EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL

Aircraft Identification Programme

Operational Concept Document

Edition Number	:	1.0
Edition Date	:	25/10/2011
Status	:	Released Issue
Intended for	:	EATM Stakeholders

DIRECTORATE NETWORK MANAGEMENT

DOCUMENT CHARACTERISTICS

TITLE		
Aircraft Identification Programme Operational Concept Document		
Document Identifier	**Edition Number:**	1.0
ACID CONOPS	**Edition Date:**	25/10/2011

Abstract

This document provides a high level overview of the operational concept of the Aircraft Identification (ACID) Programme, a Pan European cooperative programme to implement the ANSB strategy concerning aircraft identification and achieve an initial operational capability by February 2012.

The ACID Programme will achieve the implementation of operational Elementary Surveillance, CCAMS and enhanced ORCAM procedures for the unambiguous and continuous identification of aircraft for Air Traffic Services in the ECAC region.

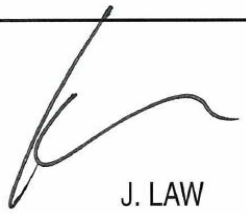
Keywords

Contact Person(s)	Tel	Unit
Sorin MURESEAN	+32 2 729 3166	DNM/COO/DCO/SCC
Martin McHUGH	+32 2 729 4760	DNM/COO/DCO/SCC
Niema MOBASCHERI	+32 2 729 1144	DNM/COO/DCO/SCC
Armin SCHAWE	+32 2 729 9877	DNM/COO/NOM/NOS/ORA

STATUS, AUDIENCE AND ACCESSIBILITY					
Status		**Intended for**		**Accessible via**	
Working Draft	☐	General Public	☐	Intranet	☐
Draft	☐	EATM Stakeholders	☑	Extranet	☑
Proposed Issue	☐	Restricted Audience	☐	Internet (www.eurocontrol.int)	☐
Released Issue	☑				

DOCUMENT APPROVAL

The following table identifies all management authorities who have successively approved the present issue of this document.

AUTHORITY	NAME AND SIGNATURE	DATE
Secretary to the Mode S Elementary Surveillance operational Introduction Task Force	 M. McHUGH	25th October 2011
Manager, Aircraft Identity Programme	 S. MURESEAN	25th October 2011
Head of Surveillance and Code Coordination	 J. LAW	25th October 2011

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
0.1	16/06/2010	Creation in preparation for Task Force review	All
0.2	08/07/2010	Review by Drafting Group	All
0.3	07/10/2010	Progressive update	All
0.4	16/03/2011	Initial ELS_OPS Task Force review	All
0.5	06/05/2011	Update following ELS_OPS Task Force review	All
0.6	17/05/2011	Update following ELS_OPS Task Force review	All
0.7	21/09/2011	Final Review edition following examination by the CCAMS User and SSR Code Planning Groups	All
0.8	04/10/2011	Pre-Release Edition for consideration of AIISG	All
1.0	25/10/2011	Released Edition	All

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Appendices

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1. INTRODUCTION

1.1 Background

Unambiguous and continuous aircraft identification is an essential and basic requirement for the provision of Air Traffic Control services in the European region. The current method of using Mode 3/A codes managed though the Originating Region Code Assignment Method (ORCAM) suffers from a number of shortcomings which have been observed over the past years. The main problems being experienced are code conflict with potential loss of identification, frequent changes of code for a given flight and a shortage of codes to meet demand.

The EUROCONTROL Air Navigation Services Board (ANSB) has determined that downlinked aircraft identification[1] is the most effective long-term solution to meet the objective of guaranteeing the unambiguous and continuous identification of individual aircraft within European airspace. As this cannot be reasonably implemented across the region before the year 2020, an Initial Operational Capability (IOC), consisting of a mixed environment of ELS, along with more efficient use of the Mode 3/A codes through a Centralised Code Assignment & Management System (CCAMS) and where necessary an enhanced ORCAM (E-ORCAM) capability which can be implemented by 2012, has been developed as a first step to realising the long term goal.

The Aircraft Identification (ACID) Programme, which is managed by EUROCONTROL, has been established to oversee the coordinated development and introduction of ELS, CCAMS and E-ORCAM so as to achieve the IOC by 9th February 2012.

The following map[2] shows the regions in which the three aircraft identification methods were initially agreed to apply, as confirmed by the Provisional Council Correspondence procedure on 31 August 2009:

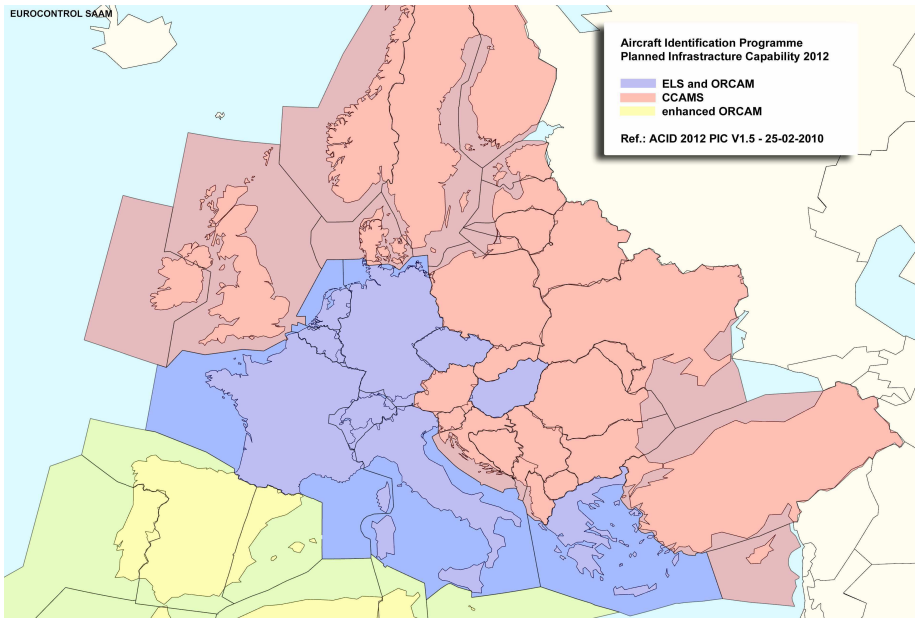


Figure 1

[1] Downlinked aircraft identification is achieved through Mode S Elementary Surveillance, ADS-B and Wide Area Multilateration and does not rely on discrete Mode 3/A codes.

[2] Revised plans that alter the infrastructure distribution shown at Figure 1 have been submitted and current plans (at the time of publication of this document) are presented at Appendix 4. However, the Mode 3/A code management requirements for flights crossing infrastructure boundaries, as described at 4.0, remain extant.

Since the approval of the scope of the ACID Programme, a number of ANSPs have indicated a change in plans regarding the technology that will be implemented as part of the ACID Programme activities. An indicative map showing these intentions is presented in Appendix 4.

1.2 Purpose

The purpose of this Operational Concept Document is to present a top level description of the concept of operations supporting the use of the aircraft identification. For the IOC 2012 and the transition phase to full use of the downlinked aircraft identification it also outlines the operational characteristics of the three aircraft identification methodologies, ELS, CCAMS and E-ORCAM, and explains how they will be expected to operate in isolation and interact in situations where flights pass from one region of aircraft identification methodology to another. It also identifies the roles and responsibilities placed on the individual States, air navigation service providers (ANSPs) and related organisations involved, to achieve the 2012 IOC.

1.3 Scope

This document is a component of the ACID Programme WP 8 (Systems Development), as defined in the ACID Programme Management Plan [6]. With respect to Mode S ELS operations within the ACID region, the following flights will be addressed:

- Flights that depart from a Mode S Declared Aerodrome and remain within Mode S Declared Airspace for the entire duration of the flight until arrival at a Mode S Declared Aerodrome.
- Flights that enter Mode S Declared Airspace from a non-ELS region and remain wholly within Mode S Declared Airspace for the remainder of the flight until arrival at a Mode S Declared Aerodrome.

Flights that depart from a Mode S Declared Aerodrome, or depart from a non-Mode S Declared Aerodrome and enter Mode S Declared Airspace, and subsequently depart Mode S Declared Airspace into a non-ELS region, are not considered in this concept of operations. This is due to potential difficulties related to correlation and identification during the process of affecting transfer from the ELS region (where a Mode 3/A conspicuity code may have been assigned) to a non-ELS region (where a Mode 3/A discrete code is required).

1.4 References

1. Mode S Elementary Surveillance Operations Manual, latest edition.
2. Transition to Elementary Mode S Surveillance – Functional requirements for Mode A Assignment and Correlation, Edition 1.0, 20 November 2001.
3. CFMU[3] (Network Operations Services) Flight Progress Messages, latest edition.
4. CFMU (Network Operations Services) Handbook - IFPS User Manual, latest edition.
5. ICAO Doc 4444/ATM501, PANS - ATM, latest edition.
6. Aircraft Identification Programme: Programme Management Plan, latest edition.
7. ELS User Requirements Document.
8. CCAMS User requirements Document.

[3] The CFMU (Central Flow Management Unit) changed its designation to Network Operations Services in 2011. However, existing documentation, until updated, will continue to refer to the original title.

9. ICAO EUR Doc 023, European Secondary Surveillance Radar (SSR) Code Management Plan.

10. ICAO Doc 7745 Volume 1, European Basic Air Navigation Plan (EUR ANP).

11. ICAO Doc 7754 Volume 2, European Facilities and Services Implementation Document (EUR FASID).

2. ORGANISATIONS: ROLES AND RESPONSIBILITIES

The following table outlines the roles and responsibilities of the organisations involved in the ACID Programme.

ORGANISATION	ROLES AND RESPONSIBILITIES
European Commission (EU)	Legislative support through publication of the ACID Implementing Rule (IR) and the Network Management Function (Scarce Resources) IR.
European Aviation Safety Agency (EASA)	Safety and environmental type certification of SSR (Modes 3/A, C and S) airborne equipment.
ICAO European and North Atlantic (EUR/NAT) Office	Allocate Mode 3/A codes to the ICAO EUR Region.
EUROCONTROL ACID Programme	Managed by the EUROCONTROL Agency to achieve the IOC, as directed by EU legislation and as identified in the ACID Programme Management Plan [6].
EUROCONTROL Network Operations Services	Provide the necessary internal infrastructure to support utilisation of the Mode S downlink aircraft identity feature and management of Mode 3/A codes within the ACID ELS, CCAMS and E-ORCAM regions, in accordance with the Code Management Plan.
National Supervisory Authorities (NSA)	Safety, regulatory and compliancy oversight of national ATM framework established to achieve the IOC.
Air Navigation Service Providers (ANSP)	Establish the necessary national ATM infrastructure to support utilisation of the Mode S downlink aircraft identity feature or management of Mode 3/A codes in accordance with the Code Management Plan, as identified in the ACID Programme Management Plan [6].
Military Air Navigation Service Providers (ANSP)	Establish the necessary national ATM infrastructure to support utilisation of the Mode S downlink aircraft identity feature or management of Mode 3/A codes in accordance with the Code Management Plan, as identified in the ACID Programme Management Plan [6].
Aircraft Operators	Ensure that appropriate staff is aware of the flight planning and operational requirements for utilisation of the Mode S downlink aircraft identity feature.
Military Aircraft Operators	Ensure that appropriate staff is aware of the flight planning and operational requirements for utilisation of the Mode S downlink aircraft identity feature.

3. THE 2012 IOC OPERATIONAL ENVIRONMENT

3.1 SSR Mode 3/A Codes and SSR Mode S Interrogator Codes (IC)

The European SSR Code Management Plan was established to provide States in the ICAO EUR Region with a means to coordinate the use of the SSR codes based on the principles of the Originating Region Code Assignment Method (ORCAM).

ICAO EUR Doc 023 [9] details the requirements to be met by the States of the ICAO European (EUR) Region to comply with the provisions of the European Basic Air Navigation Plan (EUR ANP) (Doc 7745, Volume I) [10] and the European Facilities and Services Implementation Document (EUR FASID) [11].

A detailed Code Allocation List for the EUR Region (CAL) for defined participating areas (PAs) covering the EUR region and certain adjacent areas is developed, maintained and published as a Supplement to EUR Doc 023.

The SSR Mode S interrogator code (IC) allocations for the ICAO EUR Region is produced and published by ICAO EUR/NAT as a CNS Supplement to the European Air Navigation Plan.

3.2 Airspace Considerations

The 2012 IOC has no direct effect on existing airspace structures. Furthermore the concept does not require any airspace structure adaptations as a result of the implementation of any of the three possible technologies (E-ORCAM, CCAMS and Mode S ELS)

3.3 Route Network

Achievement of the 2012 IOC requires no changes to the existing ATM Route Network. Furthermore the concept does not require any ATM Route Network adaptations as a result of the implementation of any of the three possible technologies (E-ORCAM, CCAMS and Mode S ELS)

3.4 Traffic Levels[4]

IFR Air traffic across Europe is forecast to increase by 3.2% (±0.8%) in 2011, with similar growth forecast for 2012 (3.1%, ±0.9%). Europe is forecast to have 11.6 million IFR flights in 2017, 22% more than in 2010, with an average annual traffic growth rate over this 7 year period of 2.9%.

3.5 Scope – External Identified boundaries

This concept is based on the ANSB Strategy and addresses mainly the flights operating as general air traffic in accordance with instrument flight rules. It is expected that, where deemed appropriate by the national authorities involved, similar operating principles will be used for civil air traffic operating in accordance with visual flight rules that is subject to Air Traffic Services provisions and/or that require assignment of Mode 3/A codes.

It is assumed that ICAO EUR Region States will continue to use discrete Mode 3/A codes in support of their operations based on the ICAO ORCAM arrangements. Similarly, States in adjacent ICAO regions will follow regional arrangements for Mode 3/A code usage. As such it is recognised that co-ordination between the States implementing this concept and

[4] Statistics obtained from EUROCONTROL, STATFOR: Short-Term Forecast (May 2011), Medium-Term Forecast (February 2011).

adjacent States will be conducted through ICAO mechanisms and will be supported by the Aircraft Identification Programme.

It is not planned that the current definitions of the ORCAM Participating Areas boundaries will be modified as a result of the implementation of the Aircraft Identification concept.

This concept does not have any implications on the way that Mode 3/A codes are used for OAT traffic. However it is recognised that the implementation of the Aircraft Identification concept will have an effect on the military systems' ability to unambiguously identify civil traffic. The impact on military systems is out of scope and will be analysed in a separate document

3.6 Scope – Internal Identified boundaries

Within the ACID area, ANSP ELS, CCAMS and E-ORCAM systems will interface together, and with the systems of adjacent non-ACID ANSPs, to ensure the smooth flow of traffic across the area as a whole. The concept ensures that the operations at the various combinations of interfaces will not imply an adverse effect on ATCO workload. This concept does not require additional code changes compared to the current situations. Furthermore with the progressive implementation of Mode S ELS operations and CCAMS, the number of required code changes will decrease. The confirmed target, as stated in the ANSB Strategy for Aircraft Identification, is to have only one code for each flight from 2020 onwards.

3.7 Roles

3.7.1 Role of Network Operations Services

3.6.1.1 For current and future Mode S ELS operations the role of Network Operations Services is to enable operations by annotating (flagging) flights eligible for the assignment of A1000.

3.6.1.2 For the CCAMS implementation the role of Network Operations Services is to manage and operate the central server that will provide an unambiguous SSR code for assignment to each IFR/GAT flight within the applicable region. .

3.6.1.3 For the E-ORCAM implementation the role of Network Operations Services will not change compared to today.

3.7.2 Role of ANSPs

3.6.2.1 ANSPs within the ACID ELS region (coloured Blue at *Figure 1*):

- For ELS eligible flights - employ the downlinked aircraft identification feature as the primary means of achieving flight identification.
- For non-ELS eligible flights - assign discrete Mode 3/A codes in accordance with the Code Management Plan.

3.6.2.2 ANSPs within the CCAMS region (coloured Pink at *Figure 1*):

- Implement enhanced SSR code assignment and management capabilities within FDPS to interact with the centralised network function as described at 3.6.1.2.
- For local flights and other, non-standard situations, assign discrete Mode 3/A codes in accordance with the Code Management Plan.

3.6.2.3 ANSPs within the E-ORCAM region (coloured Yellow at *Figure 1*):

- Implement enhanced SSR code assignment and management capabilities within FDPS, enabling;
    - multiple simultaneous assignments of the same code,
    - geographical correlation on the track,
    - directional code assignment,
    - code reporting and retention checking,

  and assign discrete Mode 3/A codes in accordance with the Code Management Plan.

4. AIRCRAFT IDENTIFICATION OPERATIONS- USE OF MODE 3/A CODES

4.1 Overview

The section describes the operational concept for the use of Mode 3/A codes in the context of the Aircraft Identification Programme. Although the scope of the programme covers only the Initial Operational Capability planned for 2012, this section covers also IFPS Flagging Phase 2 (see 5.1) operations and the associated scenarios.

4.2 Mode 3/A Operations Scenarios

In 2012 and beyond, controllers will still use discrete Mode 3/A transponder codes to identify a large percentage of IFR General Air Traffic. All ANSPs, irrespective of their surveillance systems capability, will be required to support the management of Mode 3/A codes in a structured and coherent fashion.

The introduction of three possible solutions supporting aircraft identification generates a number of possible combinations for the various interfaces. These interfaces and the reference scenarios are outlined in the table below:

TRANSFER INTERFACE	ELS	CCAMS	E-ORCAM
ELS	Scenario 3	Scenario 1	Scenario 2
CCAMS	Scenario 4	Scenario 5	Scenario 6
E-ORCAM	Scenario 7	Scenario 8	No scenario (As for current operations)

4.3 Mode 3/A Code Management for Flights Entering, Within and Exiting the ELS Region

The operational concept for Mode 3/A code management in the ELS region in 2012 is presented at Appendix 1, illustrating the sequence of OLDI and CCAMS messaging, and local FDPS/CCAMS Central Server interactivity, where appropriate. Five interface scenarios are explored:

- SCENARIO 1: Transfer from the ELS region to the CCAMS region.
- SCENARIO 2: Transfer from the ELS region to the E-ORCAM region.
- SCENARIO 3: Transfer between units within the ELS region.
- SCENARIO 4: Transfer from the CCAMS region to the ELS region.
- SCENARIO 7: Transfer from E_ORCAM region to ELS region.

4.4 Mode 3/A Code Management for Flights Entering, Within and Exiting the CCAMS Region

4.4.1 The operational concept for Mode 3/A code management in the CCAMS region in 2012 is presented at Appendix 2, illustrating the sequence of OLDI and CCAMS messaging, and local FDPS/CCAMS Central Server interactivity, where appropriate. A number of interface scenarios are explored:

- SCENARIO 5: Transfer between units within the CCAMS region.
- SCENARIO 6: Transfer from the CCAMS region to the E-ORCAM region.

4.4.2 The following additional transfer scenarios was considered in the CCAMS region, but was not examined in detail as it was covered by the existing scenarios detailed in the Appendices:

- Transfer from the CCAMS region to the ELS region, for transit across the ELS region for transfer and landing within the CCAMS region. The sequence of events is a combination of SCENARIO 4 and SCENARIO 1 (Transfer between the CCAMS region to the ELS region followed by transfer from the ELS region to the CCAMS region).

4.5 Mode 3/A Code Management for Flights Entering, Within and Exiting the Enhanced ORCAM (E-ORCAM Region)

4.5.1 The operational concept for Mode 3/A code management in the E-ORCAM region in 2012 is presented at Appendix 3, illustrating the sequence of OLDI and CCAMS messaging, and local FDPS/CCAMS Central Server interactivity, where appropriate. One interface scenario is explored:

- SCENARIO 8: Transfer from the E-ORCAM region to the CCAMS region.

4.5.2 One further transfer scenario was considered in the E-ORCAM region, but was not examined in detail as it is covered by the existing scenarios detailed in the Appendices:

- Transfer between units within the E-ORCAM region. The sequence of events is not changed compared to today's operations.

4.6 Mode 3/A Code Management for Flights Entering and Departing the ACID Area

The following transfer scenarios were also considered, but are not examined in detail as they are covered by the existing scenarios detailed in the Appendices:

- Transfer from the ACID region into a non-ACID region:
  - Transfer from the ELS region. The sequence of events is the same as for SCENARIO 2 (Transfer from the ELS region to the E-ORCAM region).
  - Transfer from the CCAMS region. The sequence of events is the same as for SCENARIO 6 (Transfer from the CCAMS region to the E-ORCAM region).
  - Transfer from the E-ORCAM region. The sequence of events is not changed compared to today's operations.
- Transfer from a non-ACID region to the ACID region:
  - Transfer to the ELS region. The sequence of events is the same as for SCENARIO 7 (Transfer from the E-ORCAM region to the ELS region).

- Transfer to the CCAMS region. The sequence of events is the same as for SCENARIO 8 (Transfer from the E-ORCAM region to the CCAMS region).
- Transfer to the E-ORCAM region. The sequence of events is not changed compared to today's operations.

4.7 Mode 3/A Code Management for Flights Transiting Between Radar and Non-Radar Environment Areas

The following transfer scenarios were also considered, but were not examined in detail as they are covered either by the existing scenarios detailed in the Appendices, or by existing and local procedures:

- Transfer from the a radar to a non-radar environment region:
  - Transfer from the ELS region. The sequence of events will be dictated by local procedures. The flight plan for the flight will not be flagged.
  - Transfer from the CCAMS region. The sequence of events will be dictated by local procedures.
  - Transfer from the E-ORCAM region. The sequence of events will be dictated by local procedures.
- Transfer from a non-radar to a radar environment region:
  - Transfer to the ELS region. The sequence of events is the same as for SCENARIO 7 (Transfer from the E-ORCAM region to the ELS region).
  - Transfer to the CCAMS region. The sequence of events is the same as for SCENARIO 8 (Transfer from the E-ORCAM region to the CCAMS region).
  - Transfer to the E-ORCAM region. The sequence of events is not changed compared to today's operations.

4.8 SSR Code Management Actions

There are no changes to the current processes for SSR code management for the state authorities concerned. However, a dedicated mechanism for coordination and consultation will be established, which will also ensure that the needs and usage of SSR transponder codes in the countries that are not subject to the Network Functions[5] and ACID Implementing Rules, are taken into account. This will be achieved through participation in the SSR transponder code management working arrangements set out in the relevant provisions of the ICAO Regional Air Navigation Plan, European Region, Facilities and Service. It is anticipated that the current work in support of ICAO through the SSR Code Planning Group support will continue.

It is planned that the new processes and mechanisms will be put in place fully within one year from the formal nomination of the Network Manager[6] (mid 2012), replacing the current ACID Programme activities for SSR transponder codes management.

4.9 SSR Code Allocation Regulation

The Network Manager will be required to establish a formal process for establishing, assessing and coordinating the requirements for SSR transponder code allocations taking into account all required civil and military uses of SSR transponder codes. Appropriate procedures and tools to enable the regular evaluation and assessment of the actual use of

[5] The Network Functions are specified in Article 6 of Regulation (EC) 551/2004, and includes the coordination of identified scare resources (radar transponder codes).

[6] The Network Manager is the entity established to carry out the Network Functions, as outlined above.

SSR transponder codes by Member States and Air Navigation Service Providers will also be implemented.

5. AIRCRAFT IDENTIFICATION WITHIN THE ACID ELS REGION

5.1 Introduction

Unlike other procedures for aircraft identification, use of ELS is being introduced on a progressive city-pair[7] basis. Consequently, ANSPs within the ELS region are required to manage a mixed ELS and non ELS mix of traffic, using either the Mode S downlink aircraft identification feature or discrete Mode 3/A codes.

The first step in the implementation (IFPS Flagging Phase 1) will cover the use of the downlinked Aircraft Identification for all flights for which the planned route is exclusively in the ELS Region.

In the longer term (IFPS Flagging Phase 2) the use of the downlinked Aircraft Identification will be extended to all flights entering and remaining in the ELS region. Although these operations are not in the scope of the ACID Programme a description of the corresponding operational scenarios has been included in this document for completeness.

5.2 Use of the Mode S Conspicuity Code

5.2.1 The Mode S Conspicuity Code (Mode 3/A Code 1000) is defined[8] as follows:

> "Code 1000 reserved for assignment by ATC according to procedures defined for operations in Mode S designated airspace, unless the conditions for the use of codes: 7000, 7500, 7600 and 7700 apply."

5.2.2 In accordance with the Code Management Plan and the Mode S ELS Operations Manual [1], A1000 is to be assigned to eligible flights within the ELS region when the downlinked aircraft identification is identical to that entered at Item 7 of the flight plan for the subject flight.

Note: Within an OLDI message; notification that a flight has been assigned A1000 can be regarded as confirmation that the downlinked aircraft identification has been verified.

5.3 ATC Procedures

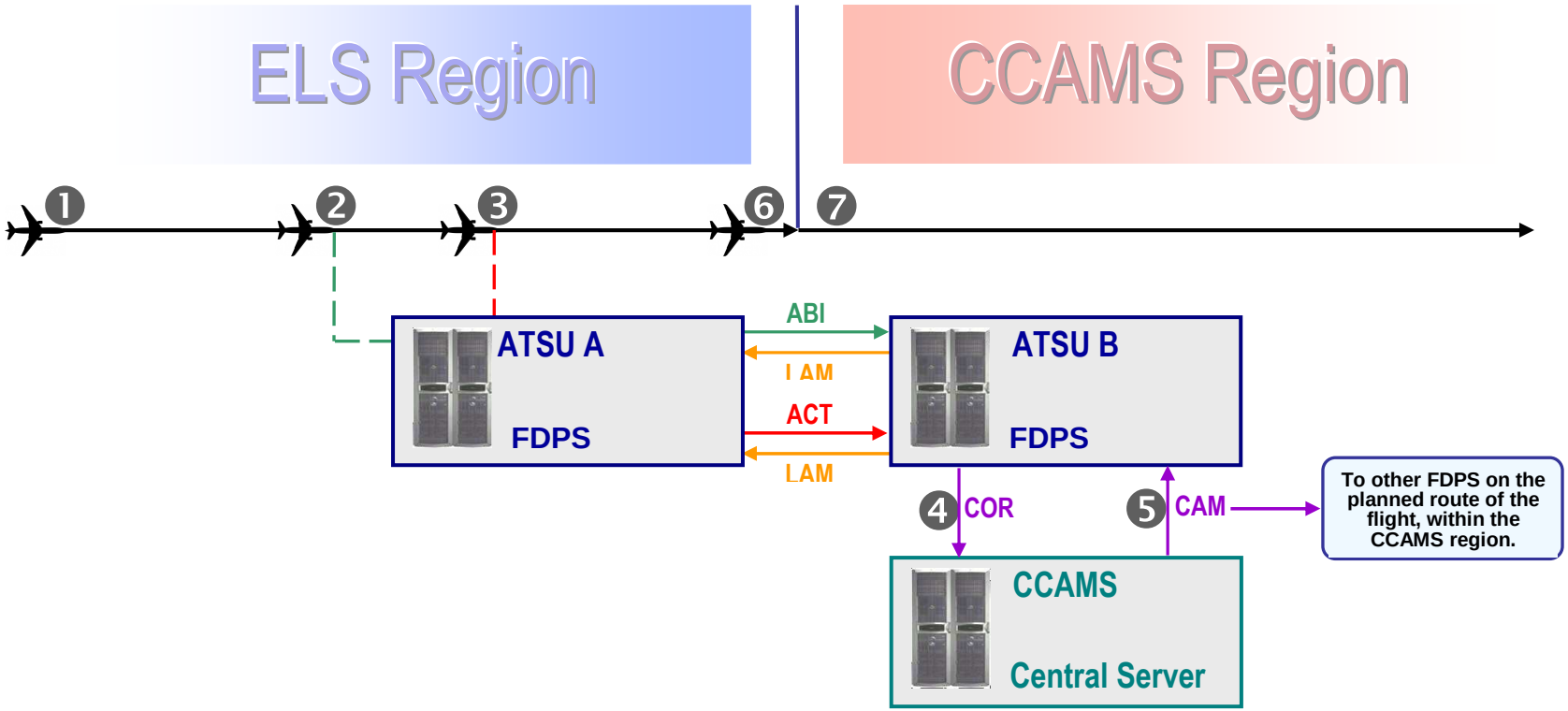
ATC procedures specific to aircraft identification within the ACID ELS region are detailed in ICAO Doc 4444/ATM501, PANS - ATM, latest edition [5]. The requirement for local, contingency planning is specified in the Mode S ELS Operations Manual, latest edition [1].

[7] In the context of the ACID Programme, the term 'city-pair' flight refers to flights within the ACID ELS region that depart Mode S Declared Aerodromes and remain wholly within Mode S Declared Airspace until they land at a Mode S Declared Aerodrome.

[8] ICAO EUR Regional Air Navigation Plan, Facilities and Services Implementation Document (FASID), Part IV, Communications, Navigation and Surveillance (CNS), Supplement, SSR Code Allocation List for the EUR Region.

Appendix 1: 2012 - Mode 3/A Code Management in the ELS Region

SCENARIO 1: Transfer from the ELS region to the CCAMS region



Sequence

❶ For departures within the ELS region, a discrete Mode 3/A code is assigned by the FDPS of ATSU A, in compliance with the appropriate Code Management Plan. For overflights entering the area of responsibility of ATSU A, the appropriate retention rules are also applied. Flight is *not* eligible for assignment of code A1000 during IFPS Flagging Phase 1 or Phase 2.

❷ A notification process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the notification is performed using automated means this step consists of a data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ABI (Advanced Boundary Information) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

❸ An initial co-ordination process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the co-ordination is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ACT (Activation) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

❹ When the notification or initial co-ordination are performed, if a code assignment message (CAM) for the flight has not already been received by the FDPS of ATSU B, the system generates a code request message (COR) that includes the currently assigned Mode 3/A code and, at a predetermined time parameter before estimated entry time, sends it to the CCAMS Central Server. The Central Server checks the assigned Mode 3/A code to confirm that either:

- The code can be retained, meaning that the use of the code will not generate a code conflict within the CCAMS Area.

Or,

- The code cannot be retained:
  - An appropriate code is generated by CCAMS.

❺ A CAM is sent to the FDPS of ATSU B and to other ATS Systems on the planned route of the flight within the CCAMS region, containing the retained or a new Mode 3/A code.

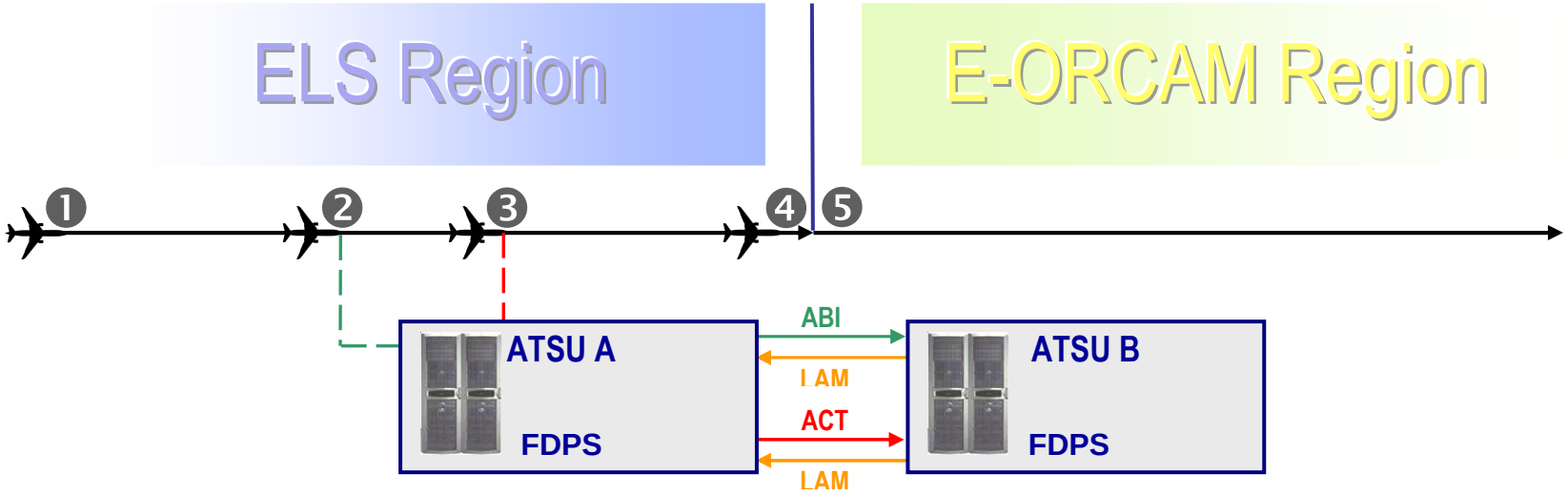
If no CAM is received within a defined time parameter of sending the COR, the FDPS of ATSU B will assign a discrete Mode 3/A code (local code) in compliance with the appropriate Code Management Plan

❻ The transfer of identification and/or responsibility from ATSU A to ATSU B is performed in accordance with the local bilateral agreements (e.g. LoA).

❼ The ATCO concerned at ATSU B applies the local procedures for identification of flights and, where applicable, assigns the new Mode 3/A code to the flight.

Note: The transfer of identification and/or responsibility can be supported by automated message exchanges and/or automated correlation between surveillance data and flight data.

SCENARIO 2: Transfer from the ELS region to the E-ORCAM region



Sequence

❶ For departures within the ELS region, a discrete Mode 3/A code is assigned by the FDPS of ATSU A, in compliance with the appropriate Code Management Plan. For overflights entering the area of responsibility of ATSU A, the appropriate retention rules are also applied. Flight is *not* eligible for assignment of code A1000 during IFPS Flagging Phase 1 or Phase 2.

❷ A notification process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the notification is performed using automated means, this step consists of a data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ABI (Advanced Boundary Information) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

❸ An initial co-ordination process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the co-ordination is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ACT (Activation) message initiated by the FDPS of the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

When the initial co-ordination is performed, the FDPS of ATSU B checks the assigned Mode 3/A code to confirm that either:

- The code can be retained, meaning that:
  - The code is in compliance with the appropriate Code Management Plan and,
  - The code is not yet in use within the area of interest of ATSU B.

Or,

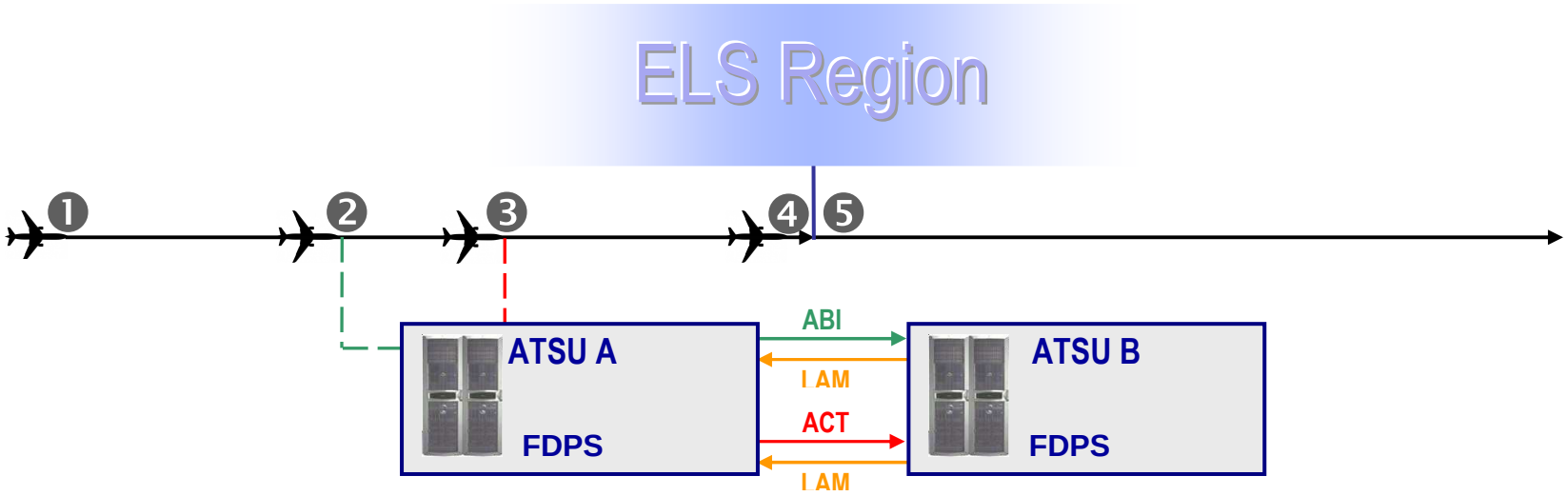
- The code cannot be retained:
  - An appropriate code is generated.

❹ The transfer of identification and/or responsibility from ATSU A to ATSU B is performed in accordance with the local bilateral agreements (e.g. LoA).

❺ The ATCO concerned at ATSU B applies the local procedures for identification of flights and where applicable assigns the new Mode 3/A code to the flight.

Note: The transfer of identification and/or responsibility can be supported by automated message exchanges and/or automated correlation between surveillance data and flight data.

SCENARIO 3: Transfer between units within the ELS region



Sequence

❶ For flights departing from within the ELS region:

- If flight is eligible for assignment of code A1000 (IFP/MODESASP), it is assigned.
- If flight is *not* eligible for assignment of A1000, a discrete Mode 3/A code is assigned in compliance with the appropriate Code Management Plan.

For flights entering the ELS region from a non-Mode S region (IFPS Flagging Phase 2 flagging), refer to Scenario 7.

❷ A notification process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the notification is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ABI (Advanced Boundary Information) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

❸ An initial co-ordination process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the co-ordination is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ACT (Activation) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

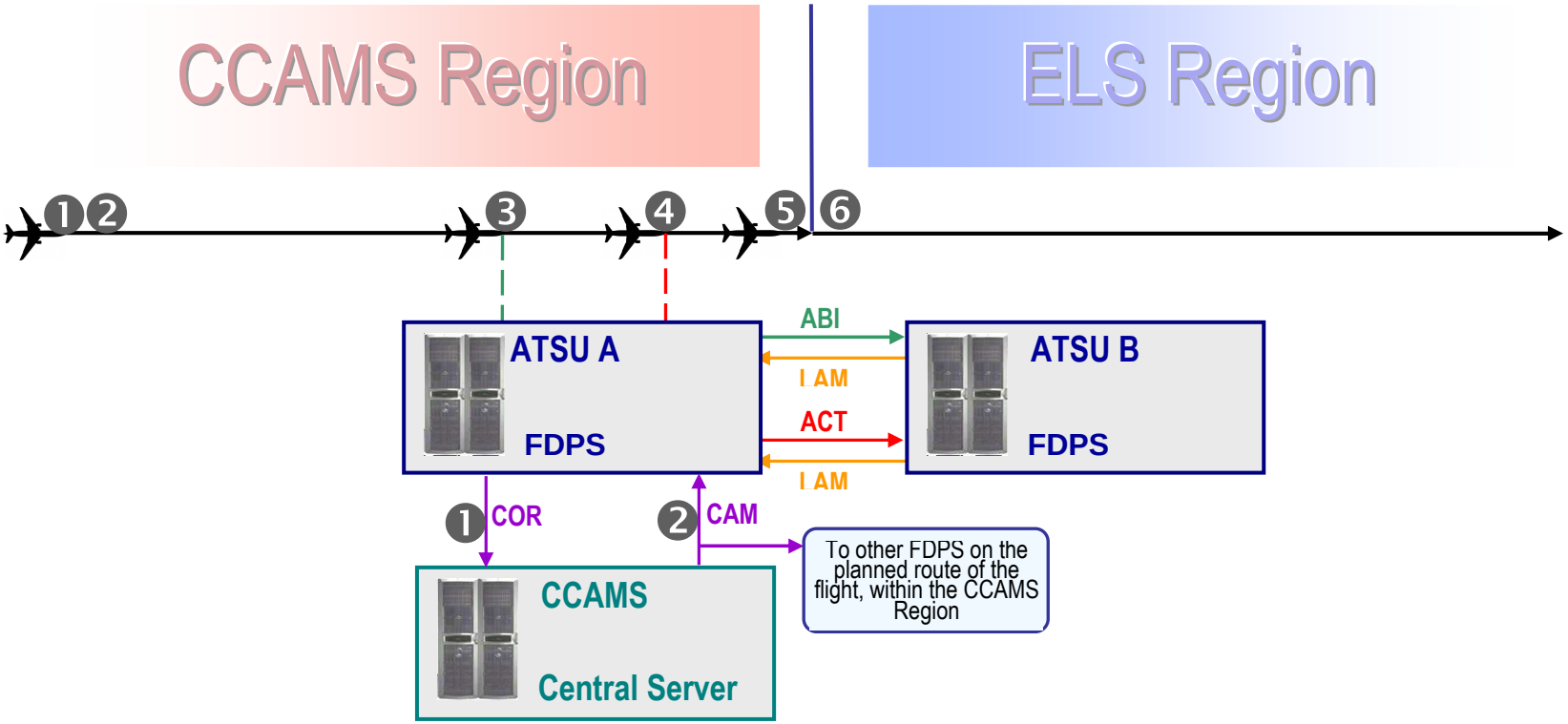
- If the flight has been assigned A1000, the ATS System of ATSU B attempts correlation using the downlinked Aircraft Identification and the ATCO will use this information for the identification of the flight.
- If the flight is eligible for assignment of A1000 but the co-ordination message indicates that a discrete Mode 3/A code has been assigned previously:
  - The ATS System of ATSU B checks the assigned Mode 3/A code to confirm that either:
    - The code can be retained:
      - The code is in compliance with the appropriate Code Management Plan and,
      - The code is not yet in use within the area of interest of ATSU B.
    - The code cannot be retained:
      - At a PA Boundary where ORCAM rules apply – the ATS system allocates code A1000.
      - Not at a PA Boundary – the system assigns code A1000 if possible, or a discrete Mode A code if not possible.
  - If the code can be retained, the ATS System of ATSU B attempts correlation between surveillance and flight plan data using the assigned Mode 3/A code and the ATCO will use the discrete Mode 3/A code for identification of the flight.
  - If the code cannot be retained, the ATS System attempts correlation between surveillance and flight plan data using the downlinked Aircraft Identification (and, where applicable, the assigned Mode 3/A code).
    - If correlation using the downlinked Aircraft Identification and the ATCO check (when bilateral radio contact is established as per point 6) are successful, the ATCO will use this information for the identification of the flight.
    - If correlation using the downlinked Aircraft Identification cannot be achieved, then the ATS System will warn the ATCO about the incorrect ACID (failure to correlate) and the ATCO will instruct the flight to correct the Aircraft identification.
      - If the Aircraft Identification can be corrected, the ATCO uses this information for the identification of the flight and assigns A1000;
      - If the Aircraft Identification cannot be corrected, a discrete Mode 3/A code is assigned and standing procedures for 'incorrect Aircraft Identification' initiated.
- If the flight is not eligible for A1000 assignment, the ATS System of ATSU B:
  - Attempts correlation using the Mode 3/A code communicated in the co-ordination message;
  - Checks the assigned code to confirm that either:
    - The code can be retained:
      - The code is in compliance with the appropriate Code Management Plan.
      - The code is not yet in use within the area of interest of ATSU B.
    - The code cannot be retained:
      - System assigns a Mode 3/A code in compliance with retention checks and the appropriate Code Management Plan.

❹ The transfer of identification and/or responsibility from ATSU A to ATSU B performed in accordance with the local bilateral agreements (e.g. LoA).

❺ The ATCO concerned at ATSU B applies the local procedures for identification of flights (e.g. check of the Aircraft Identification for flights that are assigned A1000) and where applicable assigns the new Mode 3/A code to the flight.

Note: The transfer of identification and/or responsibility can be supported by automated message exchanges and/or automated correlation between surveillance data and flight data.

SCENARIO 4: Transfer from the CCAMS region to the ELS region (IFPS Flagging Phase 1 & Phase 2)



Sequence

❶ For departure flights within the CCAMS region, the CCAMS Central Server generates an appropriate SSR code for the flight, at an agreed time before push-back.

For overflights, if a CAM (Code Assignment Message) has not already been received, the FDPS of ATSU A sends a COR (Code Request) message to the CCAMS Central Server. The Central Server generates an appropriate SSR code for application within the CCAMS region.

❷ A CAM is sent by the CCAMS Central Server to the FDPS of ATSU A and to other ATS Systems on the planned route of the flight within the CCAMS region, containing the Mode 3/A code.

If no CAM is received within a defined time parameter of sending the COR, the FDPS of ATSU A will assign a discrete Mode 3/A code (local code) in compliance with the appropriate Code Management Plan.

The code is assigned and the surveillance data is correlated with the corresponding flight plan. The ATCO uses the discrete Mode 3/A code for identification.

❸ A notification process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the notification is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ABI (Advanced Boundary Information) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

The ATS system of ATSU B:

- During IFPS Flagging Phase 1 (flight not eligible for assignment of A1000):
  - Checks the assigned Mode 3/A code to confirm that either:
    - The code can be retained and is:
      - In compliance with the appropriate Code Management Plan.
      - Not yet in use within the area of interest of ATSU B.
    - The code cannot be retained:
      - Assigns new Mode 3/A code in compliance with the appropriate Code Management Plan.
- During IFPS Flagging Phase 2 (flight is eligible for assignment of A1000):
  - Checks the assigned Mode 3/A code to confirm that either:
    - The code can be retained and is:
      - In compliance with the appropriate Code Management Plan.
      - Not yet in use within the receiving unit's area of interest.
    - The code cannot be retained:
      - Checks the eligibility for A1000 assignment (existence of IFP/MODSASP flag in Item 18 of flight plan).
        - If the flight is eligible, assigns A1000.
        - If the flight is not eligible, assigns new Mode 3/A code in compliance with the appropriate Code Management Plan.

❹ An initial co-ordination process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B. When the co-ordination message is received by the FDPS of ATSU B, the system checks the flight plan (Item 18) for A1000 assignment eligibility (the ELS flag IFP/MODESASP) and the assigned SSR code communicated in the co-ordination message.

Note: In cases where the co-ordination is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ACT (Activation) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

The ATS system of ATSU B (ELS) attempts correlation of radar track with flight plan data held.

- During IFPS Flagging Phase 1(flight not eligible for assignment of A1000):
  - Attempts correlation using current assigned Mode 3/A code.
    - If correlation fails, initiates standing procedures for 'failure to correlate'.
- During IFPS Flagging Phase 2 (flight is eligible for assignment of A1000):
  - If currently assigned Mode 3/A code is to be retained, attempts correlation using currently assigned Mode 3/A code.
    - If correlation fails, initiate standing procedures for 'failure to correlate'.
  - If A1000 is to be assigned, attempts correlation using downlinked Aircraft Identification.
    - If correlation fails, (following unsuccessful attempt by flight crew to re-enter the correct Aircraft Identification), a new Mode 3/A code is assigned in compliance with the appropriate Code Management Plan, and standing procedures for 'incorrect Aircraft Identification' initiated.
    - Re-attempt correlation using new assigned Mode 3/A code.
    - If correlation fails, initiate standing procedure for 'failure to correlate'.

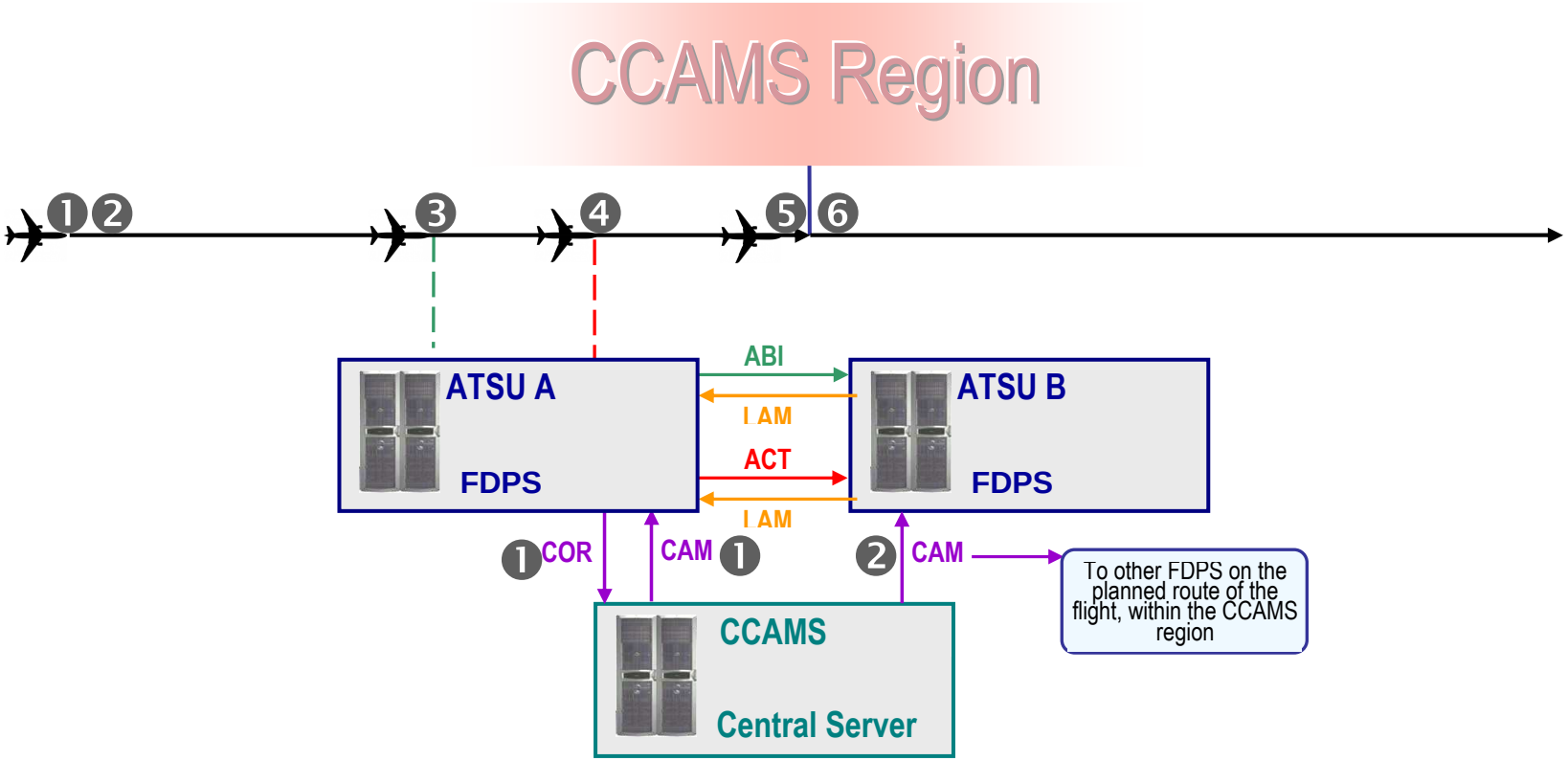
❺ The transfer of identification and/or responsibility from ATSU A to ATSU B is performed in accordance with the local bilateral agreements (e.g. LoA).

❻ The ATCO concerned at ATSU B applies the local procedures for identification of flights (e.g. check of the Aircraft Identification for flights that are assigned A1000) and where applicable assigns the new Mode 3/A code to the flight.

Note: The transfer of identification and/or responsibility can be supported by automated message exchanges and/or automated correlation between surveillance data and flight data.

Appendix 2: 2012 - Mode 3/A Code Management in the CCAMS Region

SCENARIO 5: Transfer between units within the CCAMS region



Sequence

❶ For departure flights within the CCAMS region the CCAMS Central Server selects a SSR code for the flight at an agreed time before push-back.

For overflights, if a CAM (Code Assignment Message) has not already been received, the FDPS of ATSU A sends a COR (Code Request) message to the CCAMS Central Server. The Central Server generates an appropriate SSR code for application within the CCAMS region.

❷ A CAM is sent by the CCAMS Central Server to the FDPS of ATSU A and to other ATS Systems on the planned route of the flight within the CCAMS region, containing the retained or new Mode 3/A code.

If no CAM is received within a defined time parameter of sending the COR, the FDPS of ATSU A will assign a discrete Mode 3/A code (local code) in compliance with the appropriate Code Management Plan.

The code is assigned and the surveillance data is correlated with the corresponding flight plan. The ATCO uses the discrete Mode 3/A code for identification.

❸ A notification process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the notification is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ABI (Advanced Boundary Information) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

❹ An initial co-ordination process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the co-ordination is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ACT (Activation) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

When the notification or co-ordination message is received by the FDPS of ATSU B, the ATS system:

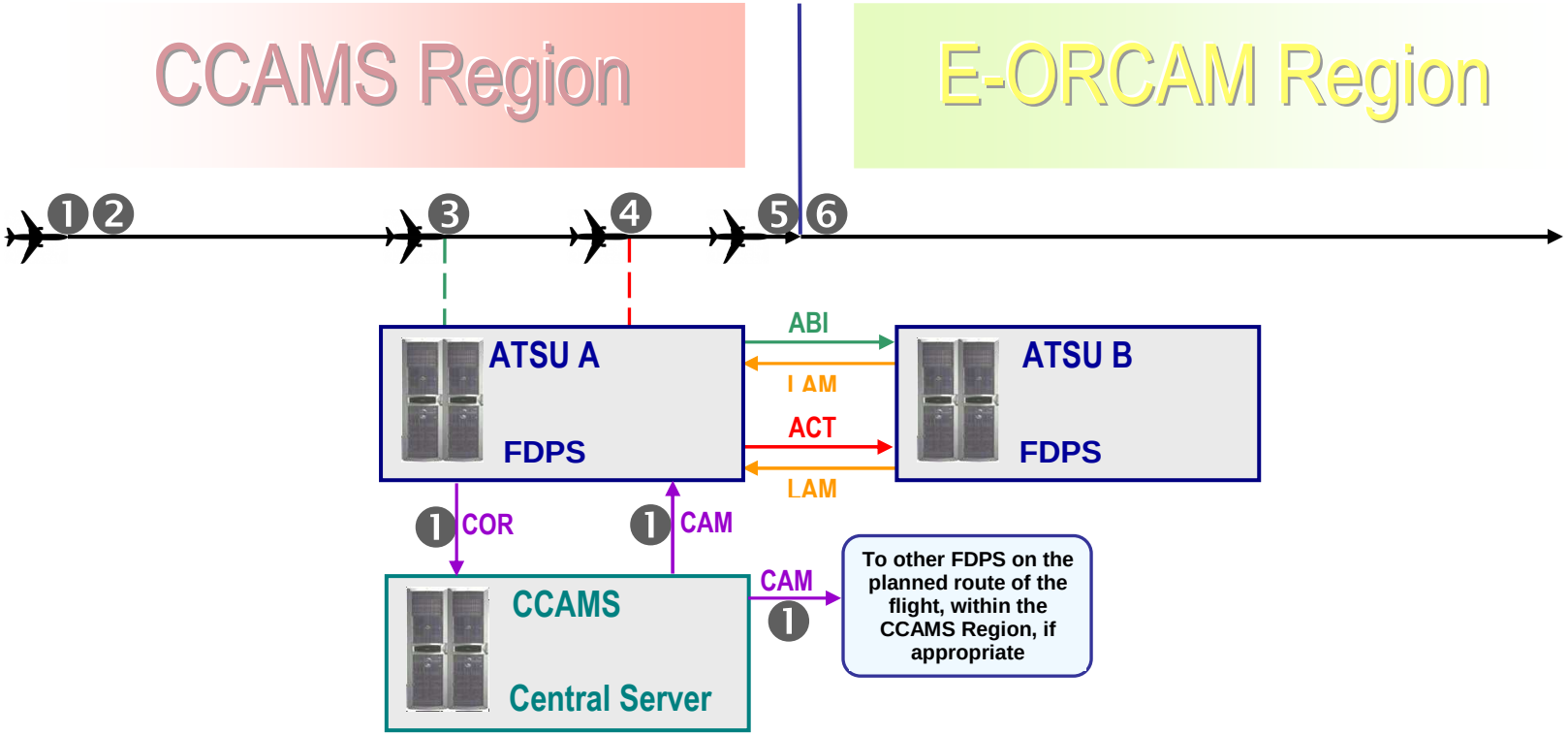
- Compares the code with the code received in the CAM:
  - If the code is the same, then it is retained.
  - If the code is not the same, then it is replaced by the code in the CAM.
- If no CAM was received:
  - The system sends a COR to the CCAMS Central Server and is assigned a code via the original CAM, which is regenerated.
  - If, following the step above, no CAM is received within an agreed time parameter, a Mode 3/A code is selected locally.

❺ The transfer of identification and/or responsibility from ATSU A to ATSU B is performed in accordance with the local bilateral agreements (e.g. LoA).

❻ The ATCO concerned at ATSU B applies the local procedures for identification of flights and where applicable assigns the new Mode 3/A code to the flight.

Note: The transfer of identification and/or responsibility can be supported by automated message exchanges and/or automated correlation between surveillance data and flight data.

SCENARIO 6: Transfer from the CCAMS region to the E-ORCAM region



Sequence

❶ For departure flights within the CCAMS region, the CCAMS Central Server selects a SSR code for the flight at an agreed time before push-back.

For overflights, if a CAM (Code Assignment Message) has not already been received, the FDPS of ATSU A sends a COR (Code Request) message to the CCAMS Central Server. The Central Server generates an appropriate SSR code for application within the CCAMS region.

❷ A CAM is sent by the CCAMS Central Server (either automatically or in response to a COR) to the FDPS of ATSU A and to other ATS Systems on the planned route of the flight within the CCAMS region, containing the retained or new Mode 3/A code.

If no CAM is received within a defined time parameter of sending the COR, the FDPS of ATSU A will assign a discrete Mode 3/A code (local code) in compliance with the appropriate Code Management Plan.

The code is assigned and the surveillance data is correlated with the corresponding flight plan. The ATCO uses the discrete Mode 3/A code for identification.

❸ A notification process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the notification is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ABI (Advanced Boundary Information) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

❹ An initial co-ordination process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the co-ordination is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ACT (Activation) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

When the initial co-ordination is performed, the FDPS of ATSU B checks the assigned Mode 3/A code to confirm that either:

- The code can be retained, meaning that:
  - The code is in compliance with the appropriate Code Management Plan.
  - The code is not yet in use within the area of interest of ATSU B.

Or,

- The code cannot be retained:
  - The ATS System assigns a Mode 3/A code in compliance with the appropriate Code Management Plan.

❺ The transfer of identification and/or responsibility from ATSU A to ATSU B is performed in accordance with the local bilateral agreements (e.g. LoA).

❻ The ATCO concerned at ATSU B applies the local procedures for identification of flights and where applicable assigns the new Mode 3/A code to the flight.

Note: The transfer of identification and/or responsibility can be supported by automated message exchanges and/or automated correlation between surveillance data and flight data.

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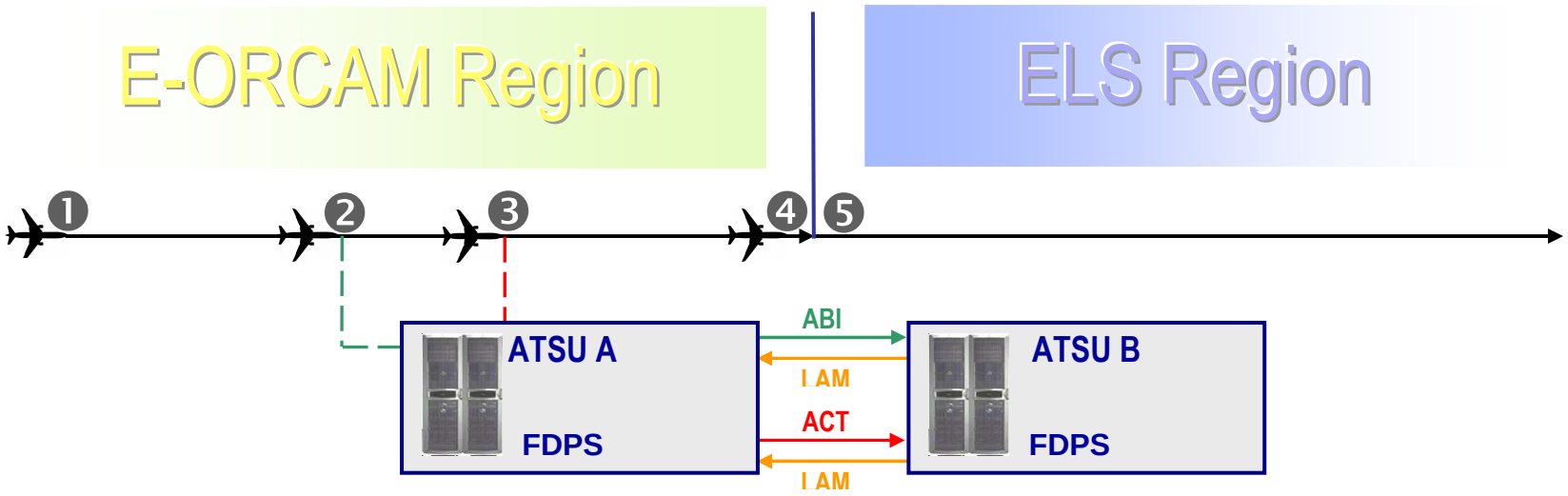
Appendix 3: 2012 - Mode 3/A Code Management in the E-ORCAM Region

SCENARIO 7: Transfer from the E-ORCAM region to the ELS region



Sequence

❶ For departures within the E-ORCAM region, a discrete Mode 3/A code is assigned by the FDPS of ATSU A, in compliance with the appropriate Code Management Plan. For overflights entering the area of responsibility of ATSU A, the appropriate retention rules are also applied.

During IFPS Flagging Phase 2, flight plan will be flagged but flight will not be eligible for assignment of code A1000 on departure.

❷ A notification process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the notification is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ABI (Advanced Boundary Information) message initiated by the FDPS of ATSU A, acknowledge through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

On receipt of the notification, he FDPS of ATSU B:

- During IFPS Flagging Phase 1(flight not eligible for assignment of A1000):
  - Checks the assigned Mode 3/A code to confirm that either:
    - The code can be retained and is:
      - In compliance with the appropriate Code Management Plan.
      - Not yet in use within the area of interest of ATSU B.

        - The code cannot be retained:
            - Assigns new Mode 3/A code in compliance with appropriate Code Management Plan.
- During IFPS Flagging Phase 2 (flight is eligible for assignment of A1000):
    - Checks the assigned Mode 3/A code to confirm that either:
        - The code can be retained and is:
            - In compliance with the appropriate Code Management Plan.
            - Not yet in use within the area of interest of ATSU B.
        - The code cannot be retained:
            - Checks the eligibility for A1000 assignment (existence of IFP/MODESASP flag in Item 18 of flight plan).
                - If the flight is eligible, assigns A1000.
                - If the flight is not eligible, assigns new Mode 3/A code in compliance with appropriate Code Management Plan.

❸ An initial co-ordination process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B..

Note: In cases where the co-ordination is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example, for an OLDI solution, the process consists of an ACT (Activation) message initiated by the FDPS of ATSU A acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

The ATS system of ATSU B attempts correlation of radar track with flight plan data held.

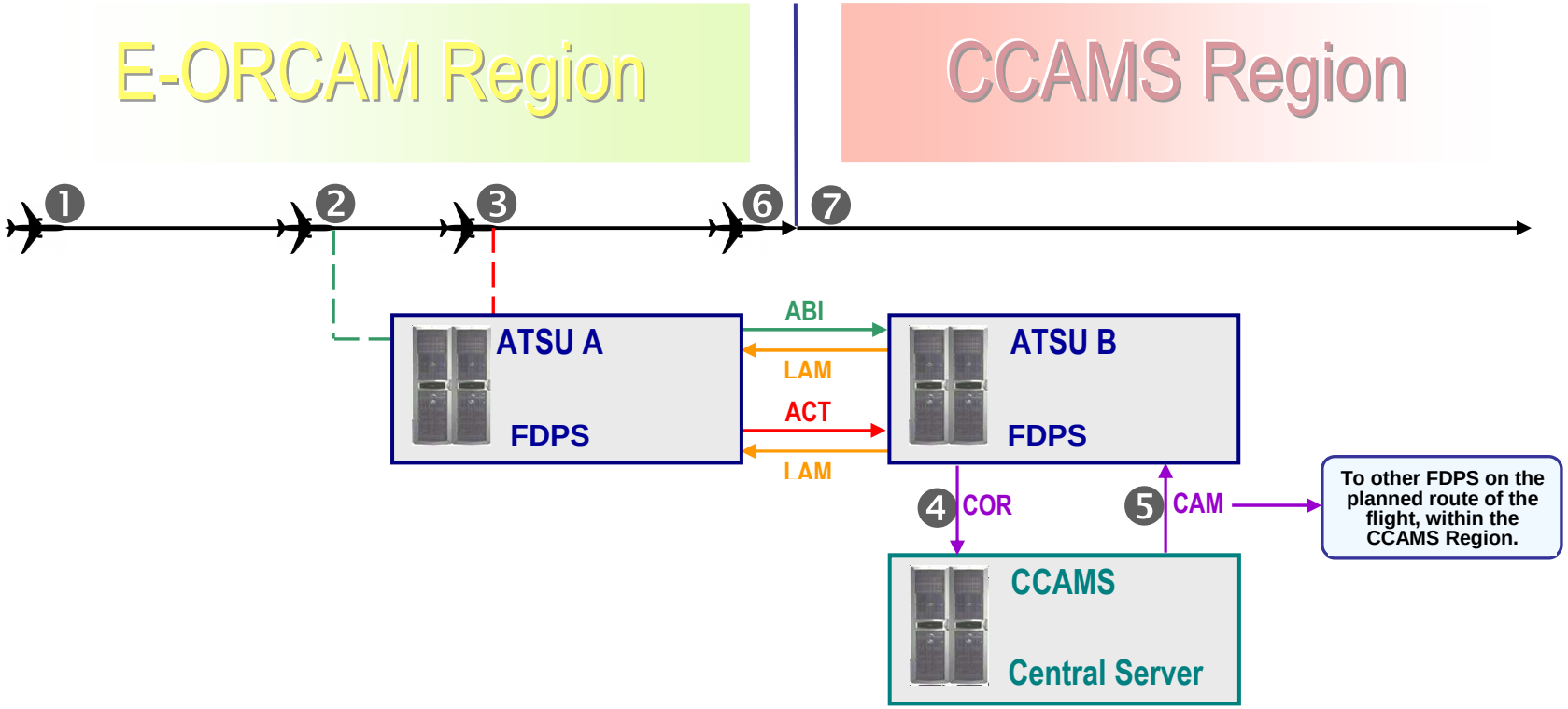
- During IFPS Flagging Phase 1(flight not eligible for assignment of A1000):
    - Attempts correlation using currently assigned Mode 3/A code.
        - If correlation fails, initiates standing procedures for ‘failure to correlate’.
- During IFPS Flagging Phase 2 (flight is eligible for assignment of A1000):
    - If currently assigned Mode 3/A code is to be retained, attempts correlation using currently assigned Mode 3/A code.
        - If correlation fails, initiates standing procedures for ‘failure to correlate’.
    - If A1000 is to be assigned, attempts correlation using downlinked Aircraft Identification.
        - If correlation fails, (following unsuccessful attempt by flight crew to re-enter the correct Aircraft Identification), a new Mode 3/A code is assigned in compliance with the appropriate Code Management Plan, and standing procedures for ‘incorrect Aircraft Identification’ initiated.
        - Re-attempt correlation using new assigned Mode 3/A code.
        - If correlation fails, initiate standing procedure for ‘failure to correlate’.

❹ The transfer of identification and/or responsibility from ATSU A to ATSU B is performed in accordance with the local bilateral agreements (e.g. LoA).

❺ The ATCO concerned at ATSU B applies the local procedures for identification of flights (e.g. check of the Aircraft Identification for flights eligible for assignment of A1000) and, where applicable, assigns either A1000 or a new Mode 3/A code to the flight.

Note: The transfer of identification and/or responsibility can be supported by automated message exchanges and/or automated correlation between surveillance data and flight data

SCENARIO 8: Transfer from the E-ORCAM region to the CCAMS region



Sequence

❶ For departures within the E-ORCAM region, a discrete Mode 3/A code is assigned by the FDPS of ATSU A, in compliance with the appropriate Code Management Plan. For overflights entering the area of responsibility of ATSU A, the appropriate retention rules are also applied.

❷ A notification process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B..

Note: In cases where the notification is performed using automated means, this step consists of a data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ABI (Advanced Boundary Information) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

❸ An initial co-ordination process, including the Mode 3/A code information, is initiated by the FDPS of ATSU A and acknowledged by the FDPS of ATSU B.

Note: In cases where the co-ordination is performed using automated means, this step consists of data exchange between the two FDPS involved. As an example for an OLDI solution, the process consists of an ACT (Activation) message initiated by the FDPS of ATSU A, acknowledged through a LAM (Logical Acknowledgement) message returned by the FDPS of ATSU B.

❹ When the notification or initial co-ordination are performed, if a code assignment message (CAM) for the flight has not already been received by the FDPS of ATSU B, the system generates a code request message (COR) that includes the currently assigned Mode 3/A code and, at a predetermined time parameter before estimated entry time into the CCAMS region, sends it to the CCAMS Central Server. The Central Server checks the assigned Mode 3/A code to confirm that either:

- The code can be retained meaning that the use of the code will not generate a code conflict within the CCAMS Area.

Or,

- The code cannot be retained:
  - An appropriate code is generated by CCAMS.

❺ A CAM is sent to the FDPS of ATSU B and to other ATS Systems on the planned route of the flight within the CCAMS region, containing the retained or a new Mode 3/A code.

If no CAM is received within a defined time parameter of sending the COR, the FDPS of ATSU B will assign a discrete Mode 3/A code (local code) in compliance with the appropriate Code Management Plan

❻ The transfer of identification and/or responsibility from ATSU A to ATSU B is performed in accordance with the local bilateral agreements (e.g. LoA).

❼ The ATCO concerned at ATSU B applies the local procedures for identification of flights and, where applicable, assigns the new Mode 3/A code to the flight.

Note: The transfer of identification and/or responsibility can be supported by automated message exchanges and/or automated correlation between surveillance data and flight data.

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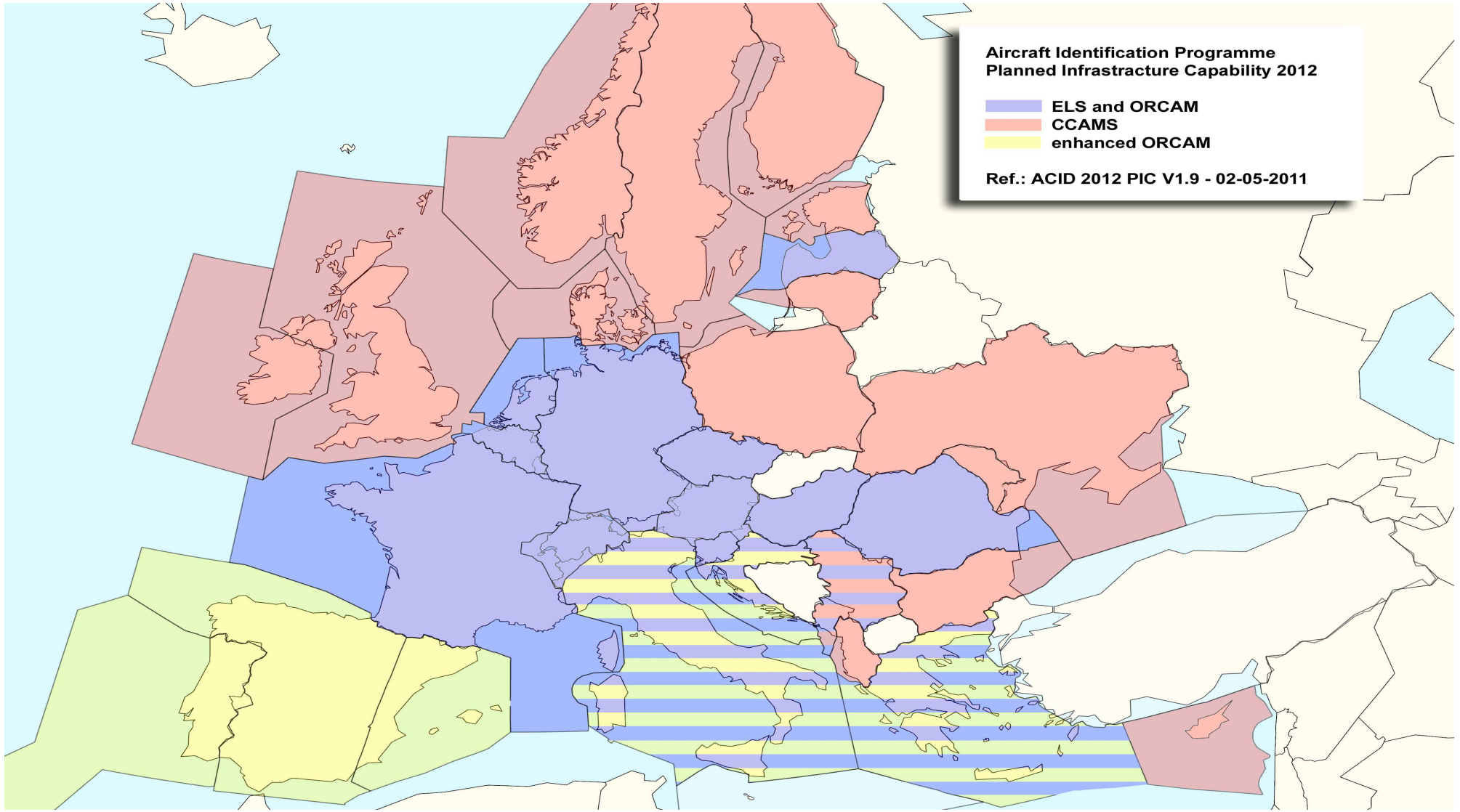
Appendix 4: ANSP Planned Infrastructure Chart for 2012



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