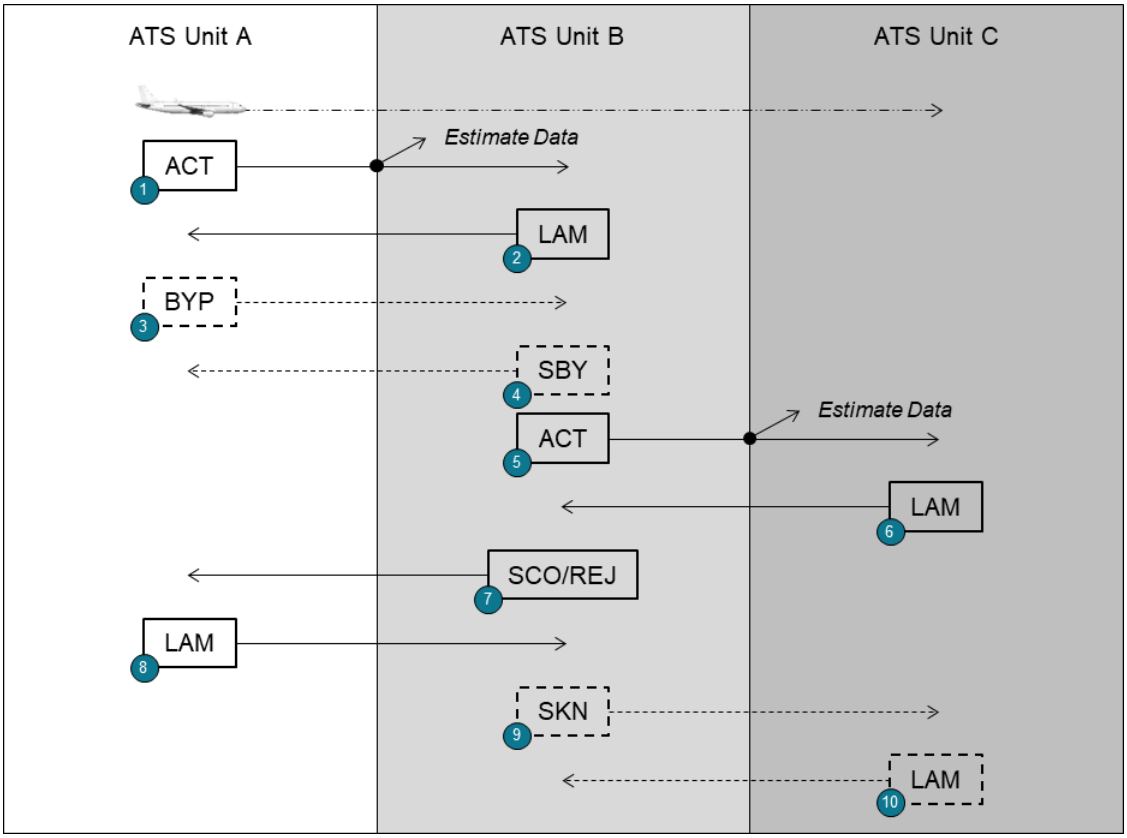


Figure 67 - ATS Unit Skip – Bypass Proposal Message (BYP). before ACT from ATSU A to ATSU B

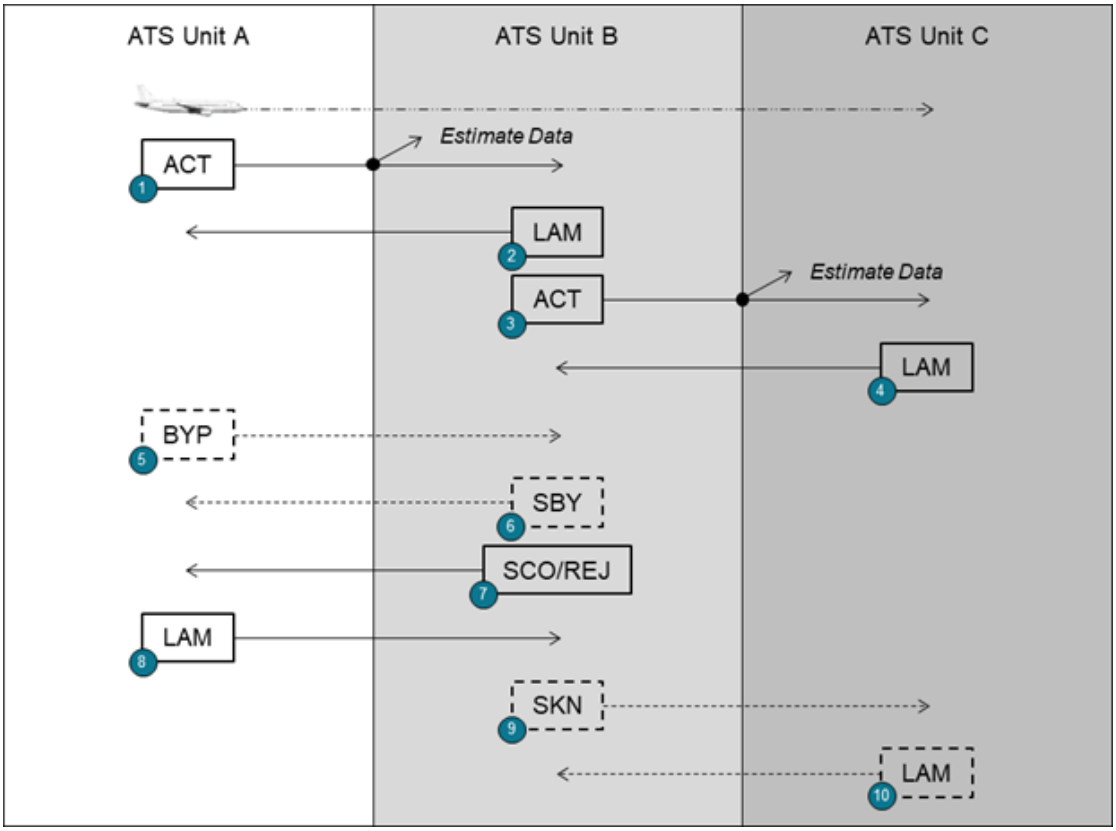


Figure 68 - ATS Unit Skip – Bypass Proposal Message (BYP) following ACT from ATSU B to ATSU C

11.4.6 ATS Unit Skip – SCO Message and Datalink

Figure 69 illustrates the **ATS Unit Skip use case** with a focus on **datalink considerations** and the seamless transfer of the datalink connection in scenarios where an entire ATS unit is skipped. In such cases, both voice and datalink communications must be transferred directly from the transferring unit (ATSU A) to the accepting unit (ATSU C), skipping the intermediate unit (ATSU B).

This use case assumes that all three ATS units involved, ATSU A, ATSU B, and ATSU C, are datalink-capable and that their respective datalink systems are functioning as intended. Prior to the initiation of coordination between ATSU A and ATSU B, LOF message is transmitted to provide the necessary ATN logon parameters to ATSU B, enabling it to utilize datalink applications (steps 1 to 2). Consequently, a *Next Data Authority (NDA)* message is uplinkeded to the aircraft, indicating that ATSU B is the next unit expected to establish a CPDLC connection (Step 3).

The ATSU A transmits the LOF message to ATSU B.

-TITLE **LOF**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **566**
-ARCID **DLH786**
-ADEP **LBSF**
-ADES **EDDM**
-AF **ATN**
-ARCADDR **47BDFB**
-ATNLOGON
-CMLTSP **414554440089649D000041435230303101010101**
-ADSQVLTSP
-AGAPPQUALIFIER **0**
-AGAPPVERSION **00**
-CPCQVLTSP
-AGAPPQUALIFIER **22**
-AGAPPVERSION **01**
-CPDLCADDRESS **414554440089649D000041435230303101160 1**
-ATIQV
-AGAPPQUALIFIER **3**
-AGAPPVERSION **00**

The ATSU A sends the ACT message to ATSU B.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **568**
-ARCID **DLH786**
-SSRCODE **A1165**
-ADEP **LBSF**
-COORDATA

-PTID **FRA02**
-TO **1241**
-TFL **F330**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0460F330 FRA01DCT FR02 DCT FRA03 DCT FRA04**

The ATSU B transmits the LOF message to ATSU C.

-TITLE **LOF**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **035**
-ARCID **DLH786**
-ADEP **LBSF**
-ADES **EDDM**
-AF **ATN**
-ARCADDR **47BDFB**
-ATNLOGON
-CMLTSP **414554440089649D0000414352303031010101**
-ADSQVLTSP
-AGAPPQUALIFIER **0**
-AGAPPVERSION **00**
-CPCQVLTSP
-AGAPPQUALIFIER **22**
-AGAPPVERSION **01**
-CPDLCADDRESS **414554440089649D0000414352303031011601**
-ATIQV
-AGAPPQUALIFIER **3**
-AGAPPVERSION **00**

The ATSU B sends the ACT message to ATSU C.

-TITLE **ACT**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **057**
-ARCID **DLH786**
-SSRCODE **A1165**
-ADEP **LBSF**
-COORDATA
-PTID **FRA03**
-TO **1257**
-TFL **F330**
-ADES **EDDM**
-ARCTYP **A320**
-ROUTE **N0460F330 FRA01DCT FR02 DCT FRA03 DCT FRA04 DCT FRA05 DCT FRA06**

The SCO message is manually initiated by the ATSU B and transmitted to ATSU A.

-TITLE **SCO**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **423**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **127325**
-SECTOR **ATSCSEC4**
-COORDATA
-PTID **FRA03**
-TO **1257**
-TFL **F330**
-UNITID **LWSS**

ATSU B sends SKN message to ATSU C.

-TITLE **SKN**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **687**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **120525**
-SECTOR **ATSASEC1**
-SKFREQ **130925**
-SKSEC **ATSUBSEC3**

Following the successful establishment of the skip procedure (steps 4–11), a *revised NDA message* is uplinked to the aircraft (step 12), designating ATSU C as the new next data authority, thereby skipping ATSU B. The *revised NDA* message includes the *ICAO ATS Unit Facility Designator* of the accepting unit (ATSU C). This data item is mandatory within the SCO message when an entire ATS unit is skipped. Its inclusion ensures that the *ICAO ATS Unit Facility Designator* of the accepting unit (ATSU C) is always available to the transferring unit (ATS Unit A), to be uplinked to the aircraft.

Given that a direct OLDI connection between ATSU A and ATSU C cannot be assumed, a ‘’forwarding mechanism’’ is implemented to ensure the transfer of the NAN message. In this mechanism, ATSU A sends the NAN message to the skipped unit (ATSU B), which in turn automatically generates a NAN message to the accepting unit (ATSU C), provided that ATSU C supports the NAN message functionality.

-TITLE **NAN**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **590**
-ARCID **DLH786**
-ADEP **LBSF**
-ADES **EDDM**

The NAN message transmitted from ATSU A to ATSU B (step 15) is only acknowledged once ATSU B has successfully forwarded the message to ATSU C and received an acknowledgment in return (steps 17 to 18). This ensures the integrity and continuity of the CPDLC connection during the skip process.

-TITLE **NAN**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **078**
-ARCID **DLH786**
-ADEP **LBSF**
-ADES **EDDM**

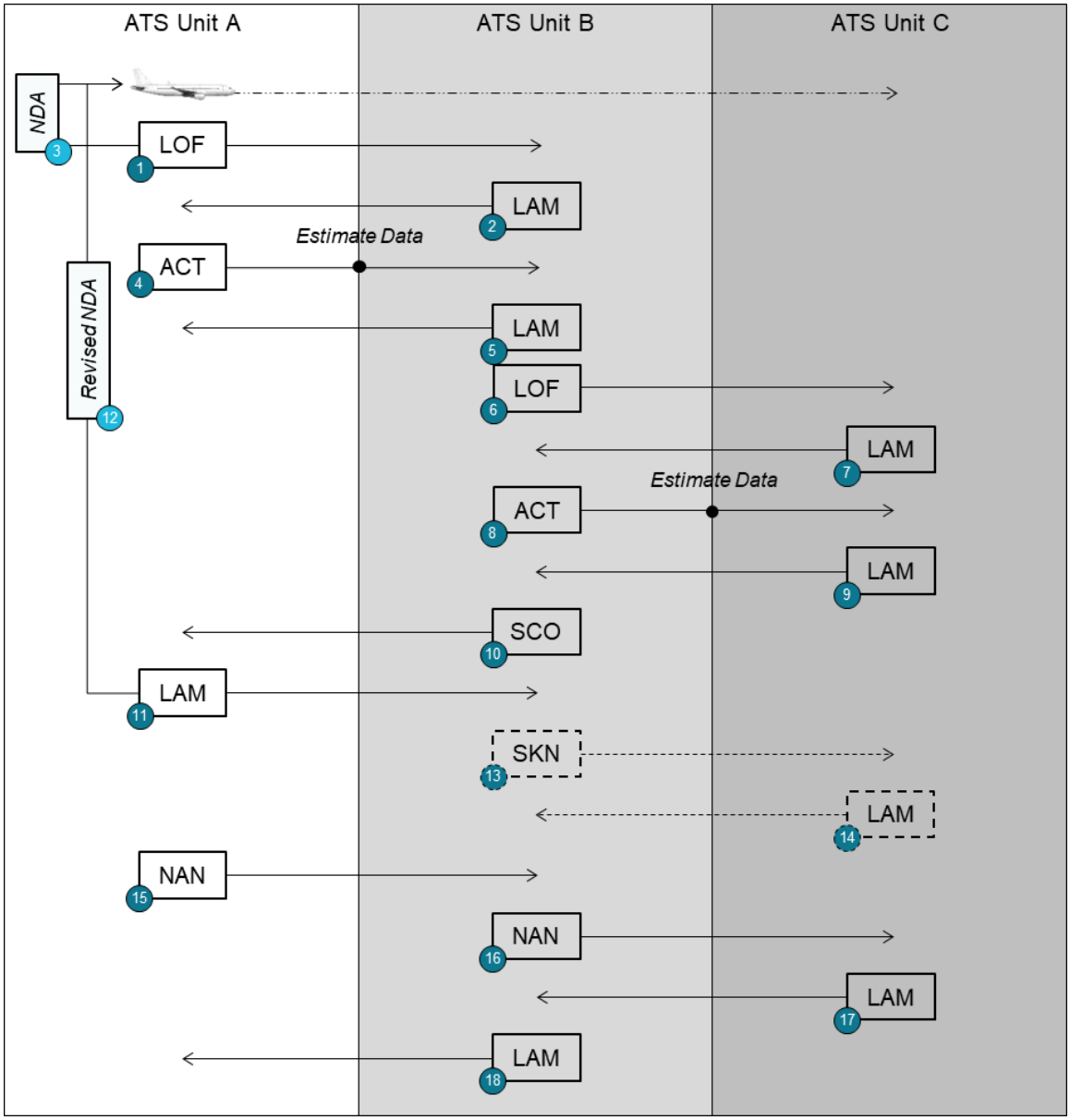


Figure 69 - ATS Unit Skip – Skip Communication Message (SCO) and Datalink Considerations

11.4.7 ATS Unit Skip – SKC Message and Datalink

Figure 70 illustrates the **ATS Unit Skip Cancellation** use case, with a focus on **datalink considerations** in scenarios where an entire ATS unit is initially skipped and subsequently reinstated through the transmission of an SKC message.

As shown in steps 1 to 12, the skip of communications with the skipped unit (ATSU B) is successfully established, including all relevant datalink interactions. Steps 13 and 14 depict the complementary transmission and acknowledgment of the SKN message.

The message sequence is the same as depicted in the previous paragraph, therefore there is no need to repeat them

If the skipped unit (ATSU B) initiates a cancellation by transmitting an SKC message to the transferring unit (ATSU A), a *revised NDA message* is uplinked to the aircraft from ATSU B (step 19). This message includes the *ICAO ATS Unit Facility Designator* of ATSU B, which now resumes its role as the accepting unit. The *revised NDA* ensures that the aircraft is correctly informed of the next data authority (addition of step 19).

-TITLE **SKC**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **435**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-MSGREF
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **423**

TSU B sends the SKC message to ATSU B to cancel SKN

-TITLE **SKC**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **699**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-MSGREF
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **687**

The ICAO designator of ATSU B, which was known to the transferring unit (ATSU A) prior to the skip, is reinstated following the skip cancellation. In accordance with nominal datalink procedures, a NAN message is then transmitted from ATSU A to ATSU B, authorizing it to initiate a *CPDLC Start Request* with the aircraft.

-TITLE **NAN**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**

-SEQNUM **604**
-ARCID **DLH786**
-ADEP **LBSF**
-ADES **EDDM**

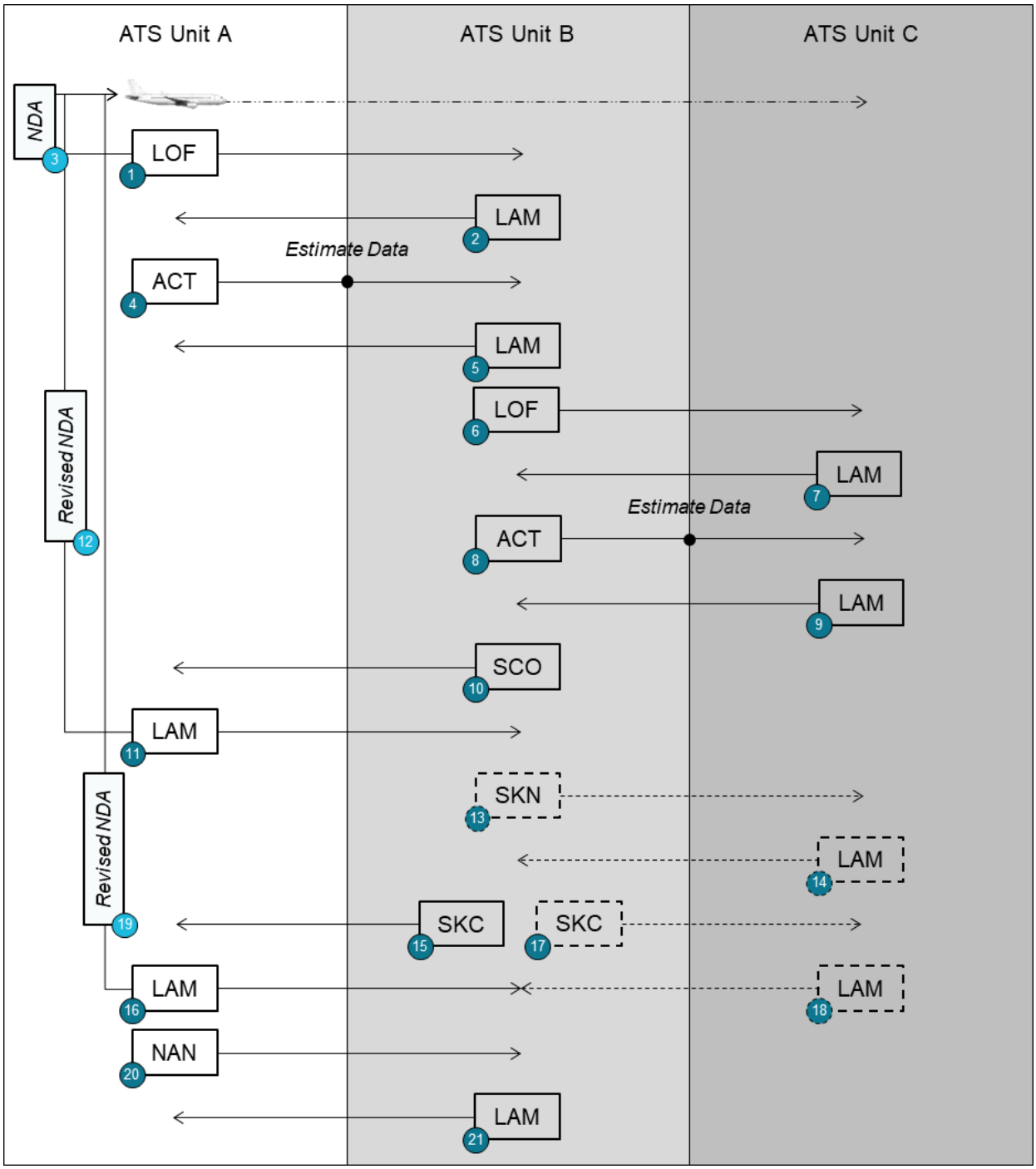


Figure 70 - ATS Unit Skip – Skip Cancellation Message (SKC) and Datalink Considerations

11.4.8 ATS Unit Skip – Transfer of Communications

Figure 71 illustrates the ATS Unit Skip use case with a focus on the transfer of communication procedures, specifically highlighting the forwarding mechanism for communication-related messages, namely, the COF, MAS, and complementary the ROF message.

Following the successful establishment of the skip procedure with ATSU B (steps 1 to 6), elaborated with the message in several paragraphs above, , the transfer of communication messages originating from the transferring unit (ATSU A) must be relayed to the accepting unit (ATSU C) via the skipped unit (ATSU B), under the assumption that no direct OLDI connection exists between ATSU A and ATSU C.

Once the COF message is transmitted from ATSU A to ATSU B (step 13), ATSU B automatically generates and transmits a new COF message to ATSU C (step 14), indicating that the aircraft has been instructed to contact the accepting unit (ATSU B).

-TITLE **COF**
-REFDATA
-SENDER -FAC **ATSA**
-RECVR -FAC **ATSB**
-SEQNUM **675**
-ARCID **DLH786**
-CFL
-FL **F330**
-ASPEED **N0450**
-FREQ **127325**
-SECTOR **ATSCSEC4**

ATSU B automatically forwards COF message received from ATSU A to ATSU C.

TITLE **COF**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**
-SEQNUM **0795**
-ARCID **DLH786**
-CFL
-FL **F330**
-ASPEED **N0450**
-FREQ **127325**
-SECTOR **ATSCSEC4**

The original COF message from ATSU A is only acknowledged once ATSU B has successfully forwarded the message to ATSU C and received an acknowledgment in return (steps 11–12). Receipt of the COF message by ATSU B also enhances situational awareness for its ATCO, confirming that the aircraft has been instructed to contact the accepting unit (ATSU C).

In the reverse direction, once ATSU C establishes radio contact with the aircraft, it transmits a MAS message to ATSU B (step 17). ATSU B then automatically generates and transmits a new MAS message to ATSU A (step 18). The original MAS message from ATSU C is only acknowledged once ATSU B has successfully forwarded the message to ATSU A and received an acknowledgment in return (steps 19 to 20). Receipt of the MAS message by ATSU B further enhances situational awareness of for its ATCO, confirming that the aircraft is now under the control of ATSU C.

-TITLE **MAS**
-REFDATA
-SENDER -FAC **ATSC**
-RECVR -FAC **ATSB**
-SEQNUM **678**
-ARCID **DLH786**

ATSU B automatically forwards MAS message received from ATSU C to ATSU A.

-TITLE **MAS**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **385**
-ARCID **DLH786**

After the SKN message transmission from ATSU B to ATS U C (steps 7 to 8), the accepting unit (ATSU C) may choose to request the aircraft on frequency by transmitting a ROF message.

TITLE **SKN**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSC**

-SEQNUM **030**
-ARCID **DLH786**
-ADES **LBSF**
-ADEP **EDDM**
-FREQ **120525**
-SECTOR **ATSASEC1**
-SKFREQ **130925**
-SKSEC **ATSBSEC3**

ATSU C sends the ROF message to ATSU B.

-TITLE **ROF**
-REFDATA
-SENDER -FAC **ATSC**
-RECVR -FAC **ATSB**
-SEQNUM **912**
-ARCID **DLH786**
-FREQ **127325**
-SECTOR **ATSCSEC2**

Upon receipt of the ROF message by the skipped unit (ATSU B), a new ROF message is automatically generated and forwarded to ATSU A (steps 9 to 10), instructing it to transfer the flight to ATSU C. The *Frequency* and *Sector Identifier* data items included in the forwarded ROF message correspond to those of the accepting unit (ATSU C).

-TITLE **ROF**
-REFDATA
-SENDER -FAC **ATSB**
-RECVR -FAC **ATSA**
-SEQNUM **766**

-ARCID **DLH786**
-FREQ **127325**
-SECTOR **ATSCSEC2**

In the event of a skip cancellation initiated through the transmission of an SKC message, the automatic generation of COF, MAS and where applicable ROF messages is prohibited. Following the skip cancellation, these messages are exchanged in accordance with nominal operational procedures between the transferring unit (ATSU A) and the accepting unit (ATSU C).

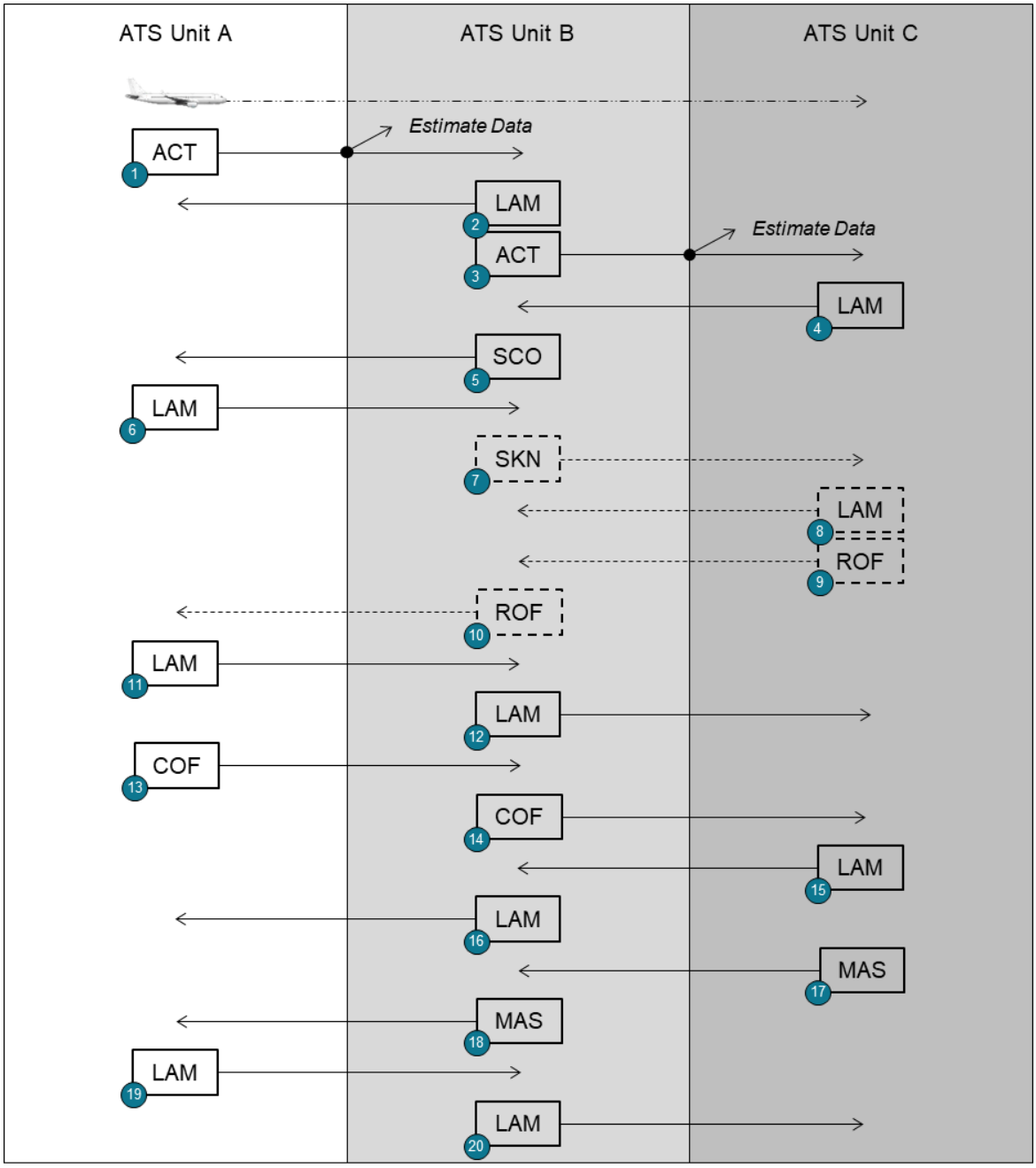


Figure 71 - ATS Unit Skip – Skip Communication Message (SCO) and Transfer Considerations

11.5. Operational Considerations of Skip Mechanism

The skip mechanism is designed for specific operational scenarios, as outlined in the above sections. Its application outside these scenarios is not recommended, as it may introduce additional complexity, raise safety concerns, and ultimately increase workload rather than reduce it.

The examples provided below are indicative, not exhaustive and may evolve as the implementation of the skip mechanism progresses. The purpose of this section is to provide guidance on situations where the skip mechanism should be avoided at an operational level.

- **Scenario 1:** Conflicting Traffic

The skip mechanism should only be applied when it reduces ATCO workload without negatively impacting adjacent ATC units. Its use is inappropriate when the flight concerned is involved in a conflict within the sector or ATS unit that would otherwise be skipped. In such cases, the transferring or accepting ATCO would need to resolve conflicts in a sector outside their responsibility, which is operationally unacceptable and contrary to established safety principles.

- **Scenario 2:** SSR Code Change Required by Accepting Unit

When the skipped unit (ATS B) or the accepting unit (ATSU C) need to perform a SSR code change, the use of the skip mechanism is not possible. The transferring unit (ATSU A) will not have the next SSR code to be assigned to the flight and this information is not included in the SCO message. Even if the data were available, additional procedures would be required to ensure the SSR code change occurs precisely at the required boundary. This introduces unnecessary complexity and undermines the intended efficiency of the skip mechanism.

- **Scenario 3:** Revision of Coordination Conditions Outside LoA Provisions by the Skipped Unit

If coordination conditions need to be changed outside the provisions of the LoA, the skip mechanism should not be applied. To avoid undesirable automatic ‘’unskips’’, the unit intended to be skipped (ATSU B) must first coordinate the desirable coordination conditions with both the transferring unit (ATSU A) and the accepting unit (ATSU C) before initiating any skip of communications.

12 OLDI testing and verification procedures

12.1. Background

This section contains the requirements that are considered best practices and by no means are mandatory.

12.2. Context

The test and verification procedures for OLDI do not cover the functional and technical tests performed during the development of OLDI facilities from an industrial perspective. These tests are normally the joint responsibility of the ANSP and the system supplier and are addressed under the applicable requirements for conformity assessment. The test and verification procedures described in this section assume that the OLDI functionality has been correctly implemented within the ATS Systems and that the manufacturer provides an EU declaration of conformity or suitability for use for the end product, where applicable.

The relevant provisions governing the declaration of conformity or suitability for use are now established in the Regulation (EU) 2017/373, in particular Part-ATM/ANS.OR (requirements for conformity and declarations) and Annex IV (assessment of constituents and systems), as amended by Regulation (EU) 2023/1771. However, complete functional tests cannot be performed in isolation. For comprehensive end-to-end testing, both from a technical and operational perspective, additional test and verification procedures are required. The procedures described here outline the general process for OLDI facilities testing and are intended to complement the conformity assessment and verification framework as defined in Regulation (EU) 2017/373.

Because of the potential number of combinations of OLDI messages, it would be impractical for these procedures to propose an exhaustive list of detailed technical and operational tests to be conducted in different environments. The procedures detailed in this document list the minimum requirements for OLDI testing and do not preclude that ANSPs complement them where deemed necessary, based on the complexity of their local environment and systems.
The wide definition of OLDI message exchanges allow for a wide range of combinations of messages or options within each message. Therefore, a structured approach for the OLDI testing, including the different steps and actions to be performed, is considered useful to ensure uniformity of results in different environments.
The following test and verification phases for OLDI have been identified:

- Identification of the need for testing;
- Definition and co-ordination of tests to be performed;
- Preparation of tests;
- Testing phase;
- Analysis of tests results;
- Reporting of results;
- Verification and approval of operational use of OLDI implementation;
- Operational implementation of the OLDI connection;
- Post implementation verification of OLDI.

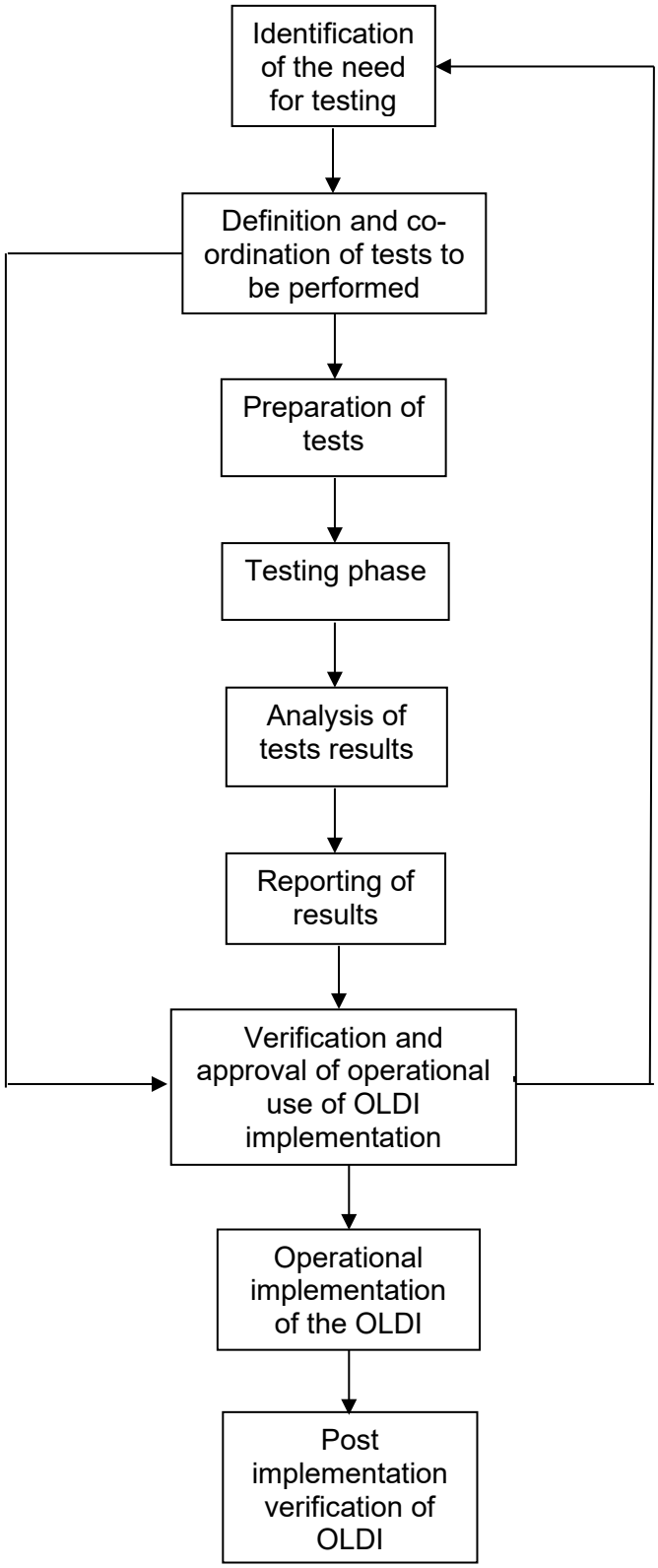


Figure 72 - Schematic view of the test and verification phases

12.3. Identification of testing needs

OLDI defines the interface requirements. Therefore, early notification of the intention to deploy or modify OLDI functionality is required. The need for testing can be identified by either of the

OLDI partners. Normally the ATS Units that intend to implement or change the existing OLDI facilities will have the initiative and will start the dialogue with the adjacent ATS units. To ensure that the network effect is appropriate, testing is required for any change affecting the cross-border functionality. These changes include:

- addition of new messages;
- changes of message content;
- usage of bilaterally agreed data items;
- usage of OLDI optional data items;
- changes of ATS System functionality that influence the system behaviour and the corresponding OLDI message exchanges (i.e. FPL processing that can impact on OLDI, system changes that can degrade the OLDI performance. etc.);
- changes of environment parameters (airspace structure definition, time parameters, etc.).

It is recommended that ATS Units establish agreements with all OLDI partners. These agreements will need to specify at least:

- the points of contact for discussions related to OLDI facilities including the responsible persons for each aspect (operational, technical, communications, etc.);
- the minimum period of time required for notification of intended OLDI changes.

It is recommended that in addition, each ATS Unit establishes points of contact and appropriate internal working arrangements to support and manage the OLDI related changes. This should result in a list of technical and operational staff responsible for each aspect of OLDI testing and the appointment of an OLDI lead.
It is to be noted that because of the complexity, ATS Systems require a rather long time for adaptations. Sometimes the changes required can be categorised as minor (i.e. lead time for the generation of a message). It is paramount that adjacent ATS Units are aware of the minimum required time for OLDI changes and their nature. This would enable them to have a harmonised development.

In this phase, the ATS unit initiating the change(s) has the responsibility to notify the adjacent ATS units about their intention. This notification will include:

- the OLDI facilities that will be affected (additional or changes to existing facilities);
- the reason for the change(s);
- the planned timescale for performing this(ese) change(s);
- the level of testing to be performed;

In return, the notified ATS units will need either to confirm the proposed changes or to propose counter-changes. In the case when an ATS Unit is not able to meet, the requests of an adjacent ATS unit they will need to propose an alternate course of action and justify their proposal. In this phase, the ATS units involved will need to agree on the objectives of the testing and the expected functionality, systems behaviour and roles and responsibilities.

12.4. Definition and co-ordination of tests to be performed

It should be noted that the tests will always be conducted by the two co-ordination partners. In this phase, the ATS Units involved will define and agree the actual tests to be performed. Special care should be given to level of detail of these tests. This agreement will outline at least:

- The functionality to be tested;

- The test plans including the dates and number of tests to be performed;
- The scenarios to be tested;
- The criteria for acceptance of the results (i.e. minimum number of tests, etc.);
- The acceptable results for the tests to be considered passed.

It is recommended that checklists for the OLDI messages are established in this phase. These lists should contain as a minimum check for the following items:

- message generation;
- message transmission/reception;
- message content;
- message format;
- correct processing of received data;
- correct distribution of messages;
- correct display of operational data;
- message/data corruption;
- processing of non-standard cases (no LAM received, wrong sequence of messages);
- response times.

It is to be noted that in the OLDI context the response times need to consider the response time up to the Controller Working Position.

In addition, the items included in the checklist should form the basis for the criteria for the acceptability of the OLDI message exchanges.

In this phase, it is expected that the ATS Units involved will pass enough information to each other to enable an efficient and objective conduct of the tests. It is clear that both partners need to fully understand each other's functionality and limitations. Therefore, transparency and efficient exchange of information are required on both sides.

The relevant environmental data needs to be exchanged. As OLDI is heavily influenced by co-ordination points, sectors definition, lead times, etc., the environment data needs to be agreed in this phase to create simulated scenarios that are as close as possible to the target operational environment. It is also important to co-ordinate the traffic and environment. This reduces the need for unwanted reject messages being generated during live tests. Involvement of the operational staff is required to ensure that the scenarios are the most realistic and relevant ones for the target environment.

It is important that starting with this phase a team that includes both operational and technical people is established and involved in all the other phases of testing and verification.

Changes to time/distance parameters and Co-ordination Points for OLDI messages that are already in operations will not require the full test and verification procedure. In this case, the ATS Units might agree to move directly to the verification and approval of operational use of OLDI implementation.

For all other changes including new systems, processing rules, additional fields or new messages it is recommended that the complete test and verification procedure is applied.

12.5. Preparation of tests

This phase covers the actual development of the test platform, detailed test scenarios,

establishment of appropriate communication lines and other technical and operational arrangements to ensure a successful conduct of the tests. In this phase, it is anticipated that the following activities will need to be performed:

- Offline test systems booked;
- Software updates developed and integration tested as required;
- System configuration file developed for external systems interface device;
- FDP system test developed, as required;
- Test simulations developed as required;
- The usage of required OLDI test tools (simulators) agreed;
- Utilisation of manual inputs (especially for SYSCO dialogue messages that requires operational reply) agreed;
- Test simulations are agreed;

If OLDI testing includes live testing with the operational platform, NM might need to be advised of testing schedule in case of any possible disruption of ATS.

Test facilities and their availability are very important. For some centres, Test Development System (TDS) are the prime facilities for live testing.

For ATS Units that do not have a Test and Development System, the live operational system might be involved in the OLDI testing. In these cases, proper attention needs to be given to the periods and extent of the testing. It is recommended that in these cases, the tests are conducted for limited periods of time during the low traffic periods to minimise the risk and impact on the controller workload.

Once a system has been released with the relevant adaptation and the associated configuration file has been supplied, initial tests can begin. Local functionality (manual triggering of messages, HMI behaviour, etc.) should be tested independently before the tests involving external partners. Communication lines and protocols need to be in place and tested before starting testing with partners. Whenever harmonised tools are available for independent testing (i.e. the EUROCONTROL ETIC test tool) these should be used to the extent possible before starting the testing with partners. Systems analysis recording data from these tests is then analysed and results and/or comments sent to parties concerned.

When the simulations are proven to comply with the requirements and the Flight Data Processing System (FDPS) is performing as expected live testing can be initiated.

12.6. Testing phase

During this phase, the actual live tests with the co-ordination partners are conducted. This is done in accordance with the times and the scenarios agreed in the previous phases. It is essential that engineering support is available when carrying out live testing. Experience has shown that technical problems can be overcome using their expertise, which otherwise may have meant abandoning the tests. Some stakeholders' systems include Test Development System (TDS) that can be used for OLDI testing. Where such platforms are available between peers, live tests should be conducted between the TDSs first. It is essential that during this period the system behaviour is documented. This can be done using recordings, control questionnaires, etc. or a mix of these methods. This information will be required for the tests analysis.

12.7. Analysis of tests results

Following the live testing, the data collected will be analysed in this phase. The analysis will look at the technical and operational acceptability of the OLDI links. Special care needs be given to any abnormal events including errors in processing, warnings, etc.

It is recommended that during the analysis phase the ATS Units involved maintain a close cooperation. Exchange of information at this stage allows partners to identify reasons for abnormal behaviour for which the data collected locally might not be enough. It also allows the cross check of the results ensuring that the same events are treated consistently and reduces the risk of having discrepant results in the final assessments.

12.8. Reporting of results

In this phase, it is expected that each ATS unit formalises the results of the analysis conducted in the previous step. The test reports could contain at least:

- the data or the interpretation of the data obtained during the tests;
- detailed data for the abnormal events or failures;
- a summary of results;
- an overall conclusion (Passed or Failed);
- the justification for this conclusion in accordance with the criteria bilaterally agreed previously;
- a recommendation including the changes required a proposal for re-conducting the tests or the putting into operations of the OLDI link/changes.

The ATS units involved are expected to share this information to enable a decision on the next steps. Whenever the conclusions and recommendations differ, it is recommended that a bilateral discussion is held to agree on the way forward. It is recommended that the agreement between the two ATS Units is recorded and formalised.

As OLDI is an interoperability system, it is essential for the partners to communicate, share information and agree on a way forward. Although ATS Units are entitled to make their own decision based on their priorities, it is highly important that decisions regarding cross border functionality are taken in cooperation based on common understanding of each other's constraints to maximise the network benefit.

12.9. Verification and approval of operational use of OLDI implementations

This phase starts when both ATS units involved in an OLDI connection report that the tests were passed and the recommendation is the start of OLDI operations. In this phase, the two units will refine the parameters for the OLDI connection. Example parameters for OLDI connection can be the following:

- the list of co-ordination points;
- time/distance parameters for message generation;
- time outs;
- flight level constraints;
- list of corresponding sectors for each sector configuration.

In this phase, it is important that the operational staff (especially) of the two ATS Units are involved in the decisions as this would be the last opportunity to refine the parameters that will have an impact on the operational use and acceptability of the OLDI facilities.

During this phase, the ATS units will agree on the date for putting into operations and co-ordinate a planning for this. Proper consideration needs to be given when deciding on the planning on controller training issues, safety aspects, operational approval, etc. Formal letters of agreement (or where deemed necessary amendments to these) need to be put in place. Some of these actions might be completed in parallel with some of the previous phases. However, in this phase the ATS Units will ensure that all conditions for live operations are met.

12.10. Implementation of the OLDI connection

In this phase, the actual switch to operational use of the OLDI facilities is completed. This will be done in accordance with the previously agreed planning. Before moving to live operations, a last check of the communication infrastructure supporting OLDI message exchanges should be conducted. The start of live operations needs to be agreed by both partners. For initial operations, the ATS Units should ensure that they retain the capability to revert to the previous mode of operations in case of a failure.

12.11. Post-implementation verification of OLDI

During the first period of OLDI operations, the OLDI links need to be monitored both from a technical and operational point of view. For this, the ATS units will agree on a period for monitoring. They will establish a means for problem reporting on both technical and operational aspects. In addition, each ATS Unit needs to establish procedures for the collection and processing of the data obtained in the post implementation monitoring.

At the end of this phase, the results will be analysed. Based on this analysis the ATS Units will decide if the capability to revert to the previous mode of operations is still required.

13 DIAGRAMS

13.1. Air / Ground Data Link – Sequence Diagrams

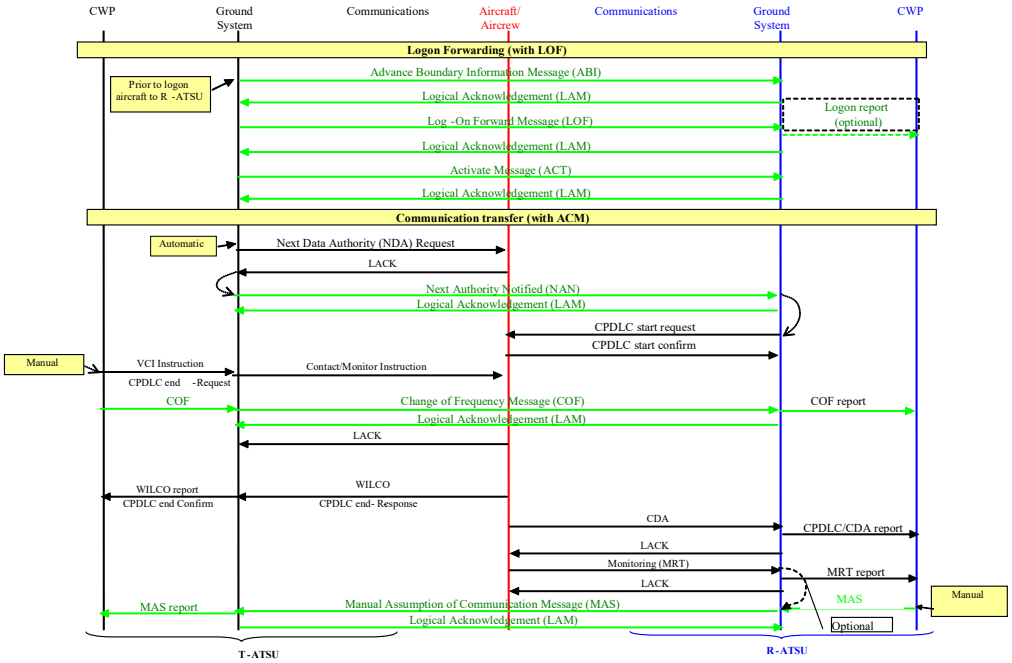


Figure 73 - Logon Forwarding, using LOF, and communication transfer for ATN

Note: *The Ground-ground co-ordination is not coupled with the air-ground message exchange.*

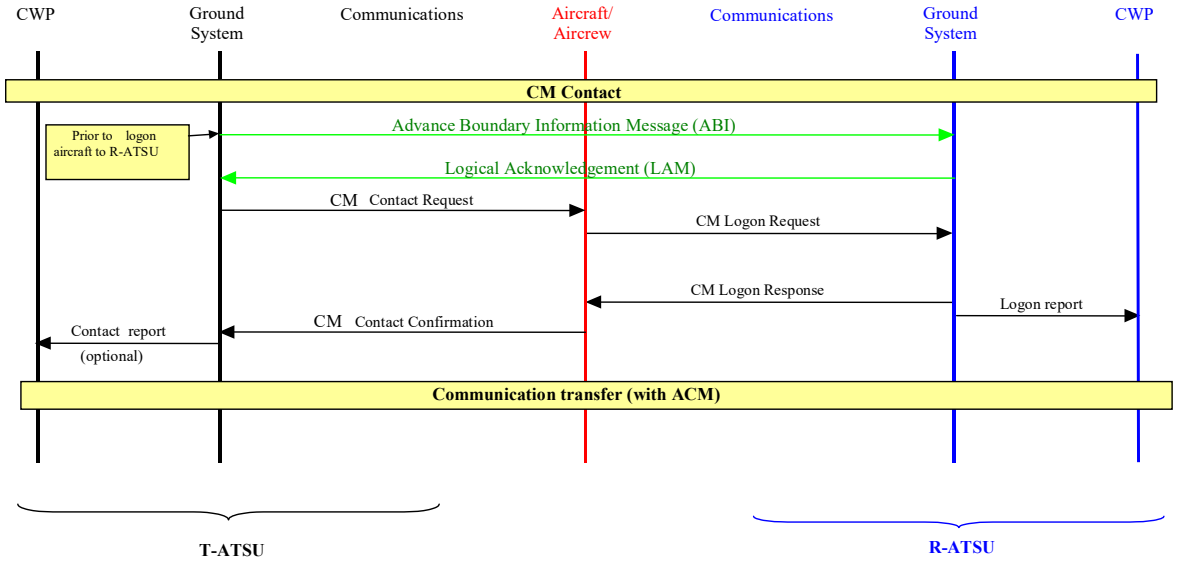


Figure 74 - Logon Forwarding, using CM-contact, and communication transfer

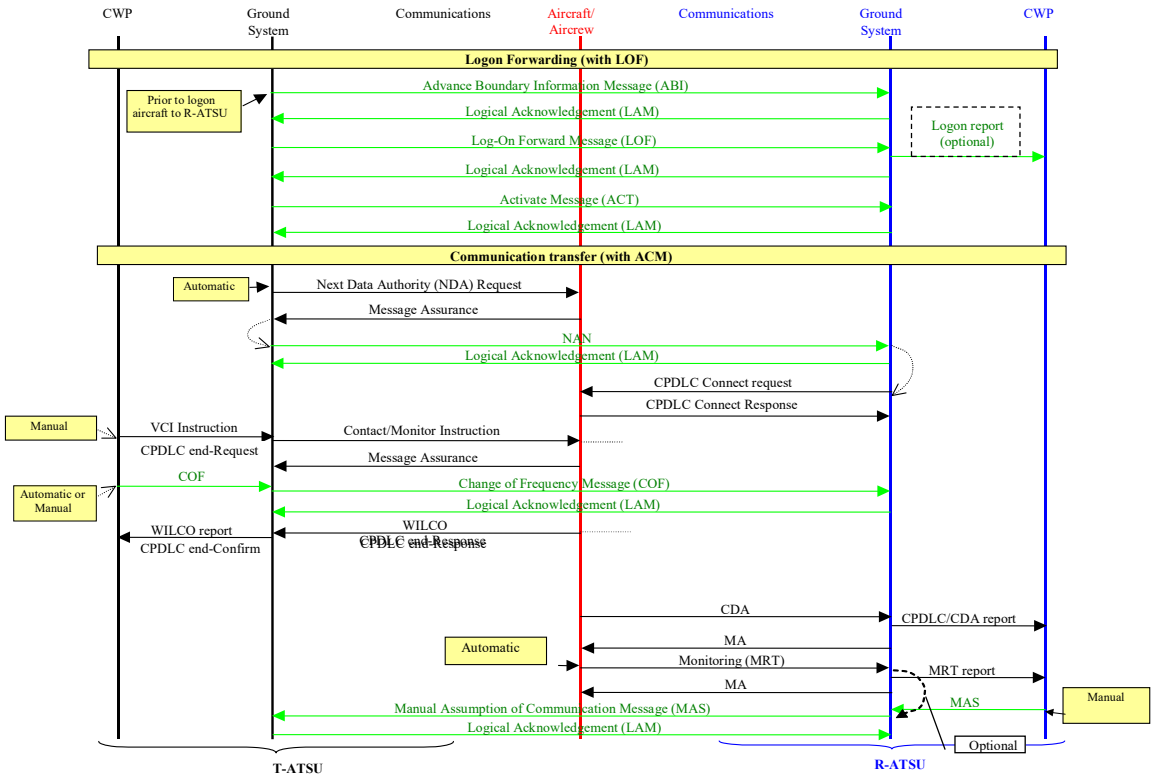


Figure 75 - Logon Forwarding, using LOF

13.2. State Transition and Sequence Diagrams

The state transition and sequence diagrams illustrate the requirements of the basic procedure detailed in this specification.

Not all messages and combinations of messages are covered to avoid too much complexity. Furthermore, they only cover the OLDI message exchanges between two ATSU units, independently of any other information flows or message exchanges with other ATSUs or facilities.

The flight plan state transitions depend on many factors linked with the local deployment modalities.

- Figure 76 illustrates the possible flight plan state transitions triggered by transmission of OLDI messages.
- Figure 77 illustrates the possible flight plan state transitions triggered by reception of OLDI messages.

Sequence diagrams are illustrated by Figures 78 to 82.

13.3. State Transition Diagrams

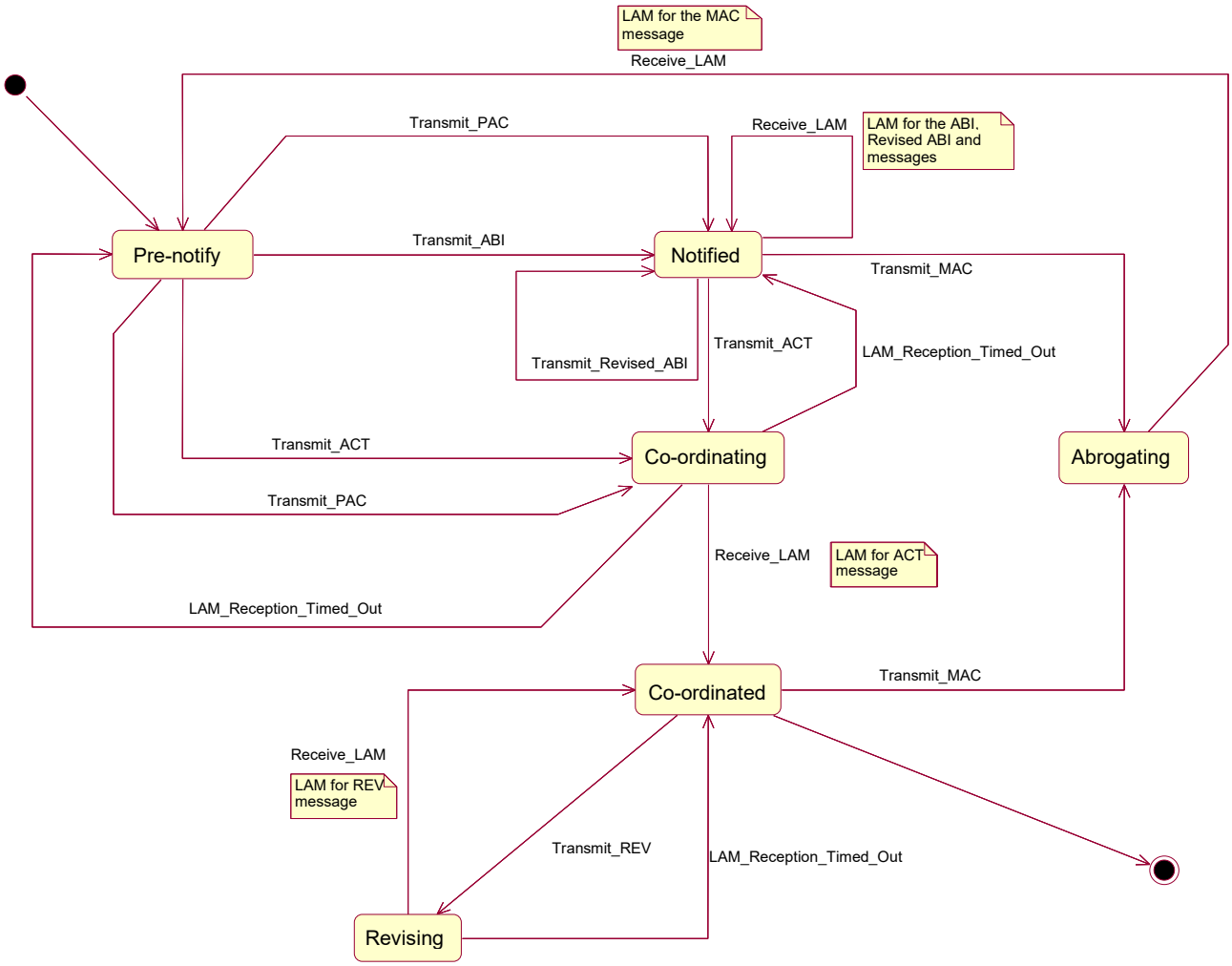


Figure 76 - Transferring Unit – Co-ordination States

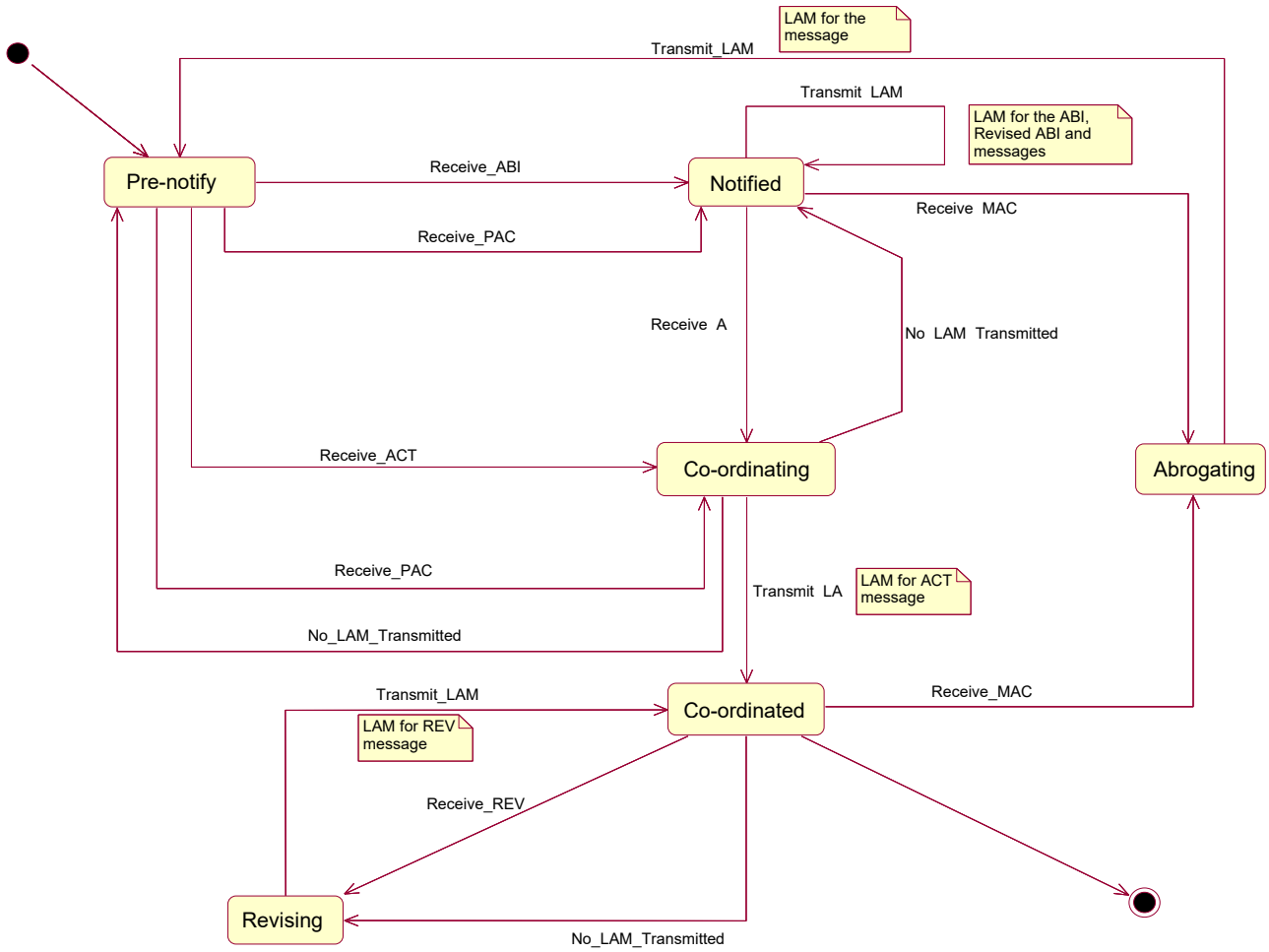


Figure 77 - Receiving Unit – Co-ordination States

13.4. Sequence Diagrams

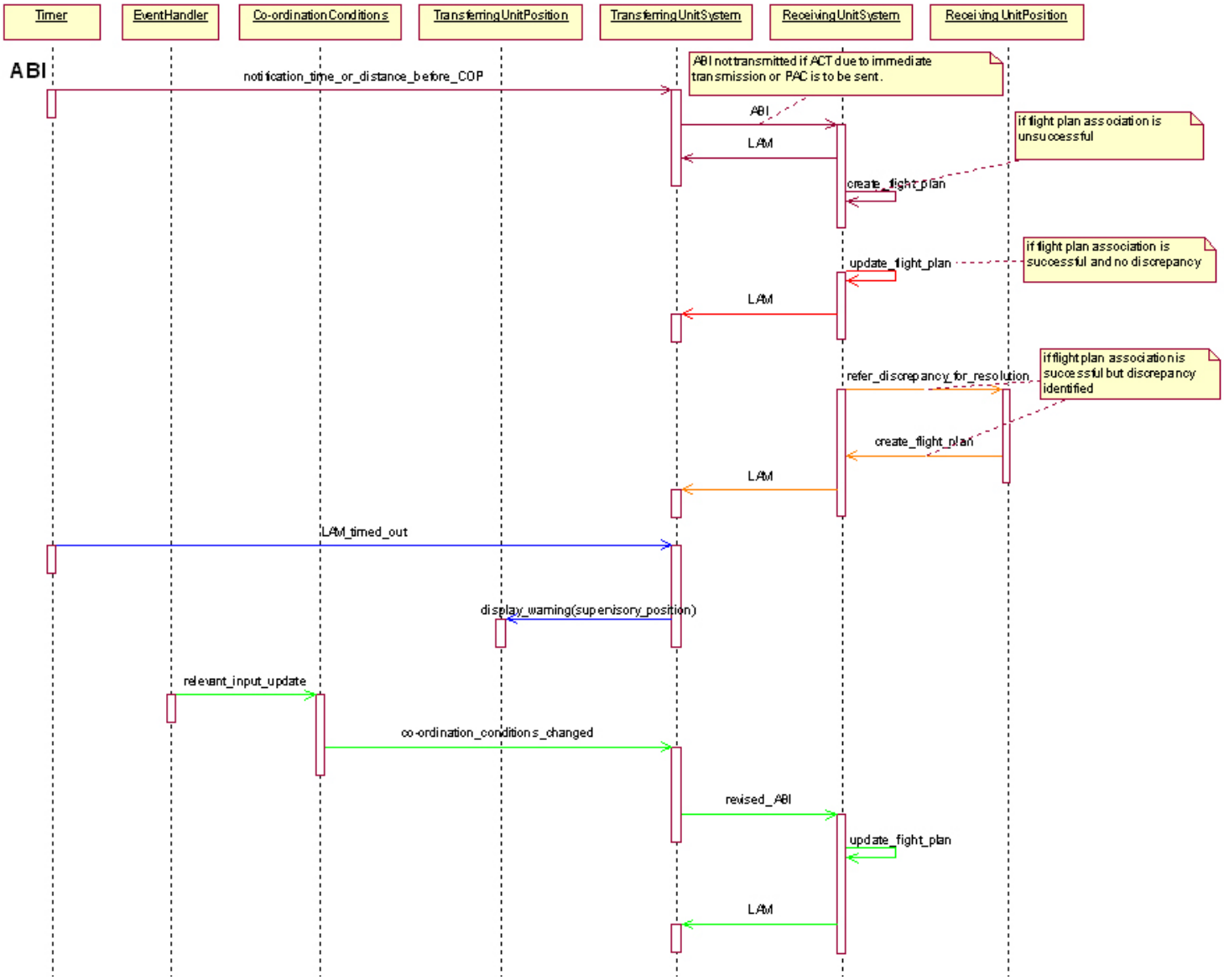


Figure 78 - Sequence Diagram – ABI Message

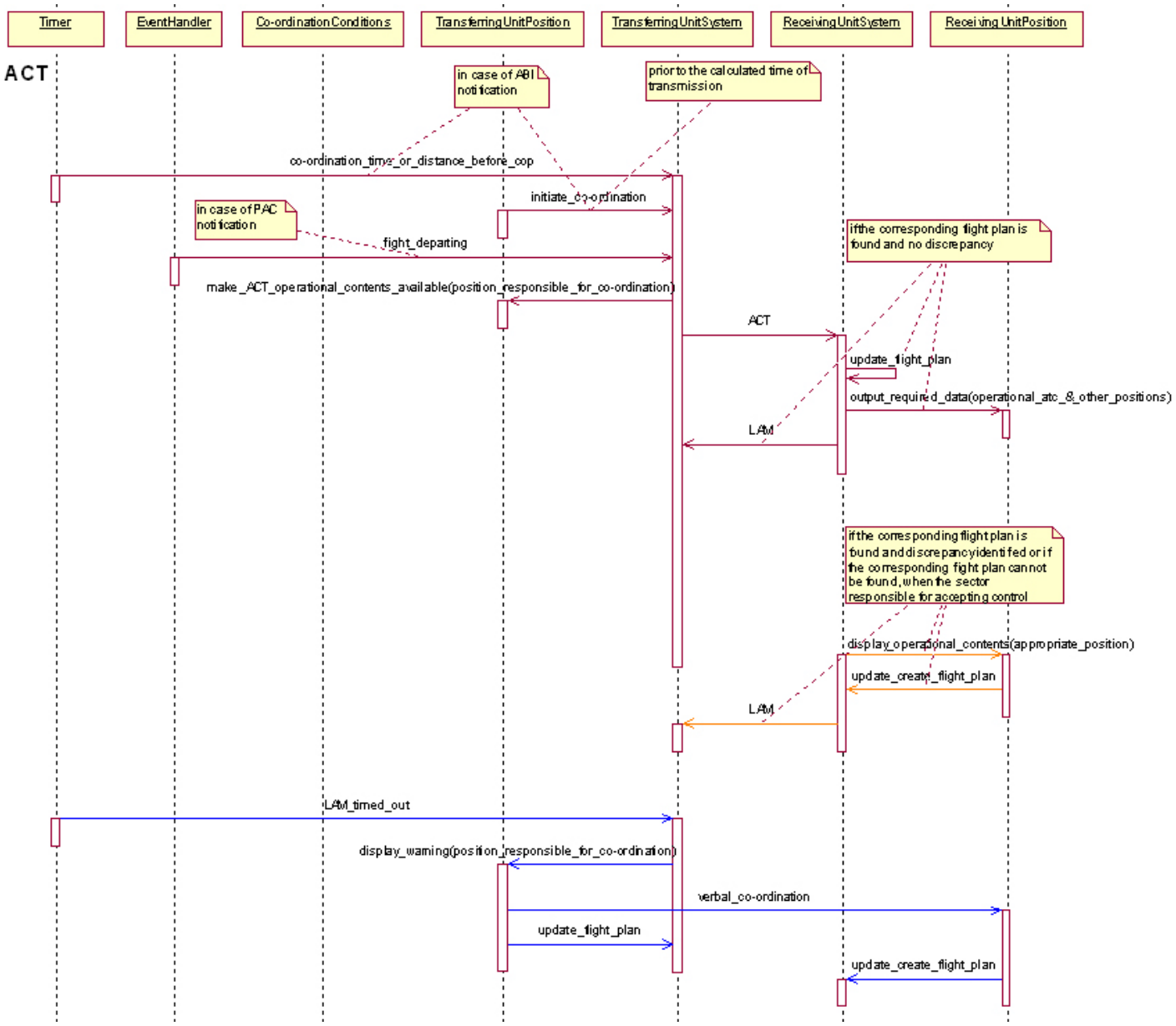


Figure 79 - Sequence Diagram – ACT Message

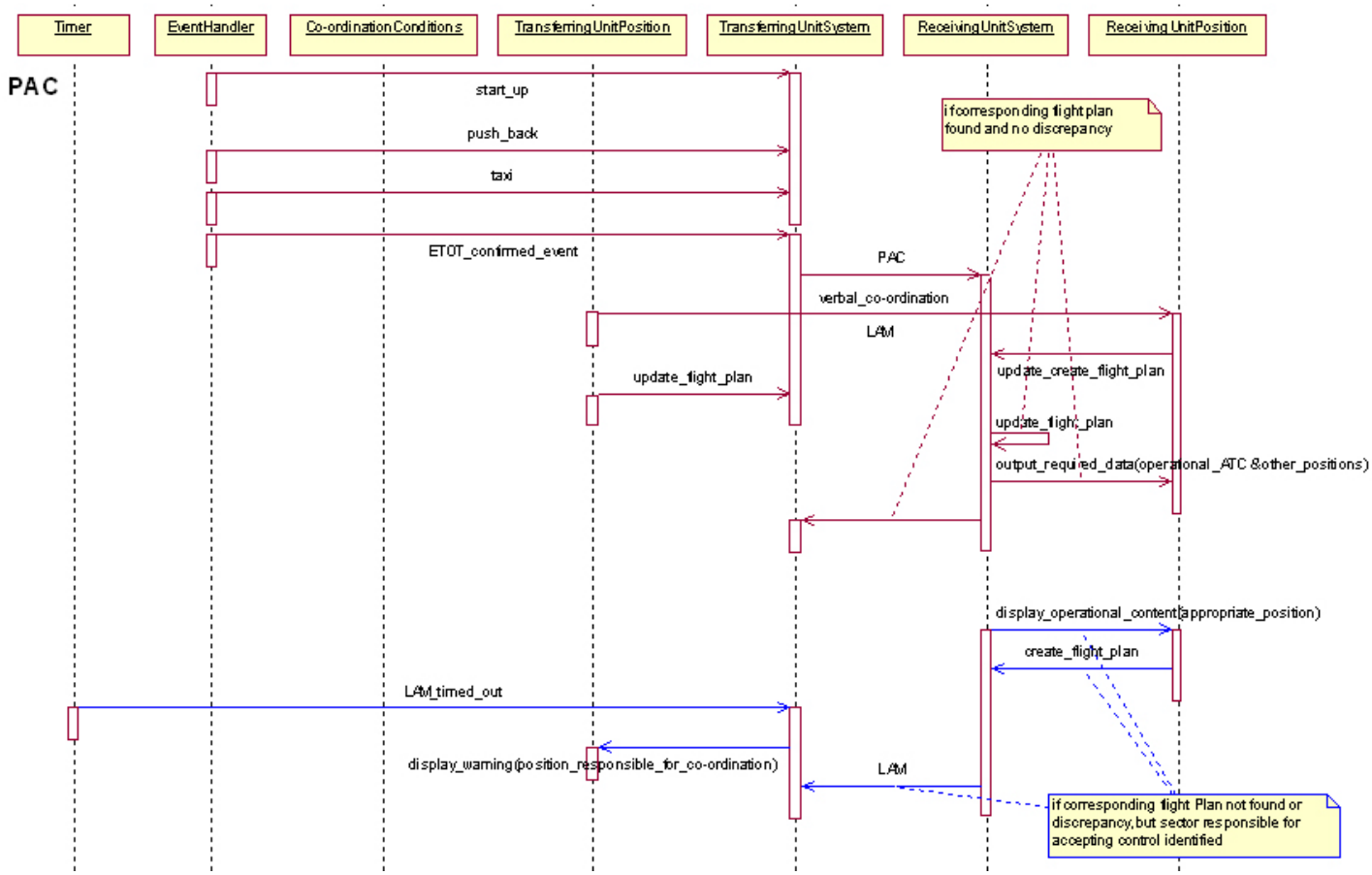


Figure 80 - Sequence Diagram – PAC Message

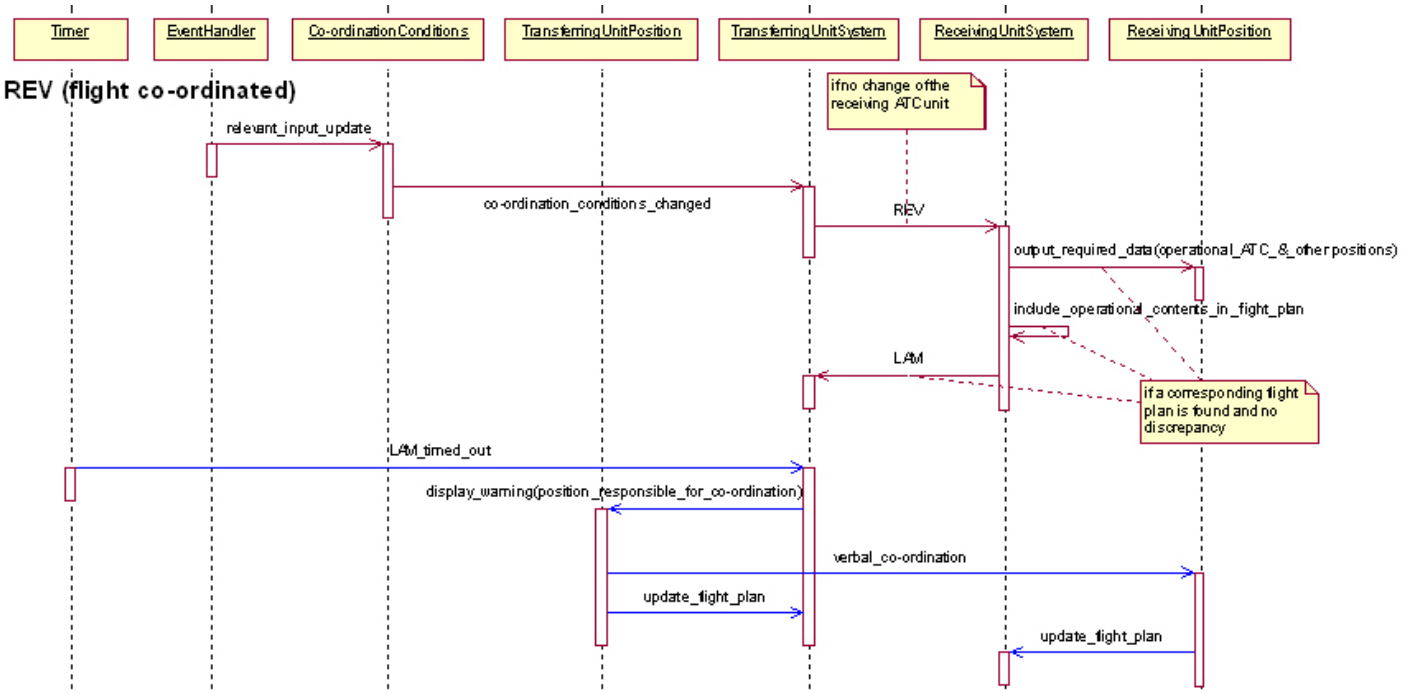


Figure 81 - Sequence Diagram – REV Message

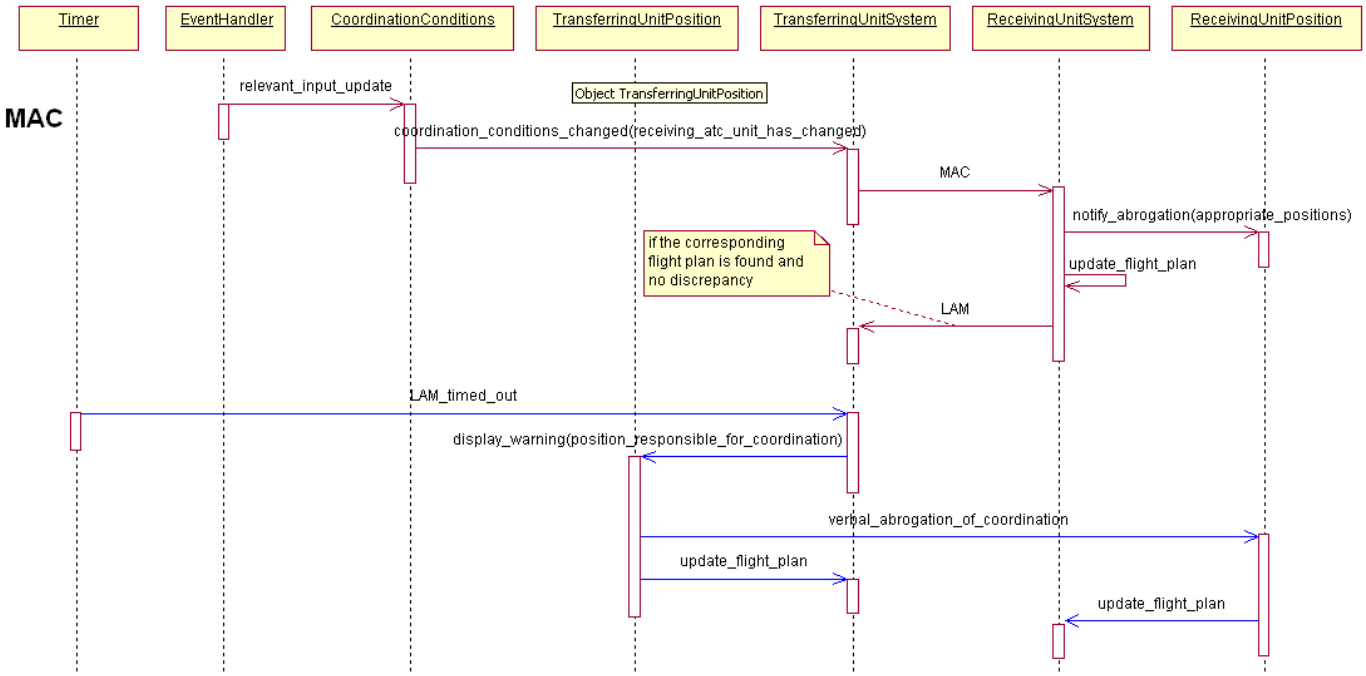


Figure 82 - Sequence Diagram – MAC Message

ANNEX A - List of Abbreviations

ABI	Advance Boundary Information message
ACC	Area Control Centre
ACH	ATC flight plan change message
ACP	Accept message
ACT	Activate message
ADS-B	Automatic Dependent Surveillance - Broadcast
ADS-C	Automatic Dependent Surveillance - Contract
ADEP	ICAO location indicator of the aerodrome of departure
ADES	The ICAO location indicator of the aerodrome of destination
ADEXP	ATS Data Exchange Presentation
AFP	ATC Flight Plan Proposal
ANP	Advanced Negotiation Proposal
ANR	Advanced Negotiation Request
ANSP	Air Navigation Services Provider
ANN	Advanced Negotiation Notification
AMA	Arrival Management message
AMAN	Arrival Manager
AoI	Area of Interest
AoR	Area of Responsibility
APL	ATC flight plan message
APP	Approach Control Unit
ASM	Airspace Management
ATC	Air Traffic Control
ATM	Air Traffic Management
ATS	Air Traffic Services
ATS B1	Air Traffic Services Baseline 1
ATS B2	Air Traffic Services Baseline 2
ATSU	Air Traffic Services Unit
B2B	Business to Business
BFD	Basic Flight Data message
CCAMS	Centralised Code Assignment and Management System
CDA	Current Data Authority
CDN	Co-ordination message
CFD	Change To Flight Data message

CFL	Cleared Flight Level
CNL	Flight Plan Cancellation
COD	SSR Code Assignment message
COF	Change Of Frequency message
COP	Co-ordination Point
CPDLC	Controller- Pilot Data Link Communications
CRP	Clearance Response message
CRQ	Clearance Request message
CTA	Control Area
CWP	Controller Working Position
ECAC	European Civil Aviation Conference
EPP	Extended Projected Profile
ETO	Estimated Time Over
ETOT	Estimated Take-Off Time
EUROCONTROL	European Organisation for the Safety of Air Navigation
FPL	Flight Plan Message
FO	Flight Object
FOC	Flight Operating Center
FDP	Flight Data Processing
FDPS	Flight Data Processing System
FRA	Free Route Airspace
GAT	General Air Traffic
HMI	Human Machine Interface
IAF	Initial Approach Fix
ICAO	International Civil Aviation Organisation
IFPS	Initial Flight Plan Processing System
LACK	Logical acknowledgement (air-ground data link)
LAM	Logical Acknowledgement message
LoA	Letter of Agreement
LOF	Log-On Forwarding message
MAC	Message for Abrogation of Co-ordination
MAS	Manual Assumption of Communication message
MFX	Metering Fix
NAN	Next Authority Notified message
NDA	Next Data Authority
NETOPS	Network Operation Team (EUROCONTROL working arrangement)
Nm	Nautical Mile

NM	Network Manager
NMD	Network Manager Directorate
OCM	Oceanic Clearance message
OLDI	On-Line Data Interchange
ORCAM	Originating Region Code Assignment Method
PAC	Preliminary Activation message
PNT	Point message
PST	P
R-ATSU	Receiving ATSU
RAP	Referred Activate message
RCM	Runway Configuration Message
REV	Revision message
RJC	Reject message
RLS	Release message
ROF	Request on Frequency message
RRQ	Release Request message
RRV	Referred Revision message
RST	R
RTI	Request Tactical Instructions message
SBY	Stand-By message
SCO	Skip Communication message
SDM	Supplementary Data message
SFL	Supplementary Flight Level
SFPL	System Flight Plan
SID	Standard Instrumental Departure
SKC	Skip Cancellation message
SSR	Secondary Surveillance Radar
STAR	Standard Arrival Route Is the MSG carrying the STAR info the same as the SID msg? If yes, correct the name of the SID to SID/STAR, or correct the definition from Standard Instrumental Departure to Standard Instrumental Departure / Standard Arrival Route
SYSCO	System Supported Co-ordination
UTA	Upper Control Area
TIM	Transfer Initiation message
TIP	Tactical Instructions Proposal message
TOM	Time Over Metering Fix
TTG	Time To Gain
TTL	Time To Lose

TWR	Aerodrome Control Tower
XAP	Crossing Alternate Proposal message
XCM	Crossing Cancellation message
XFL	Exit Flight Level
XIN	Crossing Intention Notification message

ANNEX B - Document Update Procedures

It is necessary to periodically check this EUROCONTROL Guidelines document for consistency with referenced material, notably the forthcoming editions of the OLDI Specification. The Guidelines may also evolve following real project and field experience.

The main objectives of a regular review are:

a) to improve the quality of the requirements (e.g. clarity, testability, etc.);
b) to verify that the level of detail published is adequate;
c) to make all stakeholders including industry aware of the latest developments.

The update of OLDI Guidelines can be initiated by the OLDI group or NETOPS as working arrangement to whom the OLDI group reports. Stakeholders are advised to provide a change request (CR) through the OLDI Group or NETOPS. However, any stakeholder that wishes to request a change to these guidelines can submit a change request (CR) to the document editor (page ii), the generic email address: standardisation@eurocontrol.int or the OLDI group / NETOPS working arrangements.

The CR needs to provide following minimum elements:

- Originator information (name, Organisation, contact details)
- Specification title, number and edition date
- Page, chapter, section (subsection) where the issue appears
- Description of the issue and reason for change
- Specific change proposal text (incl. potential alternatives, if any).

Main steps towards a revised edition:

- OLDI group will assess each CR.
- OLDI group will classify the urgency and establish the CR impact category (major, minor or editorial).
- OLDI group and EUROCONTROL/NM will then prepare resolution proposal(s) and, if needed, discuss those with the originator.
- Agreed changes will be integrated into a revised edition “Proposed Issue” including a summarised list of changes.
- All changes need consultation at NETOPS level.

Note: Identified errors which may cause potential problems when implementing, may be corrected directly via separate “Corrigendum”.

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