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Free Route Airspace (FRA) in ICAO EUR Region - FRA Concept

Concept, Publication, Implementation, FAQs

MIDANPIRG Air Traffic Management Sub-Group
Fourth Meeting (ATM SG/4)
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Free Route Airspace Concept

FRA Concept

Free Route Airspace Definition



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“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between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) waypoints, without reference to the ATS route network, subject to airspace availability. Within this airspace, flights remain subject to air traffic control.”

FRA Concept

Scope and Enables



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Scope

- The overall scope of the Free Route Airspace (FRA) Concept is to provide an enabling framework for the harmonised implementation of FRA in Europe whenever a State / FAB / ANSP, a group of States / FABs / ANSPs decides to proceed with such implementation.
- The FRA Concept forms the basis for a common understanding for all ATM partners involved in FRA implementation. The FRA Concept encompasses various FRA implementation scenarios that will:
 - Meet the Safety Objectives;
 - Be compatible with existing operations;
 - Be sustainable through further development;
 - Be capable of expansion/connectivity to/with adjacent airspace;
 - Be capable of being exported to other regions.

Enablers

- The enablers are:
 - Appropriate System Support - enhancement for the purposes of Flight Planning and ATFCM;
 - Procedures - enhanced procedures where necessary for operations within FRA and at its interfaces;
 - Adaptations to airspace structures;
 - 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 FRA can be realised.

FRA Concept Content



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- Airspace Classification.
- Flight Level Orientation.
- Limited Applicability of FRA:
 - *Structurally Limited* - In complex airspace, the full implementation of FRA could potentially have a detrimental effect on capacity. In such airspace, States / FABs / ANSPs may decide to implement FRA on a structurally limited basis, for example by restricting the available FRA Horizontal entry/exit points for certain traffic flows, which could increase predictability and reduce the number of potential conflicts.
- Airspace Organisation.
- Maximising Efficiency of FRA.
- Access To/From Terminal Airspace.
- Publication of a Contingency ATS Route Network.
- Maintenance of a Fixed ATS Route Network within FRA.
- Airspace Reservations.
- Route Availability.
- Sectorisation.
- Sector and Traffic Volumes Capacities/Monitoring Values.
- ATS Delegation.
- Airspace Management.
- Letters of Agreement and Coordination Procedures.
- Flight Planning.
- Air Traffic Flow and Capacity Management.

FRA Concept Definitions (1)

- **DCT** (Doc 8400, ICAO Abbreviations and Codes (PANS-ABC)
Direct (*in relation to flight plan clearances and type of approach*)
Decoded abbreviation/indicator DCT (Direct) or Encoded abbreviation/indicator Direct (DCT) should be used only:
 - for flight planning purposes when submitting FPL;
 - when executing specified type of approach.

- **ICAO Doc 4444 PANS-ATM**

Appendix 2 Flight plan provisions state the following under ITEM 15: ROUTE

Flights along designated ATS routes

INSERT, [...]

OR, If the departure aerodrome is not on or not connected to the ATS route, the letters **DCT** followed by the point joining the first ATS route, followed by the designator of the ATS route.

[...]

OR by **DCT**, if the flight to the next point will be outside the designated route, unless both points are defined by geographical coordinates.

Flights outside designated ATS routes

INSERT points normally not more than 30 minutes flying time or 370 km (200 NM) apart, including each point at which a change of speed or level, or change of track, or a change of flight rules is planned.

[...]

INSERT **DCT** between successive points unless both points are defined by geographical coordinates or by bearing and distance.

FRA Concept Definitions (2)

- **Route Availability Document (RAD)**

A common reference document containing the policies, procedures and description for route and traffic orientation. It also includes route network and free route airspace utilisation rules and availability (AURA).

- **Significant Point** (ICAO Annex 11 Air Traffic Services)

A specified geographical location used in defining an ATS route or the flight path of an aircraft and for other navigational and ATS purposes.

Note.- There are three categories of significant points: ground-based navigation aid, intersection and waypoint. In the context of this definition, intersection is a significant point expressed as radials, bearings and/or distances from ground based navigation aids.

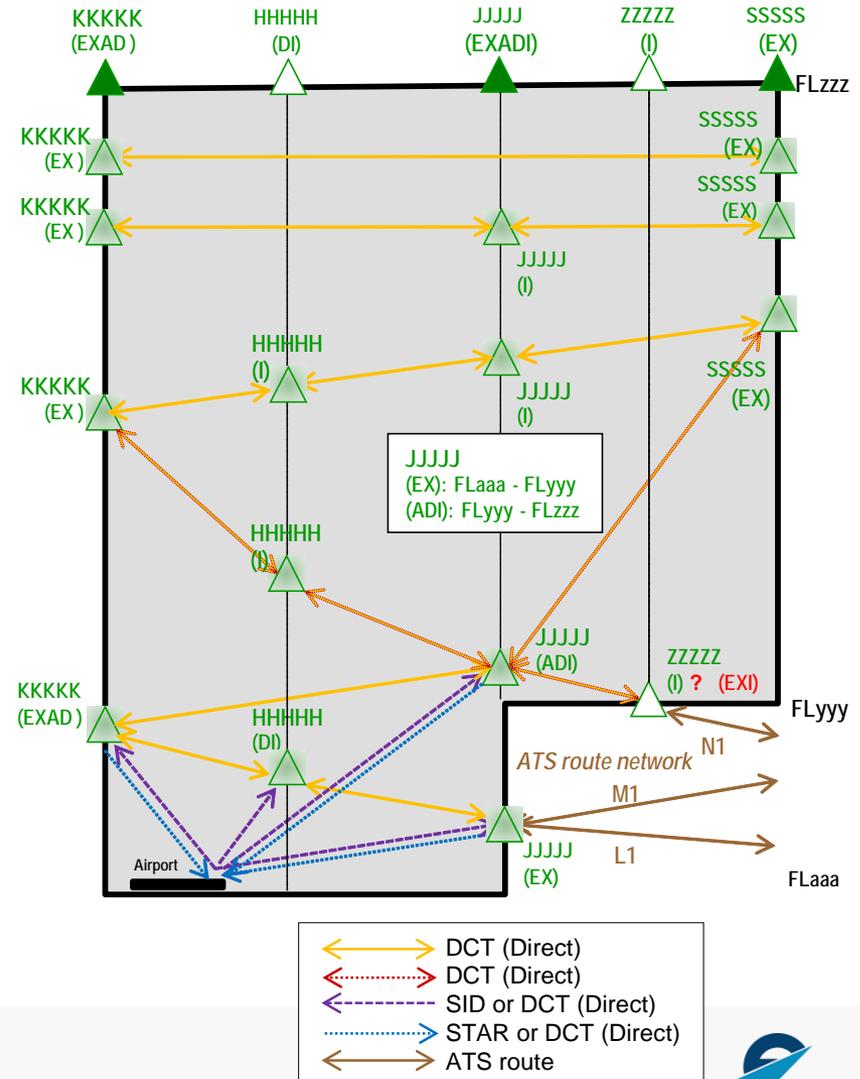
- **Special areas (SA)**

“Airspace reservation” refers to airspace of defined dimensions for the exclusive use of specific users. These are special designed areas within which both civil and military activities could take place, including CBA, TRA, TSA, D, R, P and any specially activated areas.

FRA Concept

FRA Significant Points Definitions

- FRA Horizontal Entry Point (E)**
 A published Significant Point on the horizontal boundary of the Free Route Airspace from which FRA operations are allowed.
- FRA Horizontal Exit Point (X)**
 A published Significant Point on the horizontal boundary of the Free Route Airspace to which FRA operations are allowed.
- FRA Intermediate Point (I)**
 A published Significant Point or unpublished point, defined by geographical coordinates or by bearing and distance via which FRA operations are allowed.
- FRA Arrival Connecting Point (A)**
 A published Significant Point to which FRA operations are allowed for arriving traffic to specific aerodromes.
- FRA Departure Connecting Point (D)**
 A published Significant Point from which FRA operations are allowed for departing traffic from specific aerodromes.



FRA Concept

Horizontal Rules



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FRA Horizontal Entry/Exit (EX), Entry (E) and Exit (X) points Rules

- Entry to and Exit from FRA is done only over the significant points published and defined as FRA Horizontal Entry/Exit, FRA Horizontal Entry and FRA Horizontal Exit;
- Normally these points retain their functions from ATS route network (e.g. points which are entry-only remain entry-only in FRA).

FRA Intermediate (I) points Rules

- Airspace users may file FRA Intermediate points between FRA Horizontal Entry/Exit, FRA Horizontal Entry and FRA Horizontal Exit points, circumnavigate a particular area, indicate a change in flight level or speed, or remain compliant with FRA boundary rules;
- A FRA Intermediate point could be any published en-route radio navigation aid or 5LNC or unpublished significant point defined by geographical coordinates or by bearing and distance;
- There might be no limitations on the number of FRA Intermediate points used;
- The use of FRA Intermediate points in ITEM 15: ROUTE of the flight plan is defined by each State.

FRA Boundaries Rules

- Segments between FRA Horizontal Entry/Exit or FRA Horizontal Entry, FRA Intermediate and FRA Horizontal Entry/Exit, or FRA Horizontal Exit points normally should remain fully contained in the published FRA boundaries;
- Flight plans with segments that partially violate the lateral limits of FRA area might not be accepted by the State. Whenever exceptions apply they need to be published in AIP or RAD;
- Flight plans containing segments that pass close to the FRA boundaries might be accepted, but tactical re-routing might be applied when required.

FPL ITEM 15: ROUTE Rules

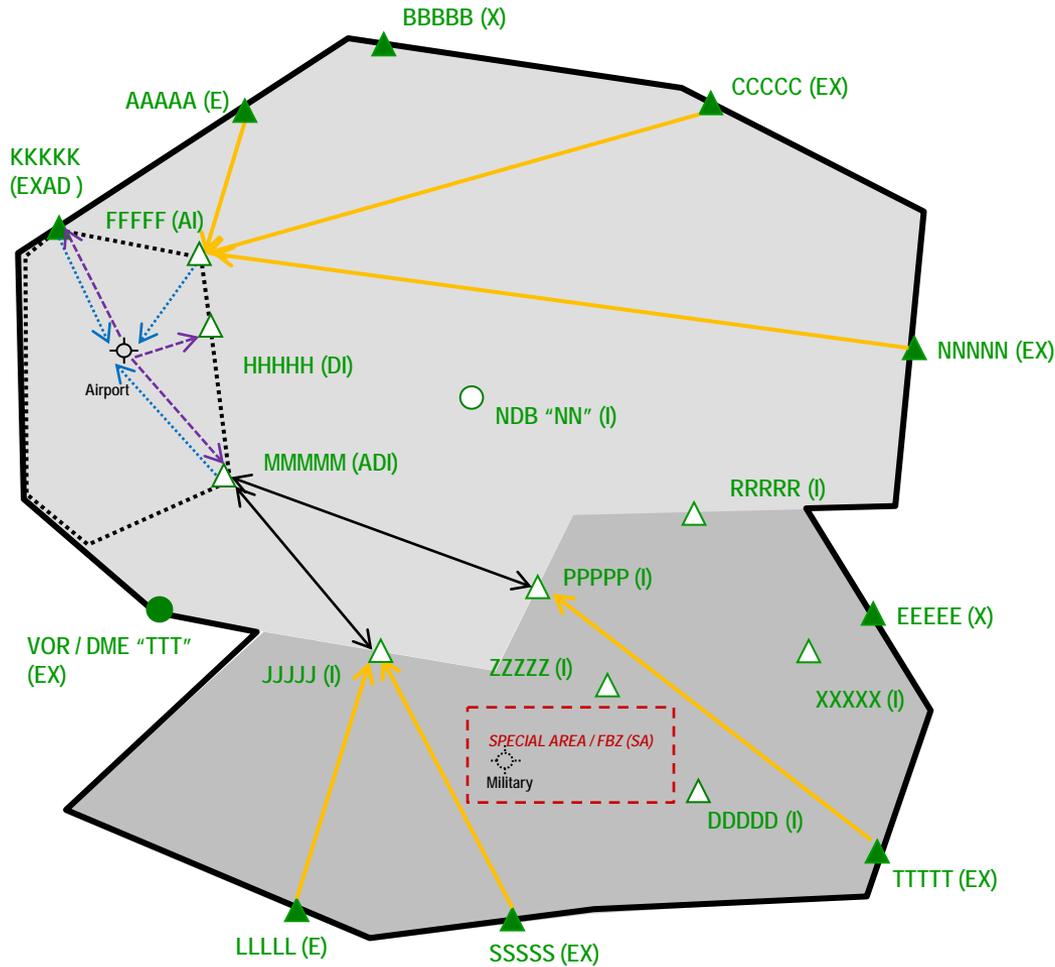
- Segments between FRA Horizontal Entry/Exit, FRA Horizontal Entry, FRA Horizontal Exit and FRA Intermediate points are to be indicated by **DCT** in ITEM 15: ROUTE of the flight plan;
- Example: [Entry Point] DCT [Intermediate point] DCT [Intermediate point] DCT [Exit Point];
- There might not be any additional limitations on the DCT segments length.

FRA Concept

FRA Horizontal Transition - Arrivals



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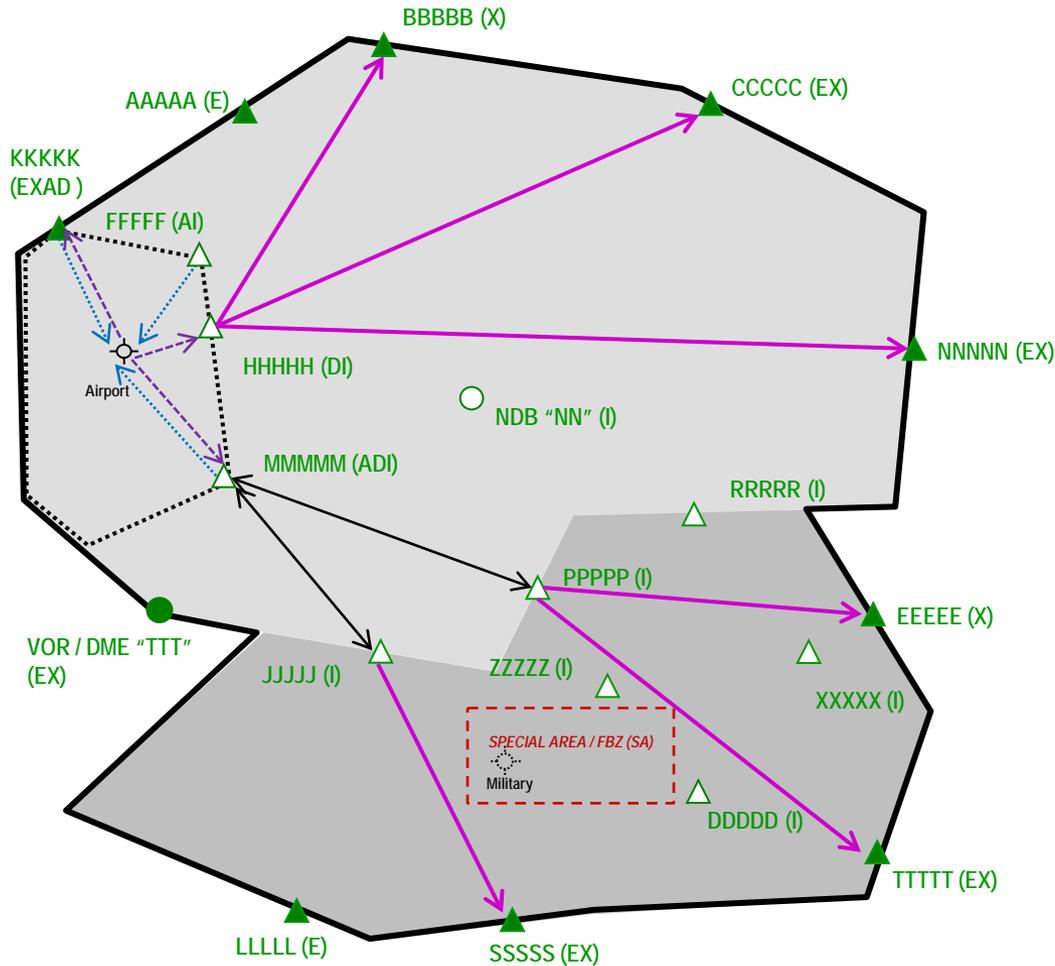


FRA Concept

FRA Horizontal Transition - Departures



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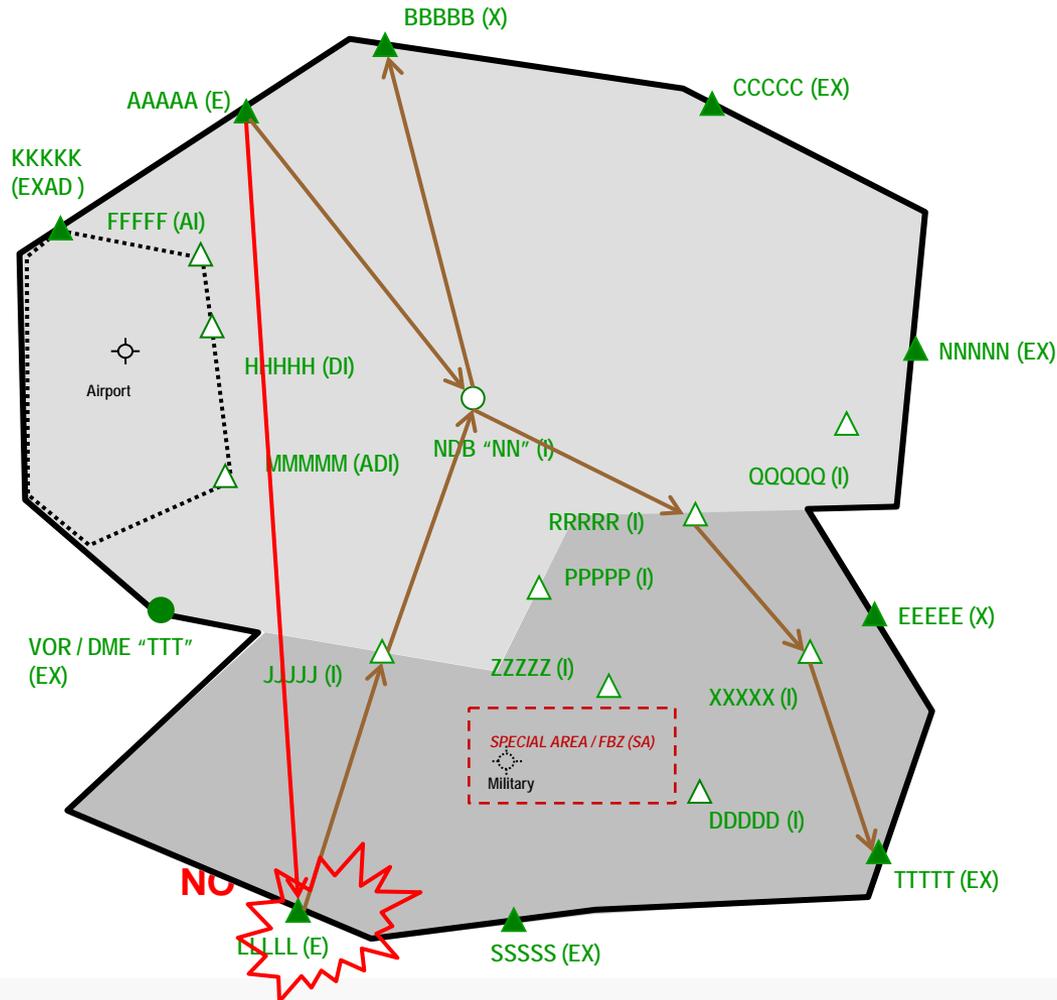


FRA Concept

FRA Horizontal Transition - Orientation Rules



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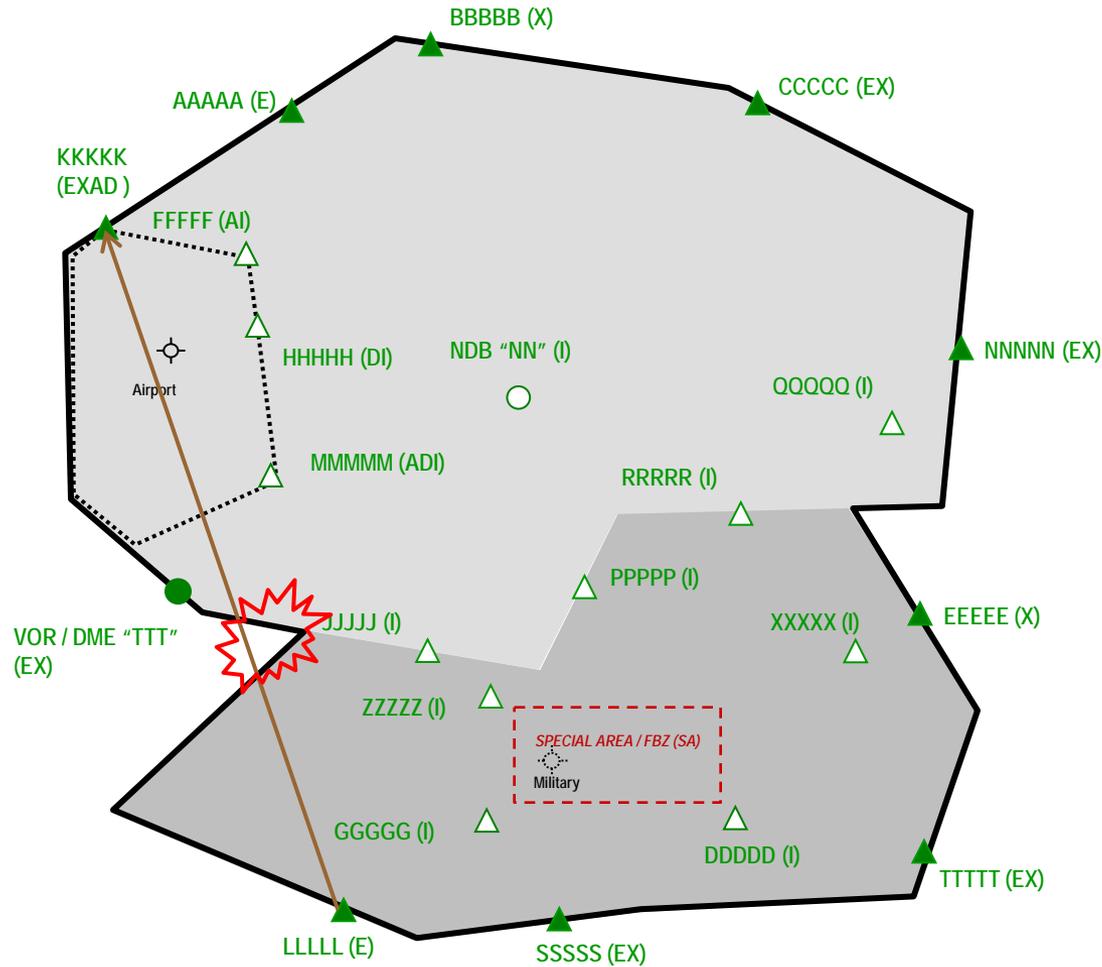


FRA Concept

FRA Horizontal Transition - Border Crossing



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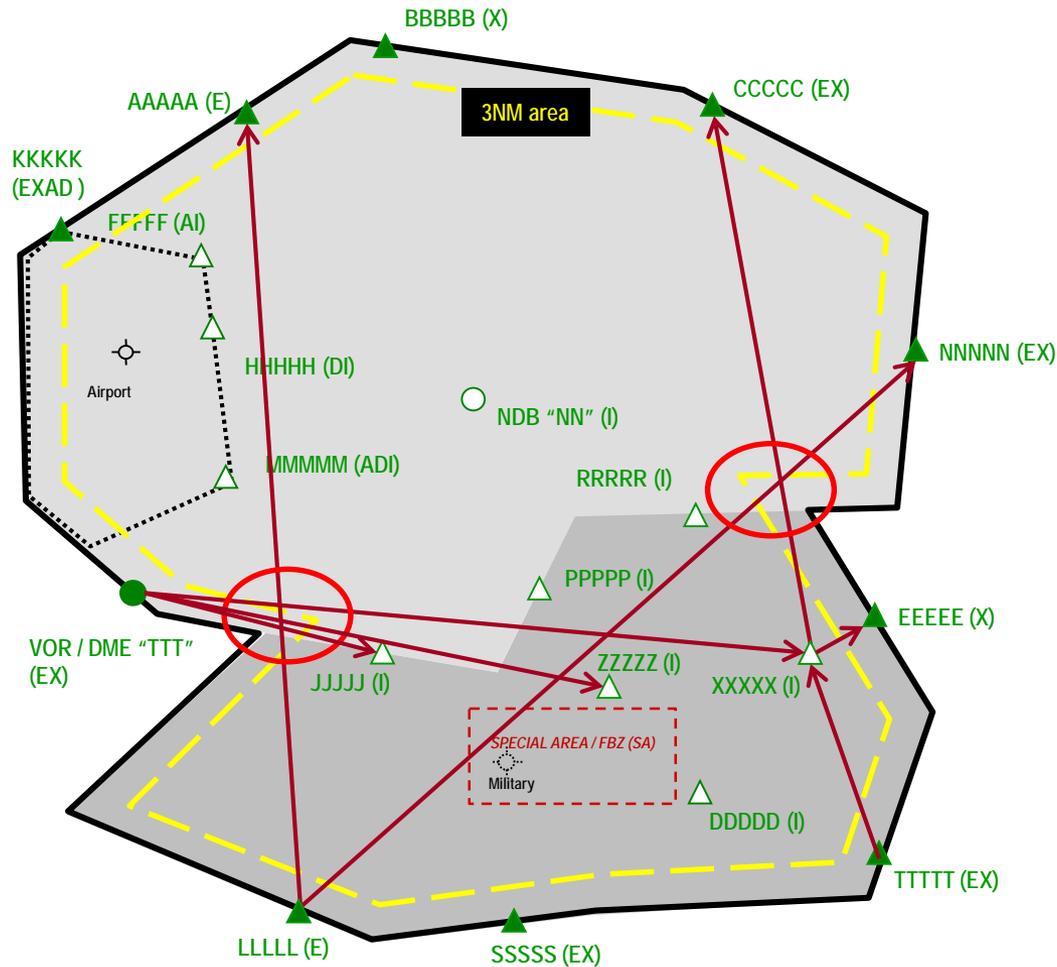


FRA Concept

FRA Horizontal Transition - Border Proximity



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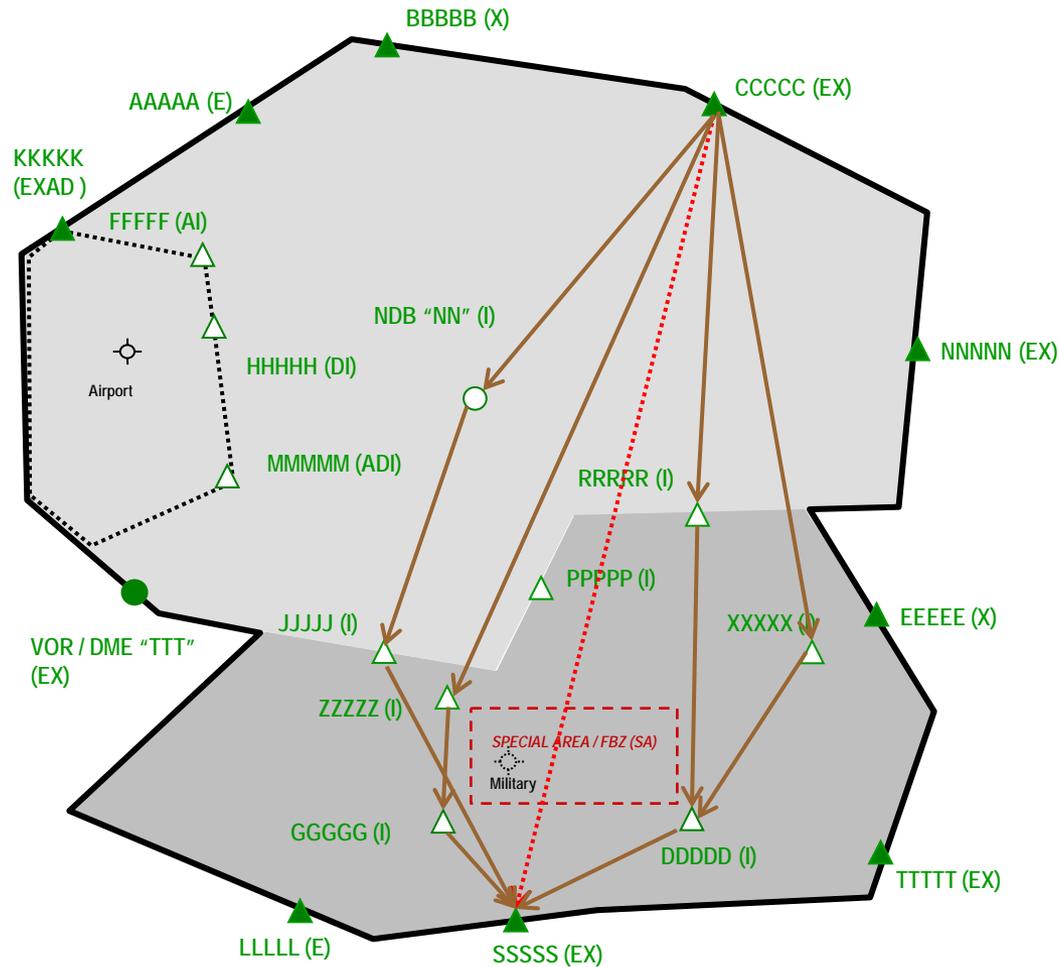


FRA Concept

FRA Horizontal Transition - Special Area



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FRA Concept

Vertical Rules

Vertical transition due change of cruising level

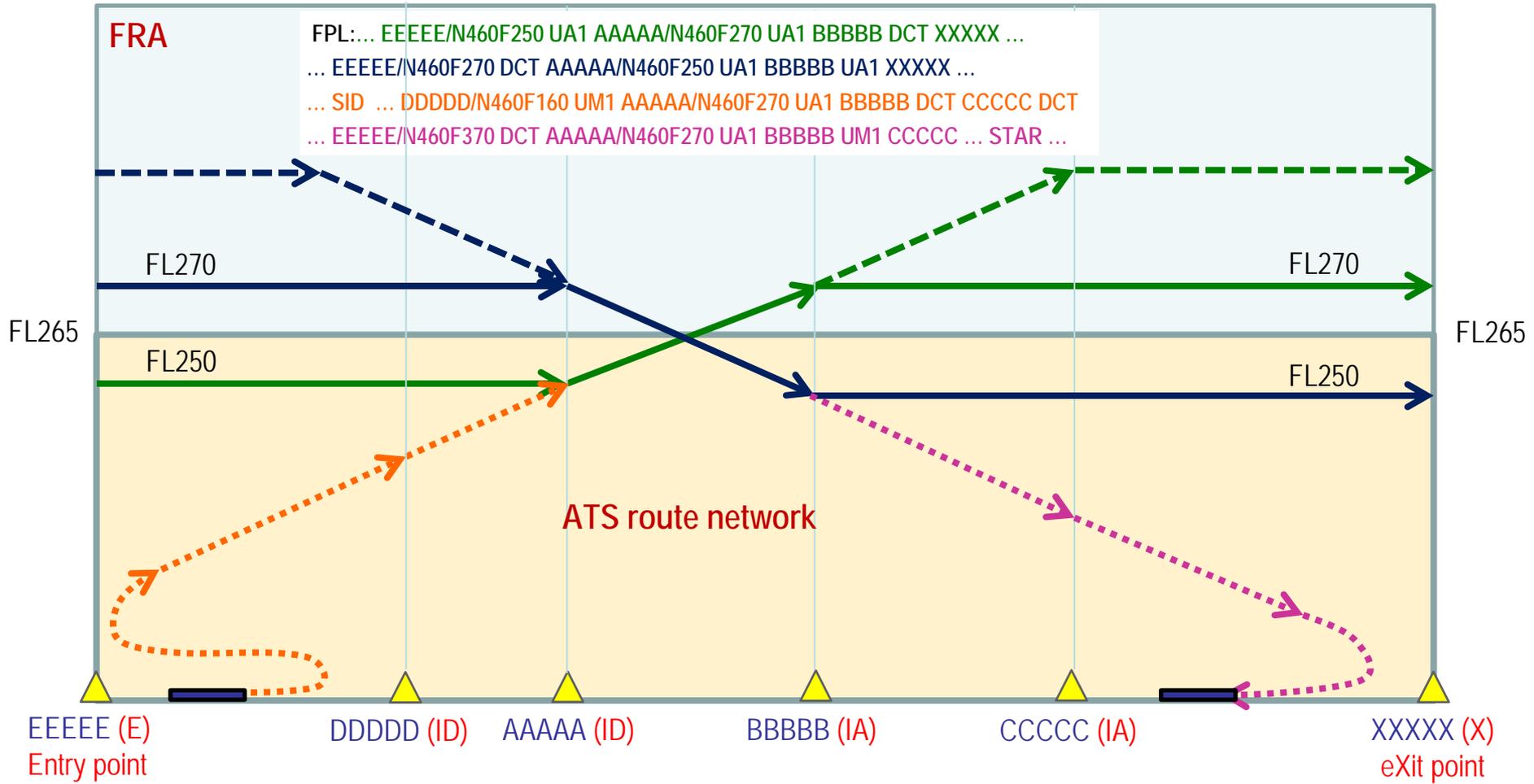
- Flights that make a change in cruising flight level resulting in a transition to/from FRA shall file the portion of the flight outside FRA along the standard ATS route network.
- The portion of the flight inside FRA may be filed according FRA rules or via the ATS route network, subject to airspace availability, according to operator's preferences.
- The transition point between FRA and ATS route network shall be any published or unpublished FRA Intermediate point and shall be defined in ITEM 15: ROUTE of the flight plan.

Vertical transition to / from airports

- Flights arriving at airports located within the limits of FRA area may plan their flights according FRA procedures either directly from FRA Horizontal Entry point or via FRA Intermediate point to a published FRA Arrival Connecting point. Then they must continue either via the ATS route network or specially defined connecting route until the entry point of the TMAs (or CTRs). The FRA Arrival Connecting point may coincide with a TMA (or CTR) entry point.
- Flights departing from airports located within the limits of FRA area may plan their flights either via the ATS route network or specially defined connecting route from the exit point of the TMA up to a published FRA Departure Connecting point. After that point they may plan according FRA procedures either via FRA Intermediate point or directly to FRA Horizontal Exit point. A FRA Departure Connecting point may coincide with a TMA exit point.

FRA Concept

Vertical Transition (theoretical expression)



FRA Concept

Cross-border FRA - General Issues

A specified Free Route Airspace that comprises part and/or the whole areas of responsibility of at least two adjacent ATC units (e.g. ACCs, UACs, etc.) or FRA areas where common procedures are applied regardless of national and/or operational boundaries.

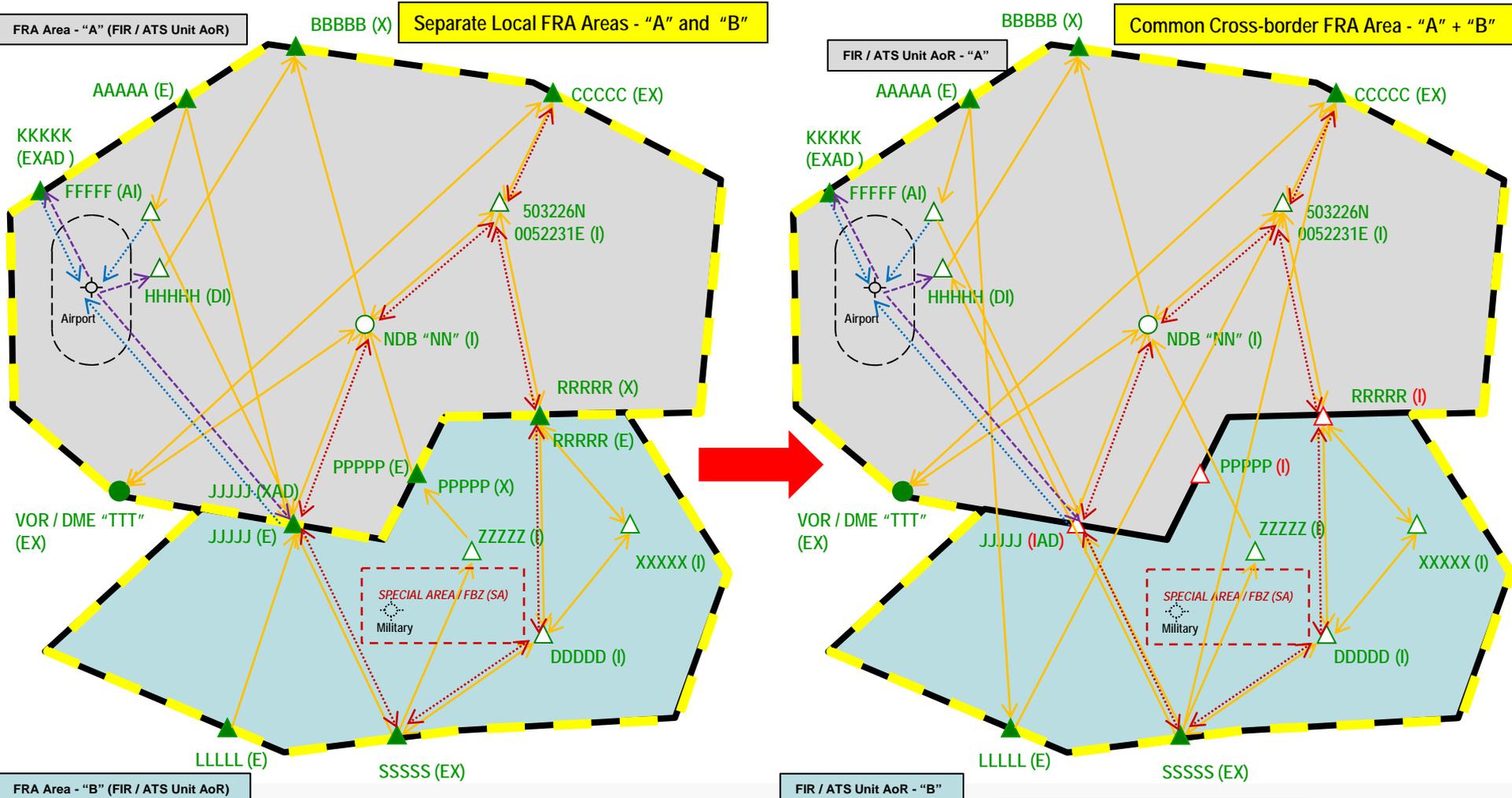
- No FRA (E), FRA (X) and FRA (EX) points on common borders - swapped to FRA (I);
- No mandatory for flight planning FRA (I) points on common border;
- No restriction on maximum DCT length;
- No cross-border constrains for ARR / DEP flows with possibility to define FRA arrival and departure connecting routes;
- More optimum use of unpublished significant points defined by geographical coordinates or by bearing and distance, as FRA (I) points,;
- Possibility of procedure to protect ATC system data overload - AIP requirement for filing of FRA significant points;
- Possibility of simplification of imposed restrictions/limitations at local FRAs - merge in common FRA area;
- Removal of “local FRA” FLOS limitations on common border FRA (E), FRA (X) and FRA (EX) points;
- LoA procedures improvement.

FRA Concept

Fictitious Examples - Local / Cross-border FRA



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FRA Area - "A" (FIR / ATS Unit AoR)

Separate Local FRA Areas - "A" and "B"

Common Cross-border FRA Area - "A" + "B"

FIR / ATS Unit AoR - "A"

FIR / ATS Unit AoR - "B"

FRA Area - "B" (FIR / ATS Unit AoR)

- DCT (Direct)
- DCT (Direct)
- SID or DCT (Direct)
- STAR or DCT (Direct)

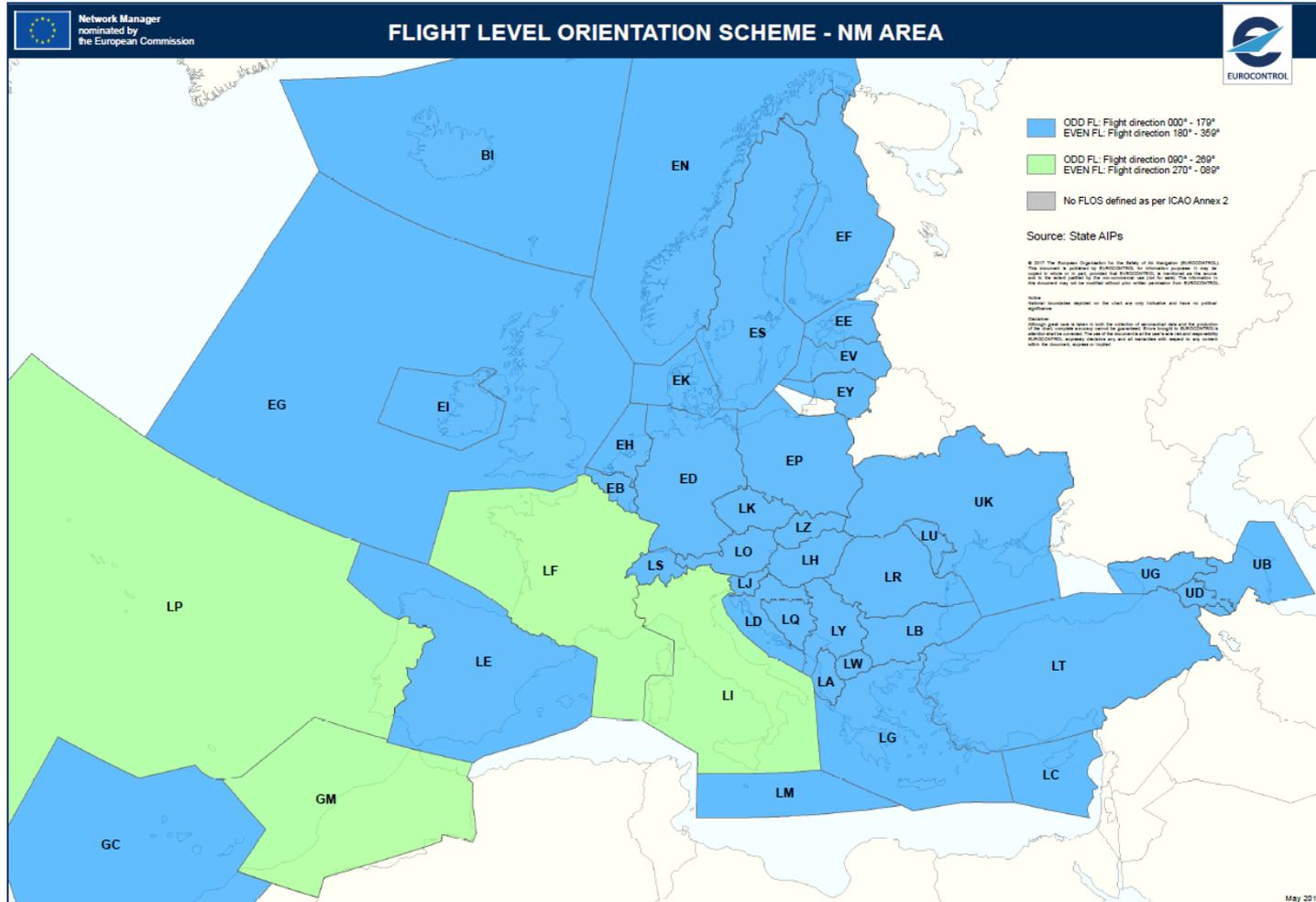


FRA Concept - FLOS NM Area

ICAO Annex 2, Appendix 3a / AIP ENR 1.7



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Harmonized FRA Check List of Implementation Actions

FRA Check List of Implementation Actions

General Checklist of Actions (1)



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Ref	Topic	Description	Rationale	Responsible/ Involved	Deadline
1	Local FRA CONOPS discussed with NM to ensure harmonised network FRA implementation	<ul style="list-style-type: none"> • General scope • 4D description of the FRA volume • Cross-Border impacts • Enablers and constraints • Impact on ATM (ATS/ASM/ATFCM) Procedures • Impact on flight planning procedures • Impact on Publication • Impact on local/AOs/CFSPs/NM systems • Identification of benefits 	To ensure network harmonised FRA implementation	ANSP(s) / NM	T0-(24-30) months depending on the expected impact of the change; input concerning the implementation plan from ERNIP Part 2.
2	Airspace Design	<ul style="list-style-type: none"> • Establish the airspace volume (horizontal and vertical limits) • Horizontal connectivity E/X points • Vertical connectivity A/D points • Connecting routes • RAD restrictions • Use of geographical coordinates as Intermediate (I) points • Usage of Intermediate (I) points • Airspace reservations • Flight Plan Buffer Zones (FBZs) • ATS delegation • Sector design 	To ensure interconnectivity and interoperability with adjacent horizontal and vertical airspace	ANSP(s) / NM / Military	T0 - 12 months
3	Airspace Management Process	<ul style="list-style-type: none"> • Priority Rules • CDM requirements • Utilisation of AUP/UUP • Information Sharing • Rerouting • OAT Handling 	To ensure seamless network application of ASM/FUA procedures	ANSP(s) / NM / Military	T0 - 12 months

FRA Check List of Implementation Actions

General Checklist of Actions (2)



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Ref	Topic	Description	Rationale	Responsible/ Involved	Deadline
4	ATC Procedures and Letters of Agreement	<ul style="list-style-type: none"> Definition of all required procedures internally and with neighbouring ATC units 	To ensure appropriate interconnectivity	ANSPs	T0 - 6 months
5	Air traffic flow and capacity management	<ul style="list-style-type: none"> Sector Configuration Management Sector and Traffic Volumes (Capacities / Monitoring Values) Re-routing Proposals ATFCM Procedures 	To ensure seamless network application of ATFCM procedures	ANSP(s) / NM	T0 - 6 months
7	Awareness and consultation	<ul style="list-style-type: none"> CONOPS 	To ensure network harmonised FRA implementation	ANSPs/NM through the NM CDM process to all operational stakeholders, including NSAs	T0 - 24 months
		<ul style="list-style-type: none"> Airspace design and airspace management 	To ensure network harmonised FRA implementation		T0 - (12 - 18) months
		<ul style="list-style-type: none"> ATC Procedures and Letters of Agreement 	To ensure network harmonised FRA implementation		T0 - (6 - 12) months
		<ul style="list-style-type: none"> Air traffic flow and capacity management 	To ensure network harmonised FRA implementation		T0 - (6 - 12) months
8	AIS/RAD Publication	<ul style="list-style-type: none"> AIC Publication AIP Publication RAD 	To ensure network harmonised FRA implementation	ANSPs/NM through the NOP Portal	T0 - (6 - 12) months
				ANSPs	T0 - 2 AIRAC cycles (min)
				ANSPs/NM	T0 - 2 AIRAC cycles
9	NM Integration/ Pre-validation Check	As described in ERNIP Part 1, 6.5.6.1	To ensure network harmonised FRA implementation	ANSPs/NM/ AOs/CFSPs	T0 - 6 months
10	Implementation	<ul style="list-style-type: none"> FRA Project Implementation 		ANSPs/NM/ AOs/CFSPs/ Military	T0

FRA Check List of Implementation Actions

General Checklist of Actions (3)



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Ref	Topic	Description	Rationale	Responsible/ Involved	Deadline
11	POST implementation	<ul style="list-style-type: none"> Lessons Learnt 	To ensure network harmonised FRA implementation	ANSPs/NM/ AOs/CFSPs/ Military	T0 + (1 -2) AIRAC cycles
12	Fine-tuning of implementation	<ul style="list-style-type: none"> Implementation of further changes depending on lessons learnt 	To ensure network harmonised FRA implementation	ANSPs/NM/ AOs/CFSPs/ Military	T0 (1 - 6) AIRAC cycles



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Harmonized FRA AIP Publication

FRA AIP Publication

Content (1)

- **Terminology in GEN 2.2 Abbreviations used in AIS publications:**
 - Explanation how to publish the common FRA terminology and relevant terms/abbreviations used for FRA operations.

- **FRA General Procedures in ENR 1.3 Instrument Flight Rules:**
 - Explanation how to publish all procedures related to the FRA, including explanation and definitions of applied FRA relevant points.

- **Flight planning in ENR 1.10:**
 - Explanation how to publish clear and understandable procedures and principles for FRA flight planning; easy to use and coherent with procedures for the fixed ATS route network.

- **Free Route Airspace structures in ENR 2.1 and ENR 2.2 - General rule:**
 - Explanation how to publish FRA structures, including sectors depending if FRA is based on FIR/UIR or ATC unit boundaries or if the FRA lateral limits do not coincide with FIR/UIR or ATC unit boundaries.

- **Cross-border application of FRA in ENR 2.2 Other regulated airspace:**
 - Explanation how to publish if FRA is implemented cross-border between adjacent FIRs/UIRs or CTAs/UTAs.

FRA AIP Publication

Content (2)

- **Delegation of the responsibility for provision of ATS in ENR 2.2 Other regulated airspace:**
 - Explanation how to publish the areas where the responsibility for provision of ATS is delegated, in order to facilitate the publication of the FRA applicability in these areas.

- **FRA Connecting Routes to/from terminal airspace and aerodromes:**
 - Explanation how to publish access to/from terminal airspace and connection to/from aerodromes when required. This may require definition of FRA connecting routes to facilitate flight planning, providing e.g. the route from FRA departure/arrival points to a published SID/STAR points at an aerodrome, or from/to an aerodrome within the TMA which does not have SID/STAR.

- **FRA Significant Points in ENR 4.1 and ENR 4.4:**
 - Explanation how to publish the FRA significant points with a clear reference to the Free Route Airspace and indication of the FRA relevance of the point;
 - Explanation on FRA significant points letters and matrix used for AIP publication;
 - Template AIP publication examples.

- **Airspace reservations in ENR 5:**
 - Explanation how to publish the FRA issues related to information of Special Areas (SA).

FRA AIP Publication Template



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AIP	ENR 1.3-1 27 NOV 03
ENR 1.3 INSTRUMENT FLIGHT RULES	
1. Rules applicable to all IFR flights ...	
2. Rules applicable to IFR flights within controlled airspace ...	
3. Rules applicable to IFR flights outside controlled airspace ...	
4. Free Route Airspace general procedures	
<u>4.1 Area of application</u> e.g. "FRA procedures are available in Amwell FIR above FL245. If applicable specify airspace where provision of service is delegated to another ANSP. For further details see ENR 2.2. and ENR Charts."	
<u>4.2 Flight Procedures</u>	
<u>4.2.1 General</u> e.g. "Traffic will be subject to General Rules (ENR 1.1), RAD and Letters of Agreement (LoA) between neighbouring ACCs." e.g. "Within FRA users will be able to plan user-preferred trajectories through the use of significant points included in AIP ... (State) ENR 4.4 Name-code designators for significant points and ENR 4.1 Radio navigation aids - en-route, respectively. Segments between significant points will be indicated by means of "DCT" instructions." DCT usage / limitations e.g. "Within the FRA area there will be no limitations on the use of "DCT"."	
<u>4.2.2 Overflying traffic</u> e.g. "Overflying traffic should plan directly from Amwell FIR entry point to the Amwell FIR exit point."	
<u>4.2.3 Access to/from Terminal Airspace</u> e.g. "Arriving traffic should plan directly from Amwell FIR entry point to the FRA Arrival Connecting Point (A) / STAR initial waypoint." e.g. "Departing traffic should plan directly from FRA Departure Connecting Point (D) / SID final point to the Amwell FIR exit point." <i>Flight planning within the FRA area will comply with adjacent ATS route network orientation.</i> e.g. "For southbound traffic via NELSO connecting to UN741, ODD and EVEN levels are available 50NM prior arriving NELSO waypoint."	
<u>4.2.4 Cross-Border Application</u> Cross-border - DCT - (NOT) allowed. Describe the exception of the segments as applicable. e.g. "Airspace users will have to plan their trajectory inside FRA in Amwell FIR through the use of the intermediate significant points."	
(Amendment Number)	(Name of Publishing Authority)

FRA Chart Publication

- **ENR 6 En-route Charts:**
 - Explanation on possible alternatives for publication..
- **Aerodrome Charts (SID/STAR and Area Charts):**
 - Explanation how to publish appropriate refinements to TMA structures initiated, including the definition of additional SIDs/STARs to permit more flexibility.
- **FRA Chart symbols:**
 - Examples and indication of points.

Example 1



BUMAB
(EX)



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EUROCONTROL Network Manager Support in FRA

Technical and operational support



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- To achieve these goals, EUROCONTROL as Network Manager provides support to ANSPs in the form of airspace design, concept of operations, advice on aeronautical publication and the pre-validation of each new FRA environment to ensure that airspace users are able to plan flights in line with the concept. EUROCONTROL is also providing appropriate solutions to further enhance operational performance and resolve any potential problems which may arise as a result of the implementation of the FRA. This is done by offering proactive coordination, and also technical and operational support, where this is requested from the NM, for local or sub-regional free route airspace initiatives, ensuring that the requisite network improvements are in place to support those initiatives.

- Coordination and support activities include:
 - development of a European free route airspace concept in the contexts of ARN Version 7 and the European route network improvement plan (ERNIP) Part 1;
 - provision of an overall focal point to consolidate and circulate information on initiatives, plans and proposals;
 - support for airspace design and utilisation projects for individual ANSPs, FABs or groups of ANSPs and FABs;
 - fast-time simulation evaluations of workload and capacity;
 - large-scale real-time simulations (RTS);
 - technical and operational support to ensure the adoption of a common approach and consistency between different initiatives;
 - identification of the requisite network enablers, in particular:
 - system adaptation and compatibility across the network;
 - harmonised AIS publication;
 - a checklist of free route airspace implementation actions;
 - enhanced flight planning procedures;
 - initiating work at network level to ensure that enablers are available;
 - support for airspace design and ASM/ATFCM processes at network, FAB and local levels;
 - support for the coordinated deployment of local, sub-regional and network aspects of these initiatives;
 - validation of airspace design and utilisation projects through the Network Manager Operations Centre (NMOC);
 - coordination of the development of network systems and operational procedures.



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FRA Concept Implementation in ICAO EUR Region

FRA Implementation

The beginning and implementation ways

▪ **The beginning**

In 2008, EUROCONTROL initiated the coordinated development and implementation of FRA in cooperation with civil and military experts in airspace design, ECAC member States, ANSPs, airspace users, flight planning organisations and relevant international bodies.

▪ **Implementation Ways**

Horizontally:

- Flights allowed to flight plan within “specified airspace” between officially published **Entry/eXit** points or via **Intermediate** points.
- “Specified airspace” usually represents the area of responsibility for relevant air traffic control (ATC) unit (CTA/UTA → ACC/UAC).

Vertically:

- Above FL335; FL305; FL285; FL245; FL175; FL095, 9500FT, etc.

Timely:

- Core night (e.g. as 22:00 - 04:00 UTC Summer time);
- Near night (extended night);
- + Weekend;
- H24.

FRA Implementation

Main Principles



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FRA shall be **operationally** driven and produce tangible benefits for all airspace users

Military airspace requirements shall be satisfied

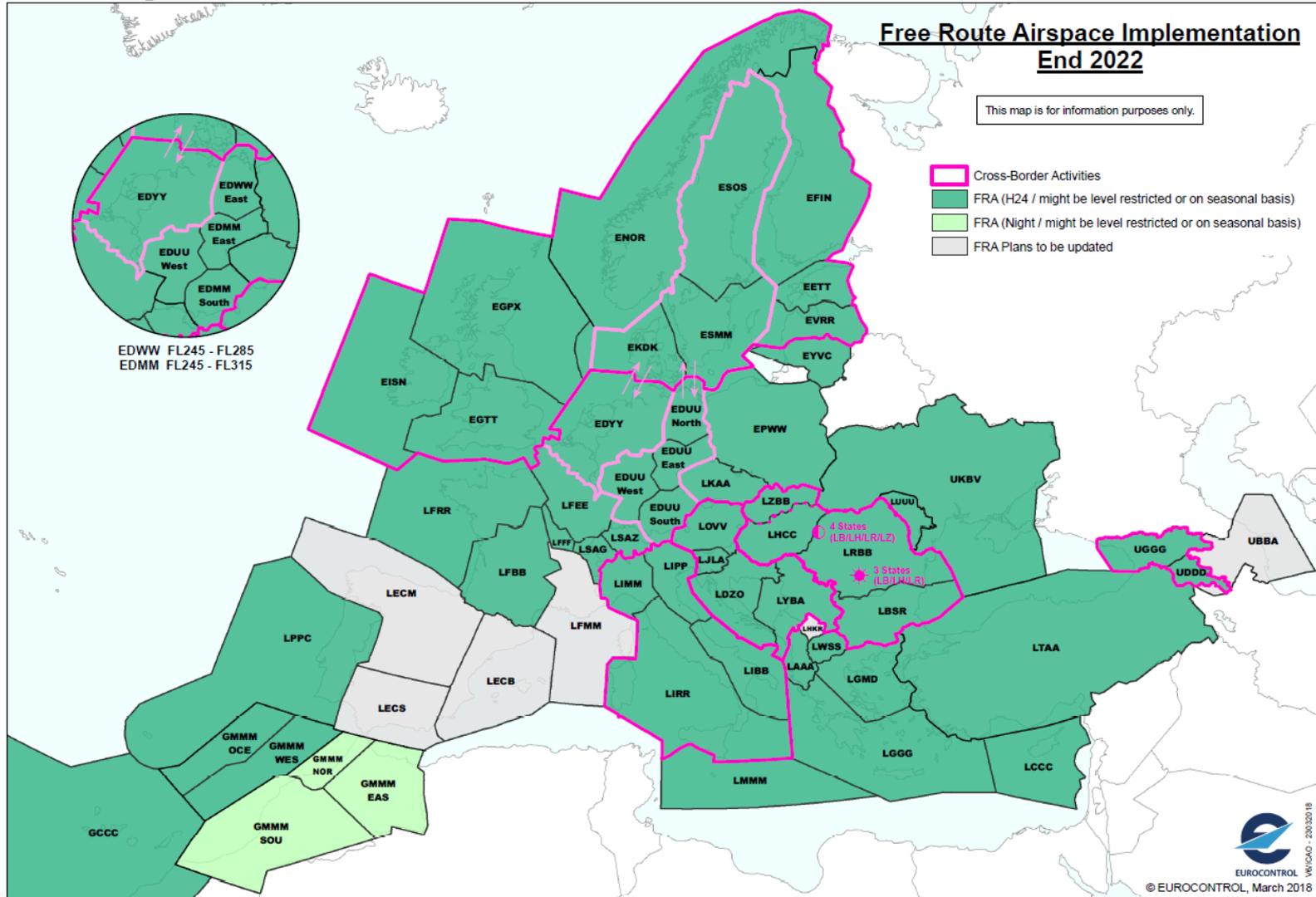
European Airspace Design Methodology will be respected

Common practice and methodology, used by EUROCONTROL/NM, will be applied

FRA Implementation - end 2022



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FRA Implementation Benefits

- **Benefits**

FRA is a way of overcoming the efficiency, capacity and environmental problems facing aviation.

- **Airspace users**

The move from routes to free airspace availability offers significant opportunities to airspace users. Savings in distance from these improvements could be as much as 25 000 NM a day. Flying distances can be reduced by approximately 7.5 million NM, representing the equivalent of 45 000 tons of fuel saved, or a reduction in emissions of 150 000 tonnes, or EUR 37 million. Airspace users are gradually adapting their flight planning systems to fully exploit the potential of FRA while the concept is compatible with current navigation capability.

- **ANSPs**

Operating a FRA environment offers improved predictability thanks to more stable trajectories while at the same time enhancing the use of conflict detection tools. This concept can lead to a better spread of conflicts compared with the concentration of conflicts generated by the current fixed route network. In addition, ANSPs have not identified any major problems which would prevent them from implementing the concept even in one of the busiest volumes of airspace in the world - the area covered by the Maastricht Upper Area Control Centre.

FRA is a key landmark in achieving free routing across European airspace on the road to SESAR business trajectories and 4D profiles. By 2019/20, additional savings of between 60 000 - 75 000 NM a day can be expected, with the subsequent fuel, environmental and cost benefits. FRA will make it possible to meet the demands of future airspace users over the next 50 years, such as civil and military RPAS, hypersonic transport, spaceplane operations to sub-orbit, wireless network balloons and airships.



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FRA Supporting Information



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FRA Concept - Video Presentation

<https://www.youtube.com/watch?v=297-yplIsHc>



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EUROCONTROL FRA website

<http://www.eurocontrol.int/articles/free-route-airspace>



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Frequently Asked Questions (FAQs)

FRA FAQ (1)

- **Are the air carriers technically prepared to perform direct routes in FRA? Are they consistently taking advantage of the benefits FRA offers?**

Airspace users are now faced with a freedom of choice that has not existed during the past 50 years of airspace design and operation. The move from route to airspace availability is offering significant opportunities and the airspace users are gradually adapting their flight planning systems to fully exploit the full potential of the concept. However it remains their decision as to whether they change their operation and realise the benefits now being offered.

Importantly, FRA provides the foundation and flexibility for meeting the demands of future airspace users over the next 50 years, such as civil and military RPAS, hypersonic transport, spaceplane operations to sub-orbit, wireless network balloons and airships.

FRA FAQ (2)

- **Are there any parts of the airspace that are experiencing or could experience more issues as a result of FRA implementation? What has been or is being done about that?**

FRA is now planned at Maastricht UAC, by DFS in Germany and NATS in UK during the next five years, proof that the ANSPs concerned do not see any major issues that may prevent them from implementing the concept in one of the busiest pieces of airspace in the world. The Network Manager works with those ANSPs to develop and implement appropriate solutions to further enhance operational performance.

FRA FAQ (3)

- **Direct routes may also mean reduced flight times and therefore potentially higher aircraft utilization? Is not this going to cause more traffic at airports? Are airports prepared?**

Yes there is the possibility of users conducting more rotations as the result of time saved using FRA, but the scale of this change will be relatively small in comparison with the overall need to improve flight efficiency and capacity of the European ATM system across Europe due to the increase in traffic and this is not related to FRA, but to the continuous development of air transport in Europe.

FRA FAQ (4)

- **Do air carriers need any specific approval to conduct direct routes? Are there any special operational requirements?**

No approval is required, current navigation capability fits with FRA operations.

FRA FAQ (5)

- **Have ANSPs developed strategies to mitigate the potentially more difficult detection of conflicts that comes with FRA implementation?**

Over the last 15 years ATC systems across Europe have been modernised to include conflict detection tools while using aircraft trajectories calculated by the ground system which are updated in real time as a flight progresses. The good news is that in an FRA environment these trajectories are likely to be more stable than today's operation and as a consequence will help improve predictability. The tools help controllers identify conflicts well in advance of them occurring and are well suited for FRA operations. Indeed one might say that the investments made in these new systems provide an additional return by enabling free route operations and a consequence an improvement in the quality of service provided by ANSPs. At the same time, the implementation of Free Route Airspace generates a much better spread of conflicts compared to the concentration of conflicts generated by the fixed route network.

FRA FAQ (6)

- **How advanced is the status of FRA implementation in Europe?**

Implementation is now ramping up. More than 30 States have implementation plans for Free Route ranging from the initial step of implementing direct routes to the implementation of the full concept which permits airspace users to flight plan and fly a route according to their own business model. It is expected that by the end of 2019 most of the European airspace would have implemented Free Route Airspace with all the airspace having this type of operations by 2021/2022. This good progress is a result of the very close cooperation between the Network Manager, the ANSPs, the military partners and the airspace users. The Network Manager provides support to ANSPs in the form of airspace design, concept of operations, advice on aeronautical publication and finally the pre-validation of each new FRA environment to ensure airspace users are able to flight plan according to the concept.

FRA FAQ (7)

- **Is there a risk for airspace around airports to become over crowded? What is being done in this respect?**

This is not specifically FRA related - improvements have to be made in all aspects of ATM to accommodate future demand. Nevertheless, specific airspace design solutions have been developed and documented by the Network Manager to ensure organised traffic flows around the airports. Airspace in TMAs will still be structured with dedicated arrival/departure routes.

FRA FAQ (8)

- **What is the status of FRA implementation in other regions of the world? Are there any lessons learnt from the European experience?**

Europe is the first region in the world having implemented a full FRA concept. However flight efficiency initiatives in various forms exist in other parts of the world i.e. North America and Australia.

Lessons learnt from the implementation so far have included the following:

- Implementation on an incremental basis, starting with State implementation followed by cross border operations over a region, when all neighbours are ready, is the best option for achieving full benefits.
- Close coordination between airspace users, ANSP and the Network Manager has guaranteed the success of the implementation so far in terms of time and cost.
- Most implementations have already exceeded that required by the SES regulation in 2022.



Network Manager
nominated by
the European Commission

QUESTIONS and COMMENTS