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FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL

Guidelines for the Application of European Coordination and Transfer Procedures

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Abstract

The uniform application across Europe of coordination and transfer procedures will provide increased efficiency and safety for operations at local and network level. Harmonisation of silent transfer of control spacing values, consistent application of procedures at interfaces between FABs, free route airspaces and fixed route airspaces is supported through a common approach towards ICAO provisions and European regulations governing coordination and transfer processes.

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Authors

EUROCONTROL

Contact(s) Person	Tel	Unit
Dragos Tonea	+32 2 729 3352	DNM/COO/NOM/OPL/PRO

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

AUTHORITY	NAME AND SIGNATURE	DATE
APDSG Chairman	Neculai Cojocariu	09/11/12
Head of Operations Planning Unit	Razvan Bucuroiu	09/11/12

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0.2		New document structure approved	TOC, all
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Publications
EUROCONTROL Headquarters
96 Rue de la Fusée
B-1130 BRUSSELS

Tel: +32 (0)2 729 1152
Fax: +32 (0)2 729 5149
E-mail: publications@eurocontrol.int

TABLE OF CONTENTS

1. Introduction

This document provides single source material to enable pan-European harmonised application of coordination and transfer procedures. The material is supported by reference to the relevant ICAO, European Commission or EUROCONTROL documentation.

1.1 Purpose of the document

The overall aim is to harmonise the processes and procedures adopted by ANSPs, states and regulators for coordination and transfer of control so that boundaries between ATS units do not represent an obstacle to the flow of traffic.

1.2 Scope of the document

The scope of the manual is limited to coordination and the transfer of control, however, within that scope the various combinations of: with and without use of bidirectional speech facilities, whether system supported or not are also addressed. Due account is also taken of the future improvements to airspace with the introduction of Functional Airspace Blocks (FAB) and the Free Route Airspace Concept (FRAC).

1.3 Structure of the document

The "Guidelines for the Application of ECAC Coordination and Transfer Procedures" contains seven chapters and four annexes as follows:

Chapter 1 provides background to the purpose and scope of the document and use by Air Navigation Service Providers.

Chapter 2 provides information in respect of coordination; relevant ICAO provisions, introduces European Network and Functional Airspace Blocks.

Chapter 3 addresses Transfer of Control with and without use of bidirectional speech facilities, lists ICAO documents governing ECAC operational procedures.

Chapter 4 introduces the Free Route Airspace concept and identifies specific aspects linked to transfer of control.

Chapter 5 addresses the European Network and in particular dynamic ATM processes.

Chapter 6 summarizes EC Requirements for exchange of flight data and system interoperability in respect of coordination and transfer of control.

Chapter 7 identifies practical steps National Administrations are encouraged to follow to establish harmonised values for spacing during silent transfer of control.

The **Annexes** include European survey information as regards the spacing used during silent transfer of control, criteria for establishing 5/10 NM radar separation, implementing rules and community specifications and mapping of basic coordination

processes and associated ICAO ATS Inter-Facility Data Communications (AIDC) and European message specifications On-Line Data Interchange (OLDI) supporting the automated exchanges for coordination and transfer. Finally, the recommendations for each chapter are listed.

2. Coordination in respect of ATC

2.1 General

2.1.1 ATC coordination

Coordination is part of the process that, in the following ICAO descriptions, will lead to the transfer of control to another ATS unit. In order for coordination to take place then there are number of fundamentals required beforehand: Letters of Agreement (LoA), Areas of Responsibility (AOR) and the subsequent airspace boundaries which lead to the transfer of traffic. There has to be an awareness of the flight to come which is notification. At ACCs the passing of data on individual flights as part of the co-ordination process may be carried out by telephone or through connecting Flight Data Processing Systems (FDPS) (Chapter 6) which have largely replaced verbal estimates. The ICAO defined phases of flight are there to ensure a standard of timing and content in the notification phase so that flight identity is assured. Coordination is part of the acknowledgement that the conditions that have been previously agreed lead to a transfer of control (TOC) (Chapter 3); or to proffer alternative conditions with which the receiving ATS unit has to agree before TOC can take place.

2.2 ICAO Provisions in respect of Coordination

Under [PANS ATM] a flight is required to be notified to the next unit and operational agreement obtained for the transfer conditions, the process being referred to as coordination. [PANS ATM] recommends that ATC units should establish and apply standardised procedures for the coordination and transfer of control of flights, in order to streamline coordination processes.

2.2.1 ICAO Doc 4444 PANS_ATM Chapter 10 - Coordination in respect of the provision of Air Traffic Control Service (10.1.1 & 10.1.2)

General

10.1.1. The coordination and transfer of control of a flight between successive ATC units and control sectors shall be effected by a dialogue comprising the following stages:

a) Notification of the flight in order to prepare for coordination, as necessary;

b) Coordination of conditions of transfer of control by the transferring ATC unit;

c) Coordination, if necessary, and acceptance of conditions of transfer of control by the accepting ATC unit; and

d) The transfer of control to the accepting ATC unit or control sector.

10.1.2 ATC units shall forward from unit to unit, as the flight progresses, necessary flight plan and control information. When so required by agreement between the appropriate ATS authorities to assist in the separation of aircraft, flight plan and flight progress information for flights along specified routes or portions of routes in close

proximity to flight information region boundaries shall also be provided to the ATC units in charge of the flight information regions adjacent to such routes or portions of routes.

The flight plan and control information shall be transmitted in sufficient time to permit reception and analysis of the data by the receiving unit(s) and necessary coordination between the units concerned.

2.2.2 ICAO Doc 7030, EUR Regional SUPPs (Para 6.12.4 Computer-Assisted Coordination)

When so agreed between adjacent ATC units, a computer-assisted coordination process shall be introduced to eliminate the need for verbal coordination of boundary estimates and to reduce the amount of manual data input into ATC computers.

The minimum requirement for the activation of flight plan data shall be the content of the boundary estimate (EST) message. When so agreed between adjacent units, the activate (ACT) message shall be used instead of the EST message, enabling additional information to be transmitted.

2.2.3 ICAO Doc 7030, EUR Regional SUPPs (6.12.4.3 Computer-Assisted Coordination Operational Procedure)

The following basic rules apply for the use of EST and ACT messages but do not cover the whole range of operational practice:

a) These messages shall be automatically generated, exchanged and processed to the extent practicable.

b) A single message shall be sent in respect of each flight due to be transferred and any subsequent revision shall be the subject of verbal coordination.

c) The message shall provide the most recent information available on all transfer conditions at the time of transmission.

d) Acceptance by the receiving unit of the transfer conditions implied in the message shall be assumed, unless the receiving unit initiates verbal coordination to amend the transfer conditions.

e) There shall be bilateral agreement as to the boundary point and transmission times for each route. The normal transmission time shall be 15 minutes before the flight concerned is expected to cross the boundary.

2.3 European Commission Regulation (EC) No 1032/2006 of 6 July 2006

EC 1032/2006 lays down requirements for automatic systems for the exchange of flight data for the purpose of notification, coordination and transfer of flights between air traffic control units.

2.4 EUROCONTROL Common Format LoA (V4.0)

The structure and the content of the LoA template was designed to accommodate ICAO requirements pertaining to coordination and transfer of control of aircraft between ATC units, as promulgated in ICAO Annex 11, Doc 4444 (PANS-ATM) and supplemented by Doc 7030 (EUR SUPPs).

Note: See also comment on LoA for future FRA/FAB airspace at Para 4.1.5.1

2.5 ATS Fixed Route to Fixed Route Coordination & Transfer of Control

Existing ICAO procedures for coordination and transfer in the current fixed route environment are sufficient and are applied consistently in Europe. System support is provided by means of compliance with the mandatory messages required through EU regulation (EC) No 1032/2006 and amended by EU regulation (EC) No 30/2009. Publication of coordination and transfer procedures to be applied between centres is regulated and documented through the use of Common Format LoA and is part of a continuous process of improvement and refinement between adjacent ATS units.

Following review and approval process over an extended period, these mandatory capabilities are judged to be sufficient to support safely and efficiently coordination and transfer procedures in the current airspace structures.

2.6 Coordination with regard to Functional Airspace Blocks (FABs)

2.6.1 EU Regulation

Commission Regulation (EU) No 176/2011 of 24 February 2011 on the information to be provided before the establishment and modification of a functional airspace block (see para 4.1.1). The FAB Implementing Rule provides for the necessary technical support to ensure "the smooth and flexible transfer of responsibility for ATC between ATS units". Inter alia this includes:

- the supporting systems for ensuring seamless and flexible operations across FIR boundaries;
- Communications systems;
- Conformity of coordination and transfer of ATC between units with Regulation (EC) No 1032/2006 (COTR-IR), as amended by Regulation (EC) No 30/2009.

2.6.2 Provisions for Coordination within FAB & with Adjacent ATS Units

The coordination process (notification, coordination and transfer of control) is governed by the same rules whether one deals with an inter FAB or intra-FAB interface. The essential elements of notification, coordination and transfer of control are valid for the FAB for flights both within the airspace and for the transfer to an adjacent ATSU unit.

Coordination where flights are entering/leaving FAB airspace will be managed in the traditional manner through recognised boundary points with the basic system support so that the predictability of the aircraft profile, according to its filed flight plan, is sufficient to allow for coordination and transfer procedures to be applied.

2.7 Coordination Procedures in Free Route Airspace

2.7.1 Basic Provisions for Coordination within Free Route Airspace (FRA)

The introduction of FRA operations does not essentially change the nature of processes to effect coordination and transfer.

LoAs will reflect the agreed conditions which may include a revision of reporting points, changes to vertical sectorisation etc the estimate information to be gathered and communicated at FIR entry/exit points. Where extended DCT segments are allowed these may need to be addressed additionally to identify crossing points. Free route airspace needs to be designed so that the predictability of the aircraft profile, according to its filed flight plan, is sufficient to allow for coordination and transfer procedures to be applied in a timely manner. In practical terms, to have sufficient published waypoints (e.g. similar to today's environment) so that the lateral profile the aircraft will fly after the COP is predictable for ATC.

As FRA is introduced the previous ATS structure (or a reduced version thereof), procedures and processes may be retained as a fall back in the event of the cancellation of FRA for operational or technical reasons.

2.7.2 Considerations on system support required for coordination and transfer in FRAC operations

Whilst the range of system support required by a particular implementation of FRA operations can only be determined after tailored analysis against local specificities, as regards coordination and transfer it is useful to consider three scenarios: .

1. FRA operations using only fixed COP
2. FRA operations using fixed and dynamic COP defined relative to existing significant points network
3. FRA operations using dynamic COP independent of any reference to an existing significant point network

This initial context setting should not be considered as a full fledged system and interoperability analysis but rather as a high level overview of the matter. It is up to a local implementer to pursue through agreed methodologies the derivation of safety and performance system characteristics supporting their particular environment and operations (See para 6.2.2.3 for further detail)

2.7.3 Additional Factors for Coordination on the Introduction of FRA.

2.7.3.1 Silent transfer of control

Silent transfer of control procedures require that traffic is predictable and sufficient system support is provided to ATCOs to ensure:

- They are in possession of all elements related to the aircraft profile and
- Should the agreed conditions of the transfer change, they have the means to speak to each other such that new conditions are agreed expeditiously and safely.

2.7.3.2 Fixed route to free route airspace

At present entry into FRA is through agreed entry/exit points which perforce generate similar requirements to those of a fixed route structure. However, the use of increased direct routes may well increase the number of boundary points to be considered and how these are to be indicated in flight plans and in supporting systems.

2.7.3.3. Free route to free route

There is a potential for more dynamic boundaries within FRA than exist at present. Coordination and transfer of control could be less specific in the sense that the crossing boundary entry/exit might be identified by improved flight planning system or in future aircraft FMS generated. However, FRA in Europe presently requires entry/exit flights though "conventional" specific points at their boundaries which is manageable by current systems.

With the increased use of DCT the internal ATS system should generate crossing point detail at sector boundaries. Where DCT cross FIR boundaries then IFPS ensures an accurate flight plan distribution; though IFPS generates boundary estimates for internal use they are not distributed to ACCs.

2.7.4 Considerations on Co-ordination Points in FRAC operations

Transfer of control points are subject to bilateral agreement between units, however, the OLDI Co-ordination Point may not always be identical to that transfer of control point. OLDI messages do not include a transfer of control point, however, a COP reference point can be created using a bearing and distance from a known point which would allow their use for DCT route or at a Free Route Airspace boundary etc.

3. Transfer of Control

GAT flights in the ECAC area normally use the route network structure to plan their operations. ATS are provided by the State being over flown or by an Air Navigation Service Provider delegated to provide this service in the airspace being used. Crossing State boundaries or boundaries between the areas of responsibility, the responsibility for an aircraft has to be transferred from one service provider (transferring sector or unit) to another service provider (accepting sector or unit). Transfer of responsibility for an aircraft between sectors or units is called transfer of control.

Specific guidance is provided in ICAO Doc 4444 and ICAO Doc 7030 EUR on the conditions under which a transfer of control between units can be exercised. The ICAO provisions address the operational procedures, system and communications requirements needed to support a transfer of control both with and without use of bi-directional speech facilities (silent transfer). Throughout this ICAO documentation the accompanying scenario is that of the fixed route ATS structure. An objective of Chapter 3 Transfer of Control, therefore, is to both provide the current ICAO provisions and, subsequently address the introduction of Free Route Airspace Concept (FRAC).

ICAO Doc 4444 also sets specific conditions for transfer of control and minimum distance to be applied between successive aircraft. ICAO Doc 7030 EUR has additional more specific provision for minimum distances between successive aircraft within European airspace.

3.1 ICAO Provisions for the Transfer of Control

3.1.1 ICAO Doc 4444 Transfer of Control (10.1.2.2)

Transfer of Control (10.1.2.2)

The responsibility for the control of an aircraft shall be transferred from the ATC unit to the next unit at the time of crossing the common control area boundary as determined by the unit having control of the aircraft or at such other point or time as has been agreed between the two units.

Where specified in letters of agreement between the ATC units concerned, and when transferring an aircraft, the transferring unit shall notify the accepting unit that the aircraft is in position to be transferred, and specify that the responsibility for control should be assumed by the accepting unit forthwith at the time of crossing the control boundary or other transfer control point specified in letters of agreement between the ATC units or at such other point or time coordinated between the two units.

If the transfer of control time or point is other than forthwith, the accepting ATC unit shall not alter the clearance of the aircraft prior to the agreed transfer of control time or point without the approval of the transferring unit.

If transfer of communication is used to transfer an aircraft to a receiving ATC unit, responsibility for control shall not be assumed until the time of crossing the control area boundary or other transfer of control point specified in letters of agreement between the ATC units.

When transfer of control of identified aircraft is to be effected, the appropriate procedures specified in ICAO Doc 4444 (PANS-ATM), Section 8.7.4, shall be applied.

3.1.2 ICAO Doc 7030, EUR Regional SUPPs (6.2.5.1.1)

ICAO Doc 7030 supplements the requirements of ICAO Doc 4444 with regards to the values for minimum distances between successive aircraft during transfer of control without prior coordination. Reiterating the requirements for bilateral agreement on detailed conditions applicable for the transfer ICAO Doc 7030 provides that the minimum distance between successive aircraft during the period of transfer must be one of the following values:

a. 10 NM; or

b. 5 NM when both units involved possess electronic aids for immediate recognition of release and acceptance of aircraft under radar transfer.

3.1.2.1 Recommendations:

i. Review minimum distance between successive aircraft during period of transfer agreed in LoAs to take account of current and improved system support.

ii. Seek harmonisation of spacing values within Functional Airspace Blocks (FABs) and Free Route Airspace.

3.2 Transfer of control with systematic use of bidirectional speech facilities.

3.2.1 ICAO Doc 4444, PANS-ATM (8.7.4.2)

According to ICAO Doc 4444 the following must be fulfilled in order to conduct transfer of control without “prior coordination”.

Both controllers need to be provided with SSR and/or ADS-B including display of position indications with associated labels;

1. The accepting controller is provided, prior to transfer, with updated flight plan information on the aircraft about to be transferred, including the discrete assigned SSR code or, with respect to SSR Mode S and ADS-B, the aircraft identification;
2. The surveillance coverage for the accepting controller must ensure that the aircraft concerned is presented on the situation display before the transfer is effected and is identified on, but preferably before, receipt of the initial call;
3. Both controllers are continuously provided with two-way direct speech facilities, which permit communications to be established instantaneously (communications which effectively provide for immediate access between controllers);
4. The conditions for transfer are subject to specific instructions or specific letter of agreement. These conditions should include:
    a. the transfer point or points;
    b. direction of flight;

c. specified levels;

d. transfer of communication points;

e. agreed minimum separation between aircraft, including that applicable to succeeding aircraft on the same route, about to be transferred;

f. conditions where the application of this type of transfer of control can be terminated by the accepting controller;

5. The accepting controller is informed of any level, speed or vectoring instructions given to the aircraft prior to its transfer and which modify its anticipated flight progress at the point of transfer.

The minimum agreed separation between aircraft about to be transferred shall be determined taking into account all relevant technical, operational and other circumstances. If circumstances arise in which these agreed conditions can no longer be satisfied, controllers shall revert to the transfer of control with verbal exchange until the situation is resolved.

3.3 Transfer of control without systematic use of bidirectional speech facilities (Silent Transfer of Control)

3.3.1 ICAO Doc 7030 EUR 6.2.5 Radar

A transfer of radar control based upon the identification of aircraft and the transfer of identity procedures specified in the PANS-ATM, 8.6.2 and 8.6.3, may be carried out without systematic use of the bidirectional speech facilities available between the adjacent units concerned, provided that:

a. The detailed conditions applicable for the transfer are the subject of a bilateral agreement; and

b. The minimum distance between successive aircraft during the period of transfer is agreed as one of the following values:

1) 19 km (10 NM) when SSR information is used in accordance with the provisions of the PANS-ATM, provided that an overlapping radar coverage of at least 56 km (30 NM) between units involved exists; or

2) 9.3 km (5 NM) when the conditions of 1) apply and both units involved possess electronic aids for immediate recognition of release and acceptance of aircraft under radar transfer.

Nevertheless, the ICAO Doc 7030 provisions above related to silent transfer of control are interpreted and implemented differently by service providers. The outcome is the use of several spacing values for silent transfer of control. These differences are generally linked to local conditions (e.g. airspace configurations, system support etc) however, the introduction of improved system support and further reviews of LoAs to reflect today's environment should support in more cases the spacing values prescribed by ICAO Doc 7030.

3.3.1.1 **Recommendations:**

iii. Seek harmonisation of ICAO Doc 7030 10 NM minimum.

iv. Progress moves towards the establishment of 5 NM minimum between successive aircraft where system support permits.

3.4 Transfer of Control between FRAs & FRA to/from Fixed Route Structure

3.4.1 Basic Provisions for the Transfer of Control

A flight needs to be notified, with coordination and acceptance of conditions by the transferring and receiving units to enable a subsequent transfer of control in accordance with the adjacent ATS Route network orientation.

The basic ICAO provisions apply for the coordination and transfer of control of any flight between successive ATC units and control sectors whether for fixed ATS structure or for Free Route Airspace.

3.4.1.1 Recommendation:

v. It follows, therefore, that the supporting infrastructure whether it be systems, communications, agreed LoAs etc required for transfer of control in Free Route Airspace as a minimum shall be equal to those within the fixed ATS route structure.

3.4.2 Transfer of control without systematic use of the bi-directional speech facilities (Silent Transfer of Control) in Free Route Environment

Silent transfer of control procedures require that traffic is predictable and sufficient system support is provided to ATCOs to ensure:

a. They are in possession of all elements related to aircraft profile and

b. Should the conditions of transfer agreed change, they have the means to speak to each other such that new conditions are agreed expeditiously and safely

In a free route environment, the fulfilment of these criteria needs to be assessed against specific local conditions (to include for example direction of dominant traffic flows). As a pre-requisite, the core ICAO requirements need to be complied with but further local analysis is needed to address the separation minima to be used.

3.5 Transfer of Communication

Transfer of communications needs to be established with transfer of control. The timing of transfer of communications can be at the point at which the flight path crosses the AOR boundary or with reference to an agreed coordination point. The transfer of communications would be part of the content within the agreed LoA.

3.5.1 ICAO Provisions for transfer of Communication - ICAO Doc 4444 PANS-ATM Chapter 10 (10.1.2.4)

10.1.2.4.1 Except when separation minima specified in 8.7.3 (when the horizontal separation minimum of 5.0 NM based on radar and/or ADS-B are being applied or further reduced when so prescribed by an ATS Authority e.g. final approach track), the transfer of air-ground communications of an aircraft from the transferring to the accepting ATC unit shall be made five minutes before the time at which the aircraft is estimated to reach the common control area boundary, unless otherwise agreed between the two ATC units concerned.

10.1.2.4.2 When separation minima specified in 8.7.3 are being applied at the time of transfer of control, the transfer of air-ground communications of an aircraft from the transferring to the accepting ATC unit shall be made immediately after the accepting ATC unit has agreed to assume control.

10.1.2.4.3 The accepting ATC unit shall normally not be required to notify the transferring unit that radio and/or data communication has been established with the aircraft being transferred and that control of the aircraft has been assumed, unless otherwise specified by agreement between the ATC units concerned. The accepting ATC unit shall notify the transferring unit in the event that communication with the aircraft is not established as expected.

10.1.2.4.4 In cases where a portion of a control area is so situated that the time taken by aircraft to traverse it is of a limited duration, agreement should be reached to provide for direct transfer of communication between the units responsible for the adjacent control areas, provided that the intermediate unit is fully informed of such traffic. The intermediate unit shall retain responsibility for coordination and for ensuring that separation is maintained between all traffic within its area of responsibility.

3.5.2 ATC standardized procedures for coordination and transfer of control of flights

In case of operations in the absence of a published ATS route network or of fixed transfer of control points, the nominal provisions for the transfer of control and transfer of communications need to be established either with reference to the point where the flight path crosses the AoR boundary or with reference to the co-ordination point specified in the co-ordination messages. In some cases all transfer of control points correspond with the AoR boundary and no specific transfer of communication point is established. Ref: EUROCONTROL Common Format LoA (V4.0)

3.5.2.1 Recommendations:

In order to optimize the provision of ATS, it is recommended that:

vi. The Transfer of Communication takes place before the Transfer of Control, at a point/time/distance as agreed upon between the transferring and accepting ATS Units.

vii. Where there are ATS Routes for which the transfer of control is not the AOR and/ or for which a specific transfer of communication point has been established need to be identified in the LoA.

Example:ACC/APP Copenhagen ATCC Malmö/TMC Göteborg

LoA Annex E. Transfer of Control and Transfer of Communications.

Effective: 17.11.2011

E.1 Transfer of Control.

The transfer of control takes place at the AoR-boundary.

E.2 Transfer of Communications.

For arriving aircraft to Copenhagen Area via SVD, the transfer of communications shall take place not later than SVD but not earlier than 30 NM before the AoR-boundary.

For other aircraft, the transfer of communications shall take place not later than the transfer of control but not earlier than 30 NM before the AoR-boundary, unless otherwise coordinated or otherwise described as a special procedure in Annex D to this LoA.

4. Free Route Operations

4.1 General considerations about Free Route Concept

The scope of the Free Route Concept of Operations is to provide an enabling framework for the harmonised implementation of Free Route Operations in Europe whenever a State/ANSP, a group of States/ANSPs or a FAB decides to proceed with such implementation. It is expected that the current Free Route Airspace (FRA) applications will be gradually extended first within FABs and eventually through the whole of the pan-European airspace

Free Route Airspace Definition

A specified airspace within which users may freely plan a route between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) way points, without reference to the ATS route network, subject to airspace availability. Within this airspace, flights remain subject to air traffic control (ARNV7 10 Jan 11).

4.1.1 Free Route Network Enablers

The enablers are:

1. Appropriate System Support - enhancement for the purposes of Flight Planning and ATFCM;
2. Procedures – enhanced procedures where necessary for operations within Free Route airspace and at its interfaces;
3. Adaptations to airspace structures;
4. Adaptations to airspace management procedures.

No additional equipment requirements or flight planning procedures changes are foreseen for aircraft operators. Nevertheless, modifications to flight planning systems may be required to ensure that full benefit of the Free Route operations can be realised.

4.1.2 Airspace Classification

Free Route Operations airspace will, in principle be classified as Class C airspace, with certain agreed exemptions (e.g. above FL460 within the Northern Oceanic Transition Area).

4.1.3 Flight Level Orientation

Flight Level Orientation System (FLOS) applicable within Free Route Operations airspace shall be promulgated through national AIS publications. (This does not constitute a change to current system of 2 FLOS in Europe)

4.1.4 Limited Applicability of Free Route Airspace Operations

A number of States/ANSPs and FABs have implemented or intend to implement Free Route Airspace this year or over the next few years. For a number of FIRs the first phase of FRA is time limited to night and weekend operations. The FRA may also be limited by flight level or expanded to include lower flight level during the published hours of operation e.g. Finland FIR/UIR plans to offer night time DCT routing for all traffic from FL 95-FL660.

4.1.4.1 Time Limited

Even though the goal is to implement Free Route Airspace Operations on a permanent basis, a limited application during defined periods could facilitate early implementation. Currently Lisbon, Shannon & Denmark/Sweden are FRA 24/7 but Maastricht Phase 1 is extended night time and weekends.

4.1.4.2 Structurally Limited

In complex airspace, the full implementation of Free Route Airspace Operations could potentially have a detrimental effect on capacity. In such airspace, ANSPs may decide to implement Free Route Airspace Operations on a structurally limited basis, for example by restricting the available entry/exit points for certain traffic flows, which could increase predictability and reduce the number of potential conflicts. There are differing vertical (base) levels for FRA airspace which need to be noted for FPL purposes; at present the levels are from FL 245 in Maastricht airspace, above FL 245 in Lisbon and Shannon and above FL 285 in the DK/SE FAB.

4.1.5 Free Route Airspace Entry and Exit (horizontal conditions) with Fixed ATS Route Network

FRA airspace in Europe is relatively limited so whether flights are crossing the North Atlantic (NAT) or whether they are moving into an adjacent fixed ATS Route Network then the requirements of the latter fixed structure becomes the dominant factor. In essence there is little to distinguish between the coordination and transfer of control procedures between “normal” ACCs and the FRA & Fixed ATS Route ACCs. Arrival and departure of the flight has to be via a specific point (and level) on the common boundary. It may well be possible to increase the number of crossing points and connecting routes to increase the flexibility of flight within the FRA. Flights from FRA airspace will join the fixed route structure at pre-determined points in a manner orientated to the subsequent structure that the flight will encounter.

Internally within a FAB where free route airspace is established the horizontal connectivity in terms of boundaries can be relaxed by bilateral agreement e.g. at the cross border within DK/SE FAB there will not be any requirement for inserting FIR BDR point between Köpenhamn FIR and Sweden FIR/UIR. The ATC systems in Denmark & Sweden are similar though the contents of their FDPs have a local content. Messages are exchanged via OLDI.

4.1.5.1. Recommendations:

viii. GAT flights entering and exiting Free Route Airspace will normally do so via the fixed route network.

ix. Flights between ACCs will continue to be subject to rules, procedures and Letters of Agreement. Where required, local procedures may allow GAT flights to flight plan climb/descent entry and/or exit at random points.

x. Aircraft that do not achieve their entry or exit criteria in climb or descent will be expected to follow their current flight-plan unless ATC instructions decide differently.

xi. OAT flights entering and exiting Free Route Airspace are not confined to fixed entry and exit points. They may be subject to rules, procedures and agreements for the purpose.

4.1.5.2 LoA for Entry/Exit into Free Route Airspace

The current LoAs may require review with the potential flexibility of route choice as a result of flight within Free Route Airspace (FRA). The ATS Unit entry/exit conditions should be such that the flight is adequately prepared for the receiving unit and should, inter alia, include:

1. An agreed and pre-defined context for the transfer and receipt of traffic;
2. Geographic points at (or between) for the transfer of communication and subsequent transfer of control at or prior to the AOR boundary;
3. Heading or vectoring instructions, levels and speed;
4. Reflects traffic sequencing and ATC profile requirements.

4.1.5.3 Adjacent Free Route Airspace to Free Route Airspace

This is potentially a complex situation as the nature of the Free Route Airspace could differ in both structure and content. The current base levels of FRA airspace are not common so at the same horizontal boundary a differing vertical structure could result in cross-border DCT at one level and a fixed route type of entry/exit points at another. Where FRAs are adjacent one would anticipate that users should be able to use DCT across the border as if it was an internal FRA operation where today two or more ACCs existed. Length of DCTs could become an issue for FPLs and use of intermediate waypoints may be required e.g FL change. The conditions for coordination and transfer of control are likely to be driven by the nature of the airspace in each FRA. For example the preparation of traffic for/from the NAT tracks will be a driver within an adjacent FRA. In the core area of Europe if a “new” FRA airspace block is prepared alongside an existing FRA structure rather than two airspaces with differing vertical boundaries or operating rules the net result should be one single larger entity with LoAs and systems in support.

4.1.6 The vertical connection between Free Route Operations airspace and the underlying fixed ATS route network

The few states that have implemented Free Route Airspace have assigned base levels aligned to match their specific circumstances and thus there is not yet a common FRA division level in Europe. Portugal, for example, has introduced FRA in the Lisboa FIR above FL 245. Sweden has FRA airspace above FL 285. The nature of flight entry into the lower airspace from the FRA is influenced by the structure below. It is likely that airports and multi-hub TMAs will be linked to FRA by dedicated fixed routes aimed at maximising arrivals and departures from airports in a sequence which prioritises the major hub airports (Ref: Network Operations Vision). In low traffic volume areas it may well be possible to descend/climb through the FRA "floor area" in a more tactical manner with agreed conditions between FRA sectors and those sectors beneath. A lat/long could be used to indicate a TOD/TOC to enable flexibility and the entry/exit points to be flight plannable. In most cases with entry subsequently into TMA airspace, the overall norm will be through pre-defined exit and entry points with flight plannable routes to start of STAR or via notified route to the STAR.

In the event of an unplanned & forced change of flight level below FRA for weather, turbulence etc the anticipated guidance would be to descend and proceed (direct) to next significant point en route towards the exit point indicated in the flight plan. In most cases the flight in the free route airspace would be typically aligned with the ATS structure beneath, also in the event of system failure etc there will be a fall-back structure for the FRA; potentially some of those points would be suitable routing for any enforced vertical descent and exit from the FRA. A similar process could be envisaged for a forced climb into the FRA; as these would be treated as individual cases no separate procedure is envisaged.

In terms of transfer of control the descending flight will need to be orientated towards the FRA exit point. Thus routing to the point of commencement of STAR, where it is coincident with the exit point, may allow some latitude of delivery but not beyond that point where the detailed route, associated base levels (Flight Levels & altitude) and waypoints are published.

Departures from a fixed ATS structure may be treated in a similar manner; for example in Portugal the SID and the TMA exit point are coincident at FL 240 while in Sweden, from the SID there is a pre-defined route to the FRA entry point and DCT can be applied from there to the next significant point. It may well be possible for a degree of tactical freedom dependent on traffic levels etc to allow radar vectoring and turn prior to the FRA entry point. If this was a more regular occurrence then it may require further analysis of the exit procedures and the creation of additional plannable FRA entry/exit points.

4.1.6.1 Recommendations:

xii. The vertical connection between Free Route Operations Airspace and the underlying fixed ATS route network shall take into account the various climbing and descending profiles.

xiii. The interconnectivity between Free Route Operations Airspace and the underlying fixed ATS route network shall be ensured through the

publication of a set of waypoints or through the definition of an intermediate airspace layer reflecting the typical climbing/descending profiles.

xiv. The promulgation of these points shall be made through the national AIS publication with a clear indication of the nature of these points (entry, exit or entry/exit points).

4.1.7 Access to/from Terminal Airspace

Access to/from Terminal Airspace will need to be considered and appropriate refinements to TMA structures initiated, including the definition of additional SIDs/STARs to permit more flexibility. In Portuguese airspace the exit points from FRA are coincident with the STAR arrival points of the TMA which extends upwards to FL 245. In Sweden, the Stockholm TMA extends to FL 95 and STARs are defined from FL 95. In this case, there are defined exit points from FRA and a plannable direct route to the requisite STAR.

Note: In case of implementation of Free Route Operations airspace down to the upper limit of Terminal Airspace, the entry/exit points into/out of Free Route Operations airspace should preferably be the last point of the SID and the first point of the STAR. In some cases a redesign of the SID/STAR will be required and, depending on airspace complexity, extensions may need to be investigated to ensure appropriate traffic segregation.

Note: If for some airports no suitable SID/STAR is available, flight planning through the use of DCT should be facilitated.

Example: Portugal TMA connectivity

In the Lisboa FIR, Free Route Airspace is in place above FL 245. The Porto, Lisboa, Faro & Madeira TMAs extend to FL 245, thus there is a direct interface between the FRA and the TMA.

The procedures in place require that departing traffic will plan directly from SID final waypoint to the Lisboa FIR exit point. Arriving traffic will plan from Lisboa FIR entry point to the STAR initial waypoint for their specific airport. It follows therefore that any transfer prior to the STAR initial waypoint must allow the subsequent flight to be in accord with the published procedure.

In the design of the Free Route airspace additional entry points were added (inter alia) to the Porto TMA boundary to the East. The existing exit points abutting the Portuguese/Spanish FIR boundary to the North were maintained. In taking advantage of the FRAL project, the arrival and departures (STARs & SIDs) were improved in the 3 main Portuguese TMAs: Porto, Lisboa and Faro.

4.2 Flight Planning within FRA Airspace

FRAC outlines several requirements related to flight planning matters that need to be solved for the deployment of FRA operations.

4.2.1 General

Within Free Route Operations Airspace, flight planning procedures are needed that are understandable and easy to use and that are coherent with procedures for the fixed route network. Except in Free Route Operations Airspace where it is published that tactical re-routeing will be given, the onus is on the originator of a FPL to submit a routeing through Free Route Operations Airspace that avoids active airspace reservations.

4.2.2 Use of Intermediate Lat/Long Points for Flight Planning

Most procedures rely require significant points as a common reference for both pilots and controllers to support coordination, clearance and re-routing. Airspace users may be allowed to use any intermediate Lat/Long points for flight planning. Such possibility shall be clearly promulgated in national AIS publications together with clear information and guidance to operators for planning operations within free route airspace. The use of Lat/Long points is not necessarily compatible with all FDP systems without modification. Where such utilisation is not possible, publication of intermediate 5LNC points shall be ensured.

Within Free Route Airspace a limited number of significant points may be made available for re-route around active segregated airspace. The alternative, if traffic volumes permit, is to manage the flights on a tactical basis. Shannon for example uses fixes to avoid segregated airspace while Portugal and Sweden may intervene on a tactical basis to achieve the same aim.

There will be occasions when ATC provides radar vectors for tactical reasons. The normal reversion to “own navigation” following vectoring could lead to uncertainty as to the aircraft flight path. Regard should be given to the number of significant points within the FRA to support operations at a tactical level.

4.2.3 Flight Planning to/from Free Route Airspace

Traffic landing at airports below Free Route airspace should plan from the area entry point:

- If the destination airport has published STARs then flight plan to the initial waypoint on the STAR.
- If the destination airport does not have published STARs then flight plan to the Navaid associated with the destination airport.
- Aircraft not equipped to fly a STAR shall flight plan and expect radar vectoring.

Traffic departing airports below Free Route airspace should:

- If the departing airport has published SIDSs then flight plan from last point on the SID procedure to the area exit point.
- If the departing airport has not published SIDSs then flight plan from the navaid serving the departure airport to the area exit point.
- Aircraft not equipped to fly a SID shall flight plan and expect radar vectoring.

5. European Network

5.1 Traffic Synchronisation

5.2 Managing Constraints

5.3 ATFCM-ATC Relationship

Notes:

The above topics will be addressed as part of APDSG Work Area A – Dynamic ATM Processes which will review and develop the necessary support procedures for the implementation of enhanced ASM and ATFCM processes. The developments will be conducted in coordination with ASMSG. APDSG will help to define the requirements and mapping of the ATFM/ASM processes with ATS processes and develop the appropriate procedural support. This is a cross-domain activity with deliverables that in the future will be inter-linked with SESAR developments on trajectory based operations. Expected duration is through to Dec 2013.

6. Interoperability and System Support

Interoperability is a set of functional, technical and operational properties required of systems and constituents of the European air traffic management network (EATMN) and of the procedures in order to enable its safe, seamless and efficient operation. Interoperability is achieved by making the systems and constituents compliant with the essential requirements (EC) No 549/2004 (the framework Regulation).

This manual is not a substitute for proper technical documentation (specifications, interoperability requirements, safety and performance requirements, etc) but rather to consider at a higher level the system support for procedures of coordination and transfer together with FRA operations.

6.1 ICAO Communication Requirements

ICAO Doc 9694 Manual of Air Traffic Services Data Link Applications

ICAO Annex 10 Volume 3 ATN Communication Service Requirements

ICAO Annex 10 Volume 3 (Part 2) Chapter 4 Aeronautical Speech Circuits

ICAO Annex 11 Chapter 6 Aeronautical fixed service (ground-ground communications)

6.1.1 Direct Controller-Controller Voice Communication (DCCVC) is defined as a two-way direct ground/ground voice communication system which allows for a communication to be established between radar controllers within 2 seconds in 99% of the time, supplemented by the ability to interrupt, if necessary, calls of a less urgent priority using the same channel.

6.1.2 Instantaneous Direct Controller-Controller Voice Communication (ICCVC) is defined as a two-way direct ground/ground voice communication system for non-physically adjacent controllers, which allows for a communication to be established between them within 1 second or less in 99% of the time.

6.2 System Interoperability

6.2.1 EC Requirements for Exchange of Flight Data

The existing European regulations on Interoperability, “REGULATION (EC) No 552/2004” and COMMISSION REGULATION (EC) No 1032/2006 lay down requirements for automatic systems for the exchange of flight data for the purpose of notification, coordination and transfer of flights between air traffic control units, provide regulatory framework and requirements needed for seamless operations and support for new concepts of operation, including Free Route Airspace Concept. COMMISSION REGULATION (EU) No 283/2011 of 22 March 2011 amends Regulation (EC) No 633/2007 as regards the transitional arrangements.

The operational use of connections between Flight Data Processing Systems (FDPSs) at ACCs for the purpose of replacing verbal "estimates" is referred to as On-Line Data Interchange (OLDI). The implementation of basic OLDI messages is mandatory in

accordance with Regulation (EC) No 1032/2006. These messages are defined by the EUROCONTROL Specifications.

6.2.2 EUROCONTROL Specifications 4.2 for On-Line Data Interchange (OLDI)

The complete descriptions, functionalities, message format & content etc is contained within the EUROCONTROL Specifications for On-Line Data Interchange (OLDI) Specification 4.2 which is recognised as a Community Specification (CS).

If OLDI messages are implemented as the result of regulatory provisions (as expressed in para 6.2.1), or based on bilateral agreements between air traffic control units, then the requirements outlined as mandatory in the EUROCONTROL specification for those messages become mandatory for implementation. This is required in order to meet the purpose of the messages and to ensure interoperability between systems.

6.2.2.1 Electronic Coordination

ICAO Doc 44444 PANS-ATM Chapter 10 requires Notification, Coordination (and acceptance) and Transfer phases. The transmission of pre-activation data starts the notification phase and activation of a flight initiates the coordination phase. The transfer phase should be initiated at a bilaterally agreed time/distance of the flight from the boundary.

The principle behind the coordination dialogue is for the system to be able to identify standard and non-standard transfer conditions applicable to a flight and, if the conditions are non-standard, send a different type of message which indicates the requirement for referral. The coordination dialogue procedure requires that systems identify whether or not transfers are in accordance with LoAs.

6.2.2.2 Mandatory Messages defined for OLDI

Flights which are being provided with an ATC service are transferred from one ATC unit to the next in a manner designed to ensure complete safety. In order to accomplish this objective, it is a standard procedure that the passage of each flight across the boundary of the areas of responsibility of the two units is co-ordinated between them beforehand and that the control of the flight is transferred when it is at, or adjacent to, the said boundary. The basic OLDI messages are:

- Advance Boundary Information Message (ABI)
- Activate Message (ACT)
- Revision Message (REV)
- Message for Abrogation of Coordination (MAC)
- Preliminary Activation Message (PAC)
- Logical Activation Message (LAM)

The general description of the minimum requirements at the application level for the implementation of OLDI is at Annex 4. For each OLDI message the standard content is

listed, however, if there is a bilateral agreement then there can be additional information exchanged which adds to the flexibility of the message exchange. Some of this additional content is shown at Annex 4.

6.2.2.3 ATS System Functionalities in context of Free Route Airspace

The procedures in place for the introduction of Free Route Airspace assume that adequate ATS system functionalities will be in place to support their utilisation. The full range of system capabilities needs to be determined after tailored analysis in the local environment where FRA operations are to be deployed. The safety and performance of these functionalities are to be determined from local analysis that derives them in accordance with specific operational scenarios envisaged (hence specific operational requirements driving the whole process). These scenarios, described in chapter 2.7.2 will require different levels of support; the high-level outline is provided below whilst Annex 4 includes the detailed OLDI messages one could use:

1. FRA operations using only fixed COP (Basic)

   In this scenario there is no significant difference between FRA operations with fixed coordination points on the boundary and a fixed ATS route which shares the same characteristics. The automated system supports, OLDI messages, consist of the same minimum requirements: ABI/ACT/LAM/REV/PAC/MAC messages are exchanged between the two ATS Units. The basic syntax and format of these messages is addressed at Annex 4.

2. FRA operations using fixed and dynamic COP defined relative to existing significant points network (Intermediate)

   This scenario contains all the elements above but with the addition that some coordination points may have to redefined and then subject to bilateral agreement. These coordination points with Free Route Airspace may not be identical to the transfer of control point. In such cases, a COP can be created in OLDI message by use of range and bearing from a known point. This would for example allow their use for a DCT route. For example in the ABI/ACT messages the co-ordination point in the estimate data could be the point of boundary crossing expressed as a bearing and distance from a reporting point.

3. FRA operations using dynamic COP independent of any reference to an existing significant point network (Full)

   The full FRA operational scenario has the ability to work with all the COP ingredients; the fixed COP boundary information typical of the fixed ATS structure, a COP created with range and bearing from a known point and finally the ability to incorporate the use of Lat/Long. The point situated on the original route from which the aircraft is to route direct; where a flight is routed direct from "present position", the point may be expressed as a bearing and distance from a reporting point. When bilaterally agreed, the point may be expressed by reference

to latitude/longitude. There are potential issues with regard to the use of Lat/Long; these may be system and human factor entry issues. (See Para 4.2.2)

6.2.2.4 Area of Common Interest (ACI)

In Europe, the Area of Common Interest is defined as a volume of airspace as agreed between 2 ATS Units, extending into the adjacent/subjacent Areas of Responsibility, within which airspace structure and related activities may have an impact on air traffic coordination procedures.[1]

Controllers are required to be familiar with the airspace structure and restrictions existing immediately beyond his/her immediate area of responsibility. This airspace has been called the Area of Common Interest (ACI). The extent to which that airspace will be described will be determined at the level of development of a particular Letter of Agreement. The description of the ACI is a mandatory element of a Letter of Agreement. The ACI, as a minimum, shall contain all of the cross-border ATS Routes.

[1] Common Format LoA 4.0

7. Recommendations for harmonising European Procedures for Spacing Values during Silent Transfer of Control

7.1 Guidance for Spacing Values

For aircraft under radar control, separation standards are based on the range of the aircraft from the radar and that between units adequate overlapping cover (30nm overlap) is maintained over the boundary etc. The separation standards applied within an ACC between sectors, regularly 5nm, is rarely applied at the border with an adjacent FIR. The supporting systems, communications, the complexity of the adjoining structures, traffic volumes etc. will need to be reviewed and a conclusion reached on the minimum radar separation to be used between units (often 10nm). The reduction to 10nm separation has to be constant or increasing (though not stated directly in Doc 7030 EUR this can be assumed given the existing longitudinal monitoring criteria).

The guidance for spacing values provided by ICAO Doc 7030 is for a transfer of radar control within a fixed route environment. Following the principles applied for the transfer of control, the same provisions that allow 5nm or 10nm radar separation in a fixed route structure should be the goal for the FRA/FRA transfer or between fixed route and Free Route Airspace.

Any safety analysis for aircraft transiting from FRA to fixed route airspace (and vice versa) the separation minima should be analysed in relation to the specific direction of the traffic flow.

Recommendations:

xv. The EUR Doc 7030 radar separation values can be used for silent transfer of control between FRA and fixed route airspace provided that:

   a. The supporting system and operational requirements to establish minimum radar separation under Doc 7030 EUR have to be in place for participating units.
   b. There has been a specific safety analysis of the relevant minimum distance between successive aircraft which takes into account the characteristics and direction of the traffic within free route airspace and overall sector complexity.

Example: Maastricht ATC Manual Vol 2

5.1.3 Radar Separation

5.1.3.1 Except for crossing tracks, radar separation may be planned between aircraft, provided that the Sector Coordinator holds a valid radar rating.

5.1.3.2 Traffic planned to leave a sector under this condition is subject to prior coordination with the relevant adjacent or subjacent centre/sector.

Recommendation:

Transfer of control of the aircraft on the same track or crossing tracks, whether at the same level, climbing or descending, may be effected provided that a minimum longitudinal separation of 3 minutes exists between aircraft, the relevant aircraft are continuously flight path monitored and the transferring ATS Unit has ensured that the actual distance between the aircraft does not reduce to less than 20 NM. (Reference: ICAO EUR Regional Supplementary Procedures, Doc 7030/5 – EUR par 6.2.2.1)

xvi. The provisions above should be considered by the parties involved as alternative conditions for the transfer of control when the standardized conditions for the application of transfer of control are not met.

In particular, these can be considered for situations when either the operational conditions (e.g. the distance between successive aircraft is not constant or increasing) or some technical conditions cannot be met (temporary failure or degradation of the bi-directional speech facilities). Ref: Common Format LoA V4.0.

Example: Maastricht ATC Manual Vol 2

5.1.2 Reduced Longitudinal Separation Standards.

5.1.2.1 Laid down in the relevant Letters of Agreement and ICAO documents.

5.1.2.2 Within the Maastricht UAC area of responsibility, a minimum longitudinal separation of three minutes may be applied between aircraft on the same track or crossing tracks, whether at the same level, climbing or descending, provided that,

5.1.2.2.1 Their flight progress is continuously monitored by radar; and,

5.1.2.2.2 The minimum distance does not fall below 20nm. (ICAO Doc 7030/4 Para 6.2.2).

7.2 Guidance to establish spacing values during Silent Transfer of Control

1) Review ICAO guidelines for silent transfer
   Doc 4444 & Doc 7030 EUR Supp for Silent Transfer of Control (TOC)
- Set up joint LoA Task Force with adjacent ATS unit

2) Does Unit(s) meet Doc 7030 requirements with regard to 10 NM?
- No, what element is lacking (systems, controller training etc). Can this be resolved?
- Yes, and then continue process of review.

3) Does your neighbouring ATS Unit meet the Doc 7030 requirements for 10NM?
- No, then spacing value based upon their capability
- Yes, and then proceed as below

4) Review existing LoA.
- Does it need changes with regard to transfer of communication, transfer of control points etc?
- Is there anything with regard to ICAO guidance that denies ability to introduce 10NM where it does not currently apply or could apply?

5) Review existing LoA
- Is your airspace subject to revision i.e. anticipating introduction of FAB or FRAC airspace.
- Any movement of Coordination Points or additional Coordination Points COPs? Add to LoA after agreement with adjacent ATSU.
- Does the nature/flow of traffic need require additional level of protection?
- Yes, safety case if reduction of current spacing value required. Safety case would reconsider traffic volumes, flight profiles and sector complexity etc.
- Does the nature/flow of traffic need require particular form of presentation to receiving unit i.e. in trail, use of parallel tracks etc Incorporate into LoA.
- Ensure a fall-back procedure in case of comms /system failure.

6) Amend and action revised LoA

Annex 1: Spacing values used for silent transfer: European Results

1. During the course of APDSG/47, WP47.03 was presented updating a proposed amendment to EUR SUPPs, addressing transfer of control without exchange of verbal coordination, also known as "Silent Radar Transfer". It was apparent through discussions that states utilised different values used for distances between successive aircraft during transfer between units. The discussion revealed that different separation distances between units were applied based on historical practice, often without the original supporting data or the operational reasoning being available. Their usage, however, had been demonstrably safe through an extended period of operations.

2. The Chairman concluded that the transfer of control between units may represent an operational bottleneck and that the potential opportunity to gain capacity should not be ignored. APDSG expressed its support and agreed to further scrutinize the different distances applied. It was agreed that the Secretariat would conduct an investigation to scrutinise the different values used between successive aircraft during the silent transfer.

3. In support of this activity a four step proposed course of action was proposed by the APDSG Secretariat. The end objective would be to harmonise where possible the values for distances between successive aircraft during transfer of control.

   Step 1 Survey State's LoAs. Gather various values applied for distances between successive aircraft during transfer, including the reasons why such value was chosen.

   Step 2 Analysis of data. Build a case for technical and operational requirements governing the establishment of values for distances between successive aircraft during the transfer

   Step 3 Proposal for harmonised application. Develop minimum requirements in terms of surveillance, communication, airspace design and management and flow design to enable application of defined values, including the establishment of the regulatory and safety requirements.

   Step 4 Publication of Harmonised Procedures. This step entails development of draft proposal for amendment to EUR-SUPPs, Common Format LoA and development of guidance material for the application of EUR provisions for transfer of control of identified aircraft

4. A questionnaire was developed to assist the APDSG members in providing input to the required information on the values and rationale being applied during the

transfer of control at their interfaces with the neighbouring ATS units for response by April 2008 and subsequently extended to Aug 2008.

5. List of States that responded:

1. Austria 2. Belarus 3. Belgium 4. Croatia 5. Czech Republic 6. Denmark 7. France 8. Germany 9. Hungary	10. Maastricht UAC 11. Malta 12. Netherlands 13. Norway 14. Serbia + Montenegro 15. Sweden 16. Switzerland (Geneva + Zurich) 17. Ukraine 18. United Kingdom

6. Results of Survey.

Given the size and scope of the survey it is not practicable to provide the overall results in this Annex. Thus the selected few are simply there to illustrate the differing values applied and should not be interpreted in any adverse manner. States wishing to see their returns or any specific details are invited to contact the APDSG secretariat.

2008 Survey Results (silent transfer applied):

- Dublin – LATCC 10 NM
- Dublin – ScATCC 15 NM
- Reims – Zurich 20 NM
- Reims – Langen 15 NM
- Praha – Karlsruhe 20 NM
- Praha – Bratislavia 15 NM
- Kyiv- Moscow 17 NM
- Odessa – Bucharest 11 NM

It was clear from the survey that the earlier impressions of a variety of spacing values were in operation; many of the values had been in place for years without review and there was little supporting evidence in terms of operational justification for the values in use. There were a number of spacing values that appear to have been directly converted from former calculations into NM e.g. 30 km/17 NM. On the positive side the spacing values have been in place for some time and do not appear to be creating any safety issue; thus the debate is whether the spacing values are a hindrance to an increased flow across a boundary where

there is a traffic demand and whether a reduced spacing value can be applied safely.

Annex 2: Guidelines for the application of 5/10 NM separation minima

References:

A. Guidelines for the application of ECAC Radar Separation Minima dated 14 Dec 1998.
B. ICAO PANS ATM Doc. 4444 Chapter 8 ATS Surveillance Services
C. ICAO Doc. 7030, EUR SUPPS
D. ICAO Doc. 9426, Air Traffic Services planning manual
E. EUROCONTROL Specification for ATM Surveillance System Performance publication dated 2 May 2012#

This document, consisting of two volumes, provides performance requirements for ATM surveillance systems when supporting 3NM and 5NM horizontal separation applications. It was developed in parallel with the draft Surveillance Performance and Interoperability Implementing Rule (SPI IR). On 21 November 2011 the final rule (Commission Implementing Regulation (EU) No 1207/2011) was published within the European Union Official Journal. This specification therefore complements and refines the requirements included in this Single European Sky (SES) regulation.

This document can be used by air navigation service providers to define, as required by Commission Implementing Regulation (EU) No 1207/2011, the minimum performance to be met by their surveillance system. This specification also defines how the associated conformity assessment must be performed.

This specification is generic and independent of technology. It must be supplemented by specific local requirements that may be due to safety constraints, to local technological choices, to the need to support other services and functions and other local requirements. This specification is written to be compatible with recently published industry standards (EUROCAE) applicable to specific surveillance sensor technologies (ADS-B RAD and NRA and WAM).

http://www.eurocontrol.int/documents/eurocontrol-specification-atm-surveillance-system-performance

A2.1 Criteria for Accuracy of a Radar System to Support 5/10NM Separation Minima

CIP Objective **3.4.5** Silent Radar Transfer between ACCs

> A radar separation minimum of 10NM/15NM may be applied between aircraft at the time of transfer of control between adjacent ACCs, without verbal co-ordination being effected between the transferring and accepting controllers.

ECAC Objective, signed by the Transport Ministers in Paris on the 24 April 1990, reads:

"En-route radar separation of 5 NM is to be applied throughout high density areas by 1995 at the latest. Elsewhere, en-route radar separation of 10 NM is to be applied by the same date."

ICAO Doc 7030 EUR 6.2.5.1 for transfer of Radar Control

6.2.5.1.1 Transfer of radar control based on the procedures specified in the PANS-ATM, 8.6.2 and 8.6.3, may be carried out without systematic use of the bidirectional speech facilities available between the adjacent units concerned, provided that:

a) the detailed conditions applicable for the transfer are the subject of a bilateral agreement; and
b) the minimum distance between successive aircraft during the period of transfer is agreed as one of the following values:

1) 19 km (10 NM) when SSR information is used in accordance with the provisions of the PANS-ATM, provided that an overlapping radar coverage of at least 56 km (30 NM) between units involved exists; or

2) 9.3 km (5 NM) when the conditions of 1) apply and both units involved possess electronic aids for immediate recognition of release and acceptance of aircraft under radar transfer.

The objective of en-route radar separation of 10 NM has been a long–standing ECAC objective. However, it should be noted in ICAO Doc 4444 para 5.4 Horizontal Separation that nothing in the provisions detailed in Sections 5.4.1 & 5.4.2 precludes a State from establishing other minima provided that the level of safety (inherent in 5.4.1 & 5.4.2) is assured.

The Surveillance and Code Coordination Unit at Eurocontrol can provide impartial advice and expert support to the stakeholders in areas such as the definition of strategies, the development of technical specifications, the writing of procurement documents and the development of safety cases. In this context, the Surveillance and Code Coordination Unit has provided the technical expertise to draft implementing rules (IRs) for surveillance performance and interoperability (SPI), for the use of aircraft identification (ACID) and for Mode S interrogator code allocation (MSI).

A2.2 Safety Assessment Methodology

Objective:

The objective of the methodology is to define the means for providing assurance that an Air Navigation System is safe for operational use. The generic process consists of three major steps:

1. Functional Hazard Assessment (FHA)
2. Preliminary System Safety Assessment (PSSA)
3. System Safety Assessment (SSA)

The supporting EC legislation is detailed at Annex 3. EUROCONTROL Agency safety activities are deployed through the ESP+ Programme (European Safety Programme for ATM 2010-2014), focused on three main activities:

1. Improving safety measurement
2. Ensuring safe ATM operations
3. Implementing safe system design

http://www.eurocontrol.int/articles/safety-management

ICAO Doc 4444 PANS-ATM
Provision of ATS Surveillance Services 8.4.2

> The number of aircraft simultaneously provided with ATS surveillance services shall not exceed that which can safely be handled under the prevailing circumstances, taking into account:
>
> > a) the structural complexity of the control area or sector concerned;
> > b) the functions to be performed within the control area or sector concerned;
> > c) assessments of controller workloads, taking into account different aircraft capabilities, and sector capacity; and
> > d) the degree of technical reliability and availability of the primary and backup communications, navigation and surveillance systems, both in the aircraft and on the ground.

A2.3 Technical Assessment:

The radar separation minimum is the starting point for applying radar separation between any pair, or larger number, of aircraft. According to ICAO rules - *"the radar separation minimum shall be prescribed by the appropriate ATS authority according to the capability of the particular system to accurately identify the aircraft position in relation to the centre of the radar position symbol"* (ICAO Doc 4444 Part VI, par. 7.4.3). This minimum is therefore to be related to the accuracy to which the radar system is capable of representing the aircraft positions on the display and is considered under section 5.2, the technical assessment. A radar system is considered to be the combination of a radar sensor(s), radar data processor and radar display.

The focus will be in three key areas: communications, radar coverage and system support:

Communications

ICAO Doc 9869 AN/462 Manual on Required Performance (RCP).

> The RCP concept applies to the performance of the communication capabilities required for an ATM function and therefore affects the provision of air traffic service and the operator's use, including aircraft equipage. The RCP concept is intended to characterize the communication capability and its performance through a statement of the communication performance (RCP type) to be achieved in order to perform the ATM function.

ICAO Annex 10 Vol 3 (Part 2) Transfer of Control Chapter 4 Aeronautical Speech Circuits.

> 4.1.3 The ATC communication requirements defined in Annex 11, Section 6.2 should be met by implementation of one or more of the following basic three call types:
> - instantaneous;
> - direct annex; and
> - indirect access.

ICAO Annex 11 Chapter 6.2 Transfer of Control Aeronautical fixed service (ground – ground communications)

> 6.2.1.1 Direct-speech and/or data link communications shall be used in ground-ground communications for air traffic services purposes.
>
> *Note 1. Indication by time of the speed with which the communication should be established is provided as a guide to communication services, particularly to determine the types of communication channels required, e.g. that "instantaneous" is intended to refer to communications which effectively provide for immediate access between controllers;*

Radar Coverage

The initial requirements to meet 10 NM between successive aircraft is overlapping radar coverage of at least 56 km (30 NM) between units (Doc 7030 EUR); further reduction to 5NM requires both units to possess electronic aids for immediate recognition of release and acceptance of aircraft under radar transfer.

ICAO Doc 4444 Chapter 8 ATS Surveillance Services

8.1.1 ATS surveillance systems used in the provision of air traffic services shall have a very high level of reliability, availability and integrity. The possibility of system failures or significant system degradations which may cause complete or partial interruptions of service shall be very remote. Backup facilities shall be provided.

Note 1.An ATS surveillance system will normally consist of a number of integrated elements, including sensor(s), data transmission links, data-processing systems and situation displays.

Note 2.Guidance material pertaining to use of radar and to system performance is contained in the Manual on Testing of Radio Navigation Aids *(Doc 8071), the* Manual on the Secondary Surveillance Radar (SSR) Systems *(Doc 9684) and the* Air Traffic Services Planning Manual *(Doc 9426).*

Note 3.Guidance material pertaining to use of ADS-B and to system performance is contained in the Assessment of ADS-B to Support Air Traffic Services and Guidelines for Implementation *(Cir 311).*

System Support

ICAO Doc 9694 Transfer Of Control Part VI ATS Inter-facility Data Communications.

The ATS inter-facility data communication (AIDC) application exchanges ATC information between ATSUs in support of ATC functions, including notification of flights approaching a flight information region (FIR) boundary, coordination of boundary-crossing conditions, and transfer of control.

ICAO ANNEX 10 volume 3

3.5.3 Ground-ground applications

Note. Ground-ground applications are defined as those ATN applications resident in ground-based systems which solely exchange information with peer applications also resident in ground-based systems.

3.5.3.1 INTER-CENTRE COMMUNICATIONS (ICC)

Note. The inter-centre communications applications set enables the exchange of information between air traffic service units.

3.5.3.1.1 *ATS INTERFACILITY DATA COMMUNICATION (AIDC)*

Note. AIDC is an ATN application that is used by two air traffic service units to enable the exchange of ATS information for active flights related to flight notification, flight coordination, transfer of control, surveillance data and free(i.e. unstructured) text data.

3.5.3.1.1.1 The ATN shall be capable of supporting the following AIDC application functions: a) flight notification; b) flight coordination; c) transfer of control; d) transfer of communications; e) transfer of surveillance data; and f) transfer of general data.

Note. The technical provisions for the AIDC application are defined in ICAO Doc 9705, Sub-volume III.

A2.4 Legislative Requirements:

The key objective of the European Commission Implementing Regulation no 1207/2011 Surveillance Performance and Interoperability Implementing Regulation (SPI IR) is to establish performance requirements for surveillance (See Annex 3). The regulations stemming from the Implementing Rule also introduce mandatory requirements for a safety assessment to be conducted for existing surveillance system. The different air traffic services and main functions that are based on surveillance information are described in ICAO PANS-ATM Document 4444.

Annex 3: European Regulations and Specifications

A3.1 Standardized European Rules of the Air

SERA Part A covers the core part of the "Rules of the Air" transposing ICAO Annex 2 and SERA Part B transposes those elements of ICAO Annex 11 and Annex 3 which have been identified as being of a "rule of the air nature". The main objectives of the proposed new European rules are to:

- harmonise the rules of the air within the European airspace;
- facilitate the free movement of airspace users within the European airspace;
- facilitate the implementation of the Functional Airspace Blocks by providing a common set of ATM procedures and operating rules; and
- to support the Member States regarding their obligations in relation to the Chicago Convection by providing for a common implementation of the ICAO Standards and Recommended Practices.

SES Mandate to EUROCONTROL for Support on Development of Standardised European Rules of the Air (SERA)

On 15th March 2012 the Single Sky Committee gave its positive opinion to the EC on the Implementing Rule for the Standardised European Rules of the Air (SERA) drafted by EUROCONTROL. This Implementing Rule, once it is published in the Official Journal of European Union (OJEU) and implemented within the States, will constitute a major step forward in the SES building, notably in the operational area.

A3.2 **European Implementing Rules (with regard to Transfer of Control etc)**

Relevant Implementing Rules can be downloaded in pdf format through the following link:

http://ec.europa.eu/transport/air/single_european_sky/implementing_rules_en.htm

COMMISSION REGULATION (EC) No 1032 /2006 of 6 July 2006.

> This regulation lays down the requirements for automatic systems for the exchange of flight data for the purpose of notification, coordination and transfer of flights between air traffic control units. It lays down requirements for flight data processing systems with regard to interoperability, performance and quality of service of their flight data exchange functions.

COMMISSION REGULATION (EC) No 30/2009 of 16 January 2009

Amends Regulation (EC) No 1032/2006 as far as the requirements for automatic systems for the exchange of flight data supporting data link services are concerned: Annex Part D details the requirements for processes supporting data link services.

COMMISSION REGULATION (EC) No 633/2007 of 7 June 2007

This Regulation lays down requirements for the application of a flight message transfer protocol for information exchanges between flight data processing systems for the purpose of notification, coordination and transfer of flights between air traffic control units and for the purposes of civil-military coordination, in accordance with Regulation (EC) No 1032/2006. This Regulation applies to:

(a) Communication systems supporting the coordination procedures between air traffic control units using a peer-to-peer communication mechanism and providing services to general air traffic;

(b) Communication systems supporting the coordination procedures between air traffic services units and controlling military units, using a peer-to-peer communication mechanism.

COMMISSION REGULATION (EU) No 176/2011 of 24 February 2011

Requires the information to be provided before the establishment and modification of a functional airspace block. These include inter alia:

Member States that establish a functional airspace block have to provide information to the Commission, the European Aviation Safety Agency, other Member States and other interested parties, giving them an opportunity to submit their observations with the aim of facilitating an exchange of views.

Member States should ensure that they fulfil their safety responsibilities effectively when establishing a functional airspace block. They should demonstrate and provide the necessary assurance that the functional airspace block will be established and managed safely and address the Member States and the air navigation service providers safety management elements associated with the functional airspace block establishment, with a focus on their respective safety roles and responsibilities.

COMMISSION REGULATION (EU) No 283/2011 of 22 March 2011

This amending Regulation (EC) No 633/2007 (above)(as regards the transitional arrangements referred to in Article 7 states that:

Those Member States and air navigation service providers shall ensure that all peer-to-peer communications from their systems to those of other Member States or air navigation service providers comply with the requirements specified in Annex I, unless a bilateral agreement concluded before 20 April 2011 allows the use of other versions of the Internet protocol for a transitional period ending no later than 31 December 2014.

COMMISSION IMPLEMENTING REGULATION (EU) No 1206/2011 of 22 November 2011

This Regulation lays down requirements for the systems contributing to the provision of surveillance information, their constituents and associated procedures in order to ensure the unambiguous and continuous individual identification of aircraft within the EATMN.

COMMISSION IMPLEMENTING REGULATION (EU) No 1207/2011 of 22 November 2011

This Regulation lays down requirements on the systems contributing to the provision of surveillance data, their constituents and associated procedures in order to ensure the harmonisation of performance, the interoperability and the efficiency of these systems within the European air traffic management network (EATMN) and for the purpose of civil- military coordination. The air traffic services that are currently addressed in the specification are:

- 3 NM horizontal separation combined with 1000 ft vertical separation when providing approach control service,
- 5 NM horizontal separation combined with 1000/2000 ft vertical separation when providing approach control service or area control service.

COMMISSION REGULATION (EC) No 29/2009 of 16 January 2009 requirements on data link services for the single European sky

While this Regulation is outside the strict limits of transfer of control an increased emphasis CPDLC is likely in the near future. This regulation lays down requirements for the coordinated introduction of data link services based on air-ground point-to-point data communications. It applies to all flights operating as general air traffic in accordance with instrument flight rules within the airspace above FL 285 apply from 5 February 2015.

This Regulation shall apply to air traffic service providers (hereinafter ATS providers) providing services to general air traffic within the airspace referred to.
ATS providers shall make appropriate arrangements to ensure that data exchanges can be established with all aircraft flying in the airspace under their responsibility and having data link capability in accordance with the requirements of this Regulation.

A3.3 Specifications

On request from the European Commission, EUROCONTROL develops EUROCONTROL specifications in accordance with the EUROCONTROL Notice of Proposed Rulemaking (ENRPM) process. A Community Specification is a voluntary standard and is used to show compliance to relevant regulations and directives. Other means of compliance may be referenced in an Implementing Rule**.** After recognition by the Single Sky Committee and publication of the specification's reference in the Official Journal of the European Union, EUROCONTROL specifications become Community specifications:

E.g. EUROCONTROL Specifications for On-Line Data Interchange (OLDI) Specification 4.2 is a Community Specification. The implementation of basic OLDI messages is mandatory in accordance with Regulation (EC) No 1032/2006.

So far, EUROCONTROL has received requests to develop specifications for the following areas :

- Air Traffic Services Data Exchange Presentation (ADEXP)
- Air Traffic Services Message Handling System (AMHS)
- Flexible Use of Airspace (FUA)
- Integrated Initial Flight Plan Processing System (IFPS) Users Manual
- On-Line Data Interchange (OLDI).

http://ec.europa.eu/transport/air/single_european_sky/community_specifications_en.htm

ADEXP

Commission communication concerning the implementation of Article 4 of Regulation (EC) No 552/2004 of the European Parliament and of the Council on the interoperability of the European Air Traffic Management network

Eurocontrol (Spec-0107) Edition 3.0 Eurocontrol specification for ATS Data Exchange Presentation (ADEXP) dated 20.10.2007.

AMHS

EUROCONTROL Specification for the Air Traffic Services Message Handling System (AMHS)

EUROCONTROL-SPEC-0136 Edition Number: 2.0 Edition Date: 18/09/2009.

The objective is to define precise means of compliance to the essential requirements of the interoperability Regulation to ensure interoperability of

AMHS systems and constituents in the framework of the Single European Sky. Implementations that comply with the mandatory provisions of this specification will be compliant to the essential requirements of the interoperability Regulation.

FUA

The Specification is intended to serve as a means of compliance to the essential
requirements listed in the European Commission Interoperability Regulation (EC) No 552/2004 of 10 March 2004 and to support implementation and application of the Flexible Use of Airspace Regulation (EC) No 2150/2005 of 23 December 2005 laying down common rules for the flexible use of the airspace.

Reference nr: EUROCONTROL-SPEC-0112 Edition 1.1 Edition date: 10.01.2009

IFPS

The EUROCONTROL **Specification for the Initial Flight Plan** was approved by the Director General EUROCONTROL on the 17th July 2007 and adopted by the Single Sky Committee as a Community Specification on 4th. December 2007.

EUROCONTROLSPEC 0101 Edition Number: 1.0 Edition Date: 15/07/2007.

OLDI

Regulation (EC) No 1032/2006 (the COTR Implementing Rule) lays down requirements for automatic systems for the exchange of flight data for the purpose of notification, coordination and transfer of flights between air traffic control units.

Edition 4.2 Replaces OLDI Edition 4.1 for which the presumption of conformity should cease on 14 November 2012

Specification document identifier: Eurocontrol Spec-0106 Edition: 4.2
Dated: 16 December 2010
http://www.eurocontrol.int/ses/public/standard_page/oldi_spec.html

Annex 4: OLDI Basic Messages

A4-1. On- Line Data Interchange (OLDI)

A4-1.1 General Description of Requirements (Edition 4.2)

This section describes the minimum requirement at the application level for the implementation of OLDI facilities: ABI/ACT/LAM/REV/PAC/MAC[2]

Advance Boundary Information Message (ABI)

The ABI is a notification message.

The ABI satisfies the following operational requirements:

- provide for acquisition of missing flight plan data;
- provide advance boundary information and revisions thereto for the next ATC unit;
- update the basic flight plan data;
- facilitate early correlation of radar tracks;
- facilitate accurate short-term sector load assessment;
- request the assignment of an SSR code from the unit to which the above notification is sent, if required.

If bilaterally agreed, the ABI message shall contain any of the following items of data:

- Route;
- Other Flight Plan Data.

Activate Message (ACT)

Purpose of the ACT Message: The ACT message satisfies the following operational requirements:

- Replace the verbal boundary estimate by transmitting automatically details of a flight from one ATC unit to the next prior to the transfer of control;
- Update the basic flight plan data in the receiving ATC unit with the most recent information;
- Facilitate distribution and display of flight plan data within the receiving ATC unit to the working positions involved;
- Enable display of correlation in the receiving ATC unit;
- Provide transfer conditions to the receiving ATC unit.

If bilaterally agreed, the ACT message shall contain any of the following items of data:

[2] For full reference the reader is invited to consult EUROCONTROL OLDI 4.2 specification

- Route;
- Other flight plan data
- Actual Take-Off Time.

Note: The Actual Take-Off Time is normally used in the cases where the AC follows a PAC message that included the Estimated Take-Off Time.

Revision Message (REV)

Purpose of the REV Message: The REV message is used to transmit revisions to co-ordination data previously sent in an ACT message provided that the accepting unit does not change as a result of the modification.

The REV message contains the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- Departure Aerodrome;
- Estimate Data and/or Co-ordination point;
- Destination Aerodrome;

Note: The Estimate Data contained in the REV has to include complete data in the Estimate Data field in order to eliminate any ambiguity regarding the transfer elements. If the ACT message included the supplementary flight level, the following REV message will include the supplementary flight level if still applicable.

The REV message will contain the following items of data if they have changed:

- SSR Mode and Code;
- Equipment Capability and Status.

If bilaterally agreed, the REV message will contain any of the following items of data, if they have changed:

- Route.

Message for the Abrogation of Co-ordination (MAC)

Purpose: A MAC message is used to indicate to the receiving unit that the co-ordination or notification previously effected for a flight is being abrogated.

The MAC is not a replacement for a Cancellation (CNL) message, as defined by ICAO, and therefore, is not be used to erase the basic flight plan data.

The MAC message contains the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- Departure Aerodrome;
- Co-ordination Point;
- Destination Aerodrome.

If bilaterally agreed, the MAC message will contain any of the following items of data:

- Message Reference;
- Co-ordination Status and Reason;

Preliminary Activation Message (PAC)

Purpose: The PAC message satisfies the following operational requirements:

- notification and pre-departure co-ordination of a flight where the time of flight from departure to the COP is less than that which would be required to comply with the agreed time parameters for ACT message transmission;
- notification and pre-departure co-ordination of a flight by a local (aerodrome /approach control) unit to the next unit that will take control of the flight;
- provide for acquisition of missing flight plan data in case of discrepancies in the initial distribution of flight plan data;
- request the assignment of an SSR code from the unit to which the above notification/coordination is sent, if required.

The PAC message contains the following items of data:

- Message Type;
- Message Number;
- Aircraft Identification;
- SSR Mode and Code;
- Departure Aerodrome;
- Estimated Take-Off Time or Estimate Data;
- Destination Aerodrome;
- Number and Type of Aircraft.

A PAC message sent from a TMA control unit or an ACC will contain the following items of data:

- Type of Flight;
- Equipment Capability and Status;

If bilaterally agreed, the PAC message will contain any of the following items of data:

- Route;

- Other flight plan data;
- Message Reference.

If bilaterally agreed and the data is required to be included for the flight, the PAC message will contain one or more of the following items of data:

- Departure Runway;
- SID Identifier;
- Cleared Flight level.

Logical Acknowledgement Message (LAM)

Purpose: The LAM is the means by which the receipt and safeguarding of a transmitted message is indicated to the sending unit by the receiving unit.

The LAM processing provides the ATC staff at the transferring unit with the following:

- a warning when no acknowledgement has been received;
- an indication that the message being acknowledged has been received, processed successfully, found free of errors, stored and, where relevant, is available for presentation to the appropriate working position(s).

The LAM message shall contain the following items of data:

- Message Type;
- Message Number;
- Message Reference.

A4-2Free Route Airspace Scenarios

Basic Rules for Direct Routings

It is the use of DCT across Free Route Airspace boundaries which drive the additional COP definitions over and above the fixed route ATS structure requirements.
OLDI-DCT-10-M Conditions for the use of OLDI for the co-ordination of flights on direct routings **shall** be agreed bilaterally. The data required for the notification and co-ordination of flights on direct routings is contained in the co-ordination point (estimate data (ICAO format) and co ordination data (ADEXP format)) and route in the applicable messages:

FRA operations using only fixed COP (Basic)

The automated system supports, OLDI messages, consist of the same minimum requirements: ABI/ACT/LAM/REV/PAC/MAC messages.
In passing an estimate for a COP see **OLDI-FC-ESTD-20-M** The co-ordination point **can only be** defined as a known reference point.

FRA operations using fixed and dynamic COP defined relative to existing significant points network (Intermediate)

In these circumstances passing an estimate **OLDI-FC-ESTD-20-M** The co-ordination point **shall be** defined as either a known **reference point, or a range and bearing from a known reference**. The additional feature for DCT is expressed at **OLDI-DCT-90-M** The co-ordination point in the estimate data **shall** be the point of boundary crossing expressed as a bearing and distance from a reporting point.

FRA operations using dynamic COP independent of any reference to an existing significant point network (Full)

OLDI-FC-ESTD-20-M The co-ordination point **shall be** defined as either **a known reference point, a range and bearing from a known reference point, or a latitude and longitude.** In these circumstances all possibilities are available with the incorporation of the additional feature: **OLDI-DCT-120-M** When bilaterally agreed, the co-ordination point for a flight on a direct route shall be expressed by reference to latitude/longitude.

Note:
In all the above cases, a bilateral agreement is required for the message exchange. While the basic OLDI messages meet first FRA option; the additional elements will require agreed use, syntax and format guidance and potentially system change.

Annex 5: Guidance Document Recommendations

Chapter 1 provides background to the purpose and scope of the document and use by Air Navigation Service Providers.

Chapter 2 provides information in respect of coordination; relevant ICAO provisions, introduces European Network and Functional Airspace Blocks.

Chapter 3 addresses Transfer of Control with and without use of bidirectional speech facilities, lists ICAO documents governing ECAC operational procedures.

Recommendations:

i. Review minimum distance between successive aircraft during period of transfer agreed in LoAs to take account of current and improved system support.

ii. Seek harmonisation of spacing values within Functional Airspace Blocks (FABs) and Free Route Airspace.

iii. Seek harmonisation of ICAO Doc 7030 10 NM minimum

iv. Progress moves towards the establishment of 5 NM minimum between successive aircraft where system support permits.

v. It follows, therefore, that the supporting infrastructure whether it be systems, communications, agreed LoAs etc required for transfer of control in Free Route Airspace as a minimum shall be equal to those within the fixed ATS route structure

vi. The Transfer of Communication takes place before the Transfer of Control, at a point/time/distance as agreed upon between the transferring and accepting ATS Units.

vii. Where there are ATS Routes for which the transfer of control is not the AOR and/ or for which a specific transfer of communication point has been established need to be identified in the LoA.

Chapter 4 introduces the Free Route Airspace concept and identifies specific aspects linked to transfer of control.

Recommendations:

viii. GAT flights entering and exiting Free Route Airspace will normally do so via the fixed route network.

ix. Flights between ACCs will continue to be subject to rules, procedures and Letters of Agreement. Where required, local procedures may allow GAT flights to flight plan climb/descent entry and/or exit at random points.

x. Aircraft that do not achieve their entry or exit criteria in climb or descent will be expected to follow their current flight-plan unless ATC instructions decide differently.

xi. OAT flights entering and exiting Free Route Airspace are not confined to fixed entry and exit points. They may be subject to rules, procedures and agreements for the purpose.

xii. The vertical connection between Free Route Operations Airspace and the underlying fixed ATS route network shall take into account the various climbing and descending profiles.

xiii. The interconnectivity between Free Route Operations Airspace and the underlying fixed ATS route network shall be ensured through the publication of a set of waypoints or through the definition of an intermediate airspace layer reflecting the typical climbing/descending profiles.

xiv. The promulgation of these points shall be made through the national AIS publication with a clear indication of the nature of these points (entry, exit or entry/exit points).

Chapter 5 addresses the European Network and in particular dynamic ATM processes.

Chapter 6 summarizes EC Requirements for exchange of flight data and system interoperability in respect of coordination and transfer of control.

Chapter 7 identifies practical steps National Administrations are encouraged to follow to establish harmonised values for spacing during silent transfer of control.

Recommendations:

xv. The EUR Doc 7030 radar separation values can be used for silent transfer of control between FRA and fixed route airspace provided that:

a. The supporting system and operational requirements to establish minimum radar separation under Doc 7030 EUR have to be in place for participating units.
b. There has been a specific safety analysis of the relevant minimum distance between successive aircraft which takes into account the characteristics and direction of the traffic within free route airspace and overall sector complexity.

Transfer of control of the aircraft on the same track or crossing tracks, whether at the same level, climbing or descending, may be effected provided that a minimum longitudinal separation of 3 minutes exists between aircraft, the relevant aircraft are continuously flight path monitored and the transferring ATS Unit has ensured that the actual distance between the aircraft does not reduce to less than 20 NM. (Reference: ICAO EUR Regional Supplementary Procedures, Doc 7030/5 – EUR par 6.2.2.1)

xvi. The provisions above should be considered by the parties involved as alternative conditions for the transfer of control when the standardized conditions for the application of transfer of control are not met.

In particular, these can be considered for situations when either the operational conditions (e.g. the distance between successive aircraft is not constant or increasing) or some technical conditions cannot be met (temporary failure or degradation of the bi-directional speech facilities). Ref: Common Format LoA V4.0

REFERENCES:

Chapter 2 – Coordination in respect of ATC

ICAO Doc 4444 PANS-ATM Chapter 10 Coordination (10.1.1 & 10.1.2) 15th Edition.

ICAO Doc 4444 PANS- ATM Chapter 10 (10.1.2.4) Transfer of Communication

ICAO Doc 7030 EUR Regional Supplementary Procedures Doc 7030 (Para 6.12.4 & 6.12.4.3) Amendment No 4 dated 25 May 2011.

Commission Regulation (EC) No 1032/2006 requirements for notification, coordination and transfer of flights and amended by EU regulation (EC) No 30/2009.

Commission Regulation No. 176/2011 dated 24 February 2011 on information to be provided before establishment and modification of functional airspace block.

EUROCONTROL Common Format LoA V 4.0

Chapter 3 – Transfer of Control

ICAO Doc 4444 PANS-ATM Chapter 10 Transfer of Control (10.1.1 & 10.1.2) 15th Edition.

ICAO Doc 4444 PANS-ATM Chapter 8 ATS Surveillance Services (8.7.4.2) Transfer of Control without prior coordination.

ICAO Doc 4444 PANS-ATM Chapter 8 ATS Surveillance Services (8.7.3.1) Horizontal Separation Minima.

ICAO Doc 7030 EUR Regional Supplementary Procedures Doc 7030 (6.2.5.1) Amendment No 4 dated 25 May 2011. (Minimum distances between successive aircraft).

EUROCONTROL Common Format LoA V 4.0

Chapter 4 – Free Route Operations

ICAO Doc 4444 PANS-ATM Appendix 2 Flight Plan. (2012 Flight Plan applicable from 15 Nov 2012).

European ATS Route Network (ARN) Version 7 dated 10 Jan 2011 - Free Route Concept of Operations (4.3)

IFPS Manual Edition 15.1 Amendment date 17 Nov 2011 (handling of DCT by IFPS)

Chapter 5 – European Network

To be completed

Chapter 6 - Interoperability and System Support

ICAO Annex 10 Volume 3 ATN Communication Services

ICAI Annex 11 Chapter 6 Aeronautical Fixed Services

ICAO Doc 9694 Manual of Air Traffic Services Data Link Applications

ICAO Doc 4444 PANS-ATM Chapter 10 Coordination

Commission Regulation (EC) No 552/2004 of 10 March 2004 on the interoperability of the European Air Traffic Management network (the interoperability Regulation).

Commission Regulation (EU) No 283/2011 of 22 March 2011 amends Regulation (EC) No 633/2007 as regards the transitional arrangements.

Commission Regulation (EC) No 1032/2006 of 6 July 2006 requirements for automatic exchange of flight data for purposes of notification, coordination and transfer of flights and amended by EU regulation (EC) No 30/2009.

Commission Regulation (EC) No 633/2007 of & June 2007 requirements for application of flight message transfer protocol for purposes of notification, coordination and transfer of flights.

Commission Regulation (EC) No 30/2009 of 16 January 2009 amending Regulation (EC) No 1032/2006 as far as the requirements for automatic systems for the exchange of flight data supporting data link services.

Commission Regulation (EC) No 283/2011 of 22 March 2011 amending Regulation (EC) No 633/2007 as regards the transitional arrangements for update of internet protocols and flight data systems.

EUROCONTROL Specifications for On-Line Data Interchange (OLDI) Specification 4.2

Chapter 7 – Recommendations for harmonising European Procedures for Spacing Values during Silent Transfer of Control

ICAO Doc 7030 Regional Supplementary Procedures EUR par 6.2.2.1 (longitudinal separation).

EUROCONTROL Common Format LoA V 4.0

GLOSSARY

Definitions SID & STAR

A Standard Instrument Departure Route (SID) is a standard ATS route identified in an instrument departure procedure by which aircraft should proceed from take-off phase to the en-route phase.

A Standard Arrival Route (STAR) is a standard ATS route identified in an approach procedure by which aircraft should proceed from the en-route phase to an initial approach fix.

(EUROCONTROL EATM Glossary of Terms)

SIDs and STARs are produced with the object of expediting the safe and efficient flow of air traffic operating to and from the same or different runways at the same or neighbouring airfields.

SIDs and STARs aim to deconflict potentially conflicting traffic by the use of specific routings, levels and check points. Typically, each runway will have a number of SIDs and STARs to ensure that air traffic is not unnecessarily delayed by deviation from the direct route from or to the aerodrome.

The SID or STAR which a pilot intends to use is usually included in the ATC flight plan.
Further Reference: ICAO Annex 11: Air Traffic Services, Appendix 3, Section 5.