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ASBU THREADS

☑ Concept of Operation ☑ Elements

Operational

FRTO	Improved operations through enhanced en-route trajectories	Operational

CONCEPT OF OPERATIONS BY BLOCK

Block	Description
Baseline	En-route trajectories are constrained by the fixed route network, permanently segregated areas, conventional navigation or limited use of area navigation (RNAV), rigid allocation of airspace between civil and military authorities, and rigid sector configurations. Conflict detection is a manual task, performed on the basis of paper/electronic flight strips.
Block 0	En-route trajectories are enhanced by using more direct routings, and collaborative airspace management process and tools. ATCOs are assisted by tools for the conflict identification and conformance monitoring.
Block 1	Block 1 introduces the initial steps towards trajectory-based operations by the enhancement of FRTO B0 processes and system support or the deployment of new processes and system support where necessary. In continental airspace, the most important operational improvement is related to Free Route Airspace (FRA) as the continuation of direct routing introduced in FRTO B0. For airspace where FRA cannot be deployed, or for connectivity between FRA and terminal manoeuvring areas (TMAs), RNP routes might be considered. Collaborative airspace management is enhanced with new features such as real time airspace management (ASM) data exchanges. Additional system capabilities such as dynamic sectorization intend to align the traffic demand to the available capacity.
Block 2	Block 2 includes further steps towards trajectory-based operations by the enhancement of FRTO B1 processes and system support or the deployment of new processes and system support where necessary applicable to both continental and oceanic airspace where trajectory type operations are common. The most important operational improvement is related to the large scale cross border Free Route Airspace (FRA) as the continuation of FRTO B1. Large scale FRA (e.g. Continental operations) are envisaged to be widely deployed, except where structure provides for efficient performance-based routings into and out of high density airspace. There is a need ensure a smooth transition between FRA and highly structured airspace based on Dynamic Airspace Configuration (DAC) principles. There is a need for more dynamic, accurate and precise information on constraints allowing the FRA extension and accommodation of different business trajectories. All trajectories, planned and submitted/shared, are consistent with constraints and associated avoidance measures. This will be supported by Enhanced Collaborative Decision Making (ECDM) processes in the execution phase, enabling optimisation of trajectories in real time. Airspace user's participation in the

ECDM will be extended to a higher level of integration between the decision support tools and it will be a major factor for the harmonisation of the competing goals.

One of most important tools to support the ECDM concept is the integration of ATFM and ATC planning by bridging the gap between conventional ATFM planning and conventional sector based ATC planning, maintaining the autonomy and certain level of flexibility of ATC for separation management. The local components of integrated ATFM/ATC planning function are addressed by FRTO B2.

Dynamic Sector Management will evolve into Dynamic Airspace Configuration (DAC), capable of accomodating traffic demand and air traffic flows in real time. DAC will be mainly executed at a network level, FRTO elements cover: the local DAC components to be provided as inputs (ATC sectorisation, airspace structure, and restrictions), the application of dynamic airspace configuration identified at a network Level and the local adaptation and fine-tuning of DAC according to local ATC needs. This capability will be based on the Network Operations Plan, which will evolve and allow for airspace adaptations at a local level, always taking into account the overall network effect of these changes. In addition, new ATC working methods will be established (like Flight Centric ATC), in order to optimise ATCO workload in this dynamic environment which is not necessarily based on geographical sectors but rather on distribution of logical flows and individual trajectories.

Any airspace user, including manoeuvrable new entrants, operating at regular airspace will follow the same rules and procedures. If they are not manoeuvrable then they will become a dynamic type of restriction.

Within this timeframe a considerable amount of traffic in high upper and lower airspace is flying. These operating environments will be free routing and any new proposal or change to any existing trajectory should be strategically de-conflicted from constraints. Seamless airspace and operations between ATSUs with interoperable ATC tools and systems are envisaged. The tools and system should include at least:

- Enhanced conflict and complexity resolution tools taking into account the network
- Associated trajectory optimisation processes;
- Tools for trajectory coordination, revision and execution.

ELEMENTS

Element ID	Title
FRTO-B0/1	Direct routing (DCT)
FRTO-B0/2	Airspace planning and Flexible Use of Airspace (FUA)
FRTO-B0/3	Pre-validated and coordinated ATS routes to support flight and flow
FRTO-B0/4	Basic conflict detection and conformance monitoring
FRTO-B1/1	Free Route Airspace (FRA)
FRTO-B1/2	Required Navigation Performance (RNP) routes
FRTO-B1/3	Advanced Flexible Use of Airspace (FUA) and management of real time airspace data
FRTO-B1/4	Dynamic sectorization
FRTO-B1/5	Enhanced Conflict Detection Tools and Conformance Monitoring
FRTO-B1/6	Multi-Sector Planning
FRTO-B1/7	Trajectory Options Set (TOS)
FRTO-B2/1	Local components of integrated ATFM and ATC Planning function (INAP)

FRTO-B2/2 Local components of Dynamic Airspace Configurations (DAC)

FRTO-B2/3 Large Scale Cross Border Free Route Airspace (FRA)

FRTO-B2/4 Enhanced Conflict Resolution Tools