

Introducing Free Route Airspace: Summary Paper from NEFAB Customer Consultation Days Helsinki, October 21, 2014 and Oslo, October 23, 2014

NEFAB Programme Office organised customer consultation days on October 21 in Helsinki and October 23 in Oslo, to discuss with civil and military airspace users the implementation of the Free Route Airspace within the NEFAB airspace in November 2015.

The topics presented and discussed comprised an introduction to the NEFAB Programme, airspace structures, Free Route Airspace, interface with Danish-Swedish FAB (NEFRA), Airspace Management and Air Traffic Flow and Capacity Management, as well as airspace availability for civil and military users.

Conclusions from the discussions are presented in this paper.

▲ Objective of the consultation

The objective of the customer meetings was to discuss and consult with airspace users the major changes to be implemented in the NEFAB airspace in November 2015. The feedback from the meetings and customer expectations will also be reported to the NEFAB states and National Supervisory Authorities to address the outcome of the meeting. The results will help look into potential alignments to build the optimal structures and flight planning rules.

▲ Customer expectations

Customers were invited to express their current experience and capabilities to utilize the Free Route Airspace as well as their expectations for the future.

Hence, customers:

- are interested in more efficient routes and flight planning;
- expect the latest update on the NEFAB projects, in particular, an overview of the most important airspace changes and developments;
- expect to learn the potential benefits for airlines resulting from the upcoming changes;
- are interested in potential benefits from larger Free Route Airspace areas, in particular, from the cooperation between NEFAB and DK/SE FAB;
- expect continued information and further involvement in the developments;
- military representatives wish to understand the changes on the civil side and see their consequences and impact on the military operations. No radical changes for military parties are expected.

▲ Introduction to NEFAB

A general introduction was provided by the NEFAB Programme.

- **Functional airspace blocks** are relatively new structures, stemming from the Single European Sky initiative, requesting for commitments, measurable deliverables and cooperation on different levels (state and air navigation service providers). They are based on operational requirements and established regardless of State boundaries, to enhance cooperation among air navigation service providers. Functional airspace blocks are set up for the

benefit of the airspace users in order to optimize the performance of air navigation in Europe.

- **Framework of NEFAB:** NEFAB, the North European Functional Airspace block is cooperation among four states, Estonia, Finland, Latvia and Norway, and respective air navigation service providers, EANS, Finavia, LGS and Avinor.

NEFAB is owned by the states hence decisions on the airspace optimization and design or any other legal issue can only be adopted on the state level. The states participate at the Council, the supreme governance authority in NEFAB hence it is important that decisions on airspace optimization made by individual states are well coordinated at the NEFAB Council. It was recognised that NEFAB Civil-Military Committee is ready to enhance the coordination processes with the states.

NEFAB air navigation service providers (ANSPs) are contributing actively on the expert level to the inception phase and design of the concept which then will be validated by the ANSPs and finally implemented. The local ANSPs will submit notification for change in accordance with the state formal change management processes.

- **NEFAB objective** is to achieve optimal performance in the areas relating to safety, environmental sustainability, capacity, cost-efficiency, flight efficiency and military mission effectiveness, by the design of airspace and the organisation of air traffic management in the airspace concerned, regardless of the FIR boundaries.

▲ **NEFAB Target Concept 2015**

An introduction to NEFAB Target Concept and its elements was provided by Knut-Bjarne Klaussen, Manager Airspace Project.

- NEFAB 2015 Target Concept has been designed to be in alignment with the European developments (ATM Master Plan, Network Strategy Plan, ESSIP Plan and Interim Deployment Plan). Its main challenge is a synchronized and timely implementation of the NEFAB concept of operations to be implemented and fully functional in November 2015.
- The Target Concept includes several individual elements which to a large degree are interrelated and are facilitators for the Free Route Airspace. These elements are:
 - User preferred trajectories. Users will be able to choose between free route planning and operations or use fixed route networks. ATS-route network will be maintained to enable airspace users to choose their preferences and also to ensure connectivity between FRA airspace and airports.
 - Common NEFAB flight planning rules explaining how the airspace users can utilize the FRA.
 - The ACC sectors adapted to accommodate the changes in traffic flows. This may also involve cross border sectorisation, where required, based on the studies (modelling, Real and Fast Time simulations), to decrease the workload in coordination between the ACCs and sectors.
 - Re-designed military airspace structures. There are major developments in Finland and Norway in progress. As this is a state issue, NEFAB programme will cooperate with the individual states to provide the data helping the changes.

- Airspace Management enhancement through harmonised ASM procedures, introduction of LARA tool and Flight Plan Buffer Zone (FBZ) Methodology;
 - ATFCM processes: sector configurations will be updated in real-time to the Network Manager;
 - Automated flight coordination and ATM-system interconnectivity enhancements will enable safe and efficient ATS-provision in the free route environment. Changes into the ATM systems are required to enable data exchange in the Free Route Airspace; it is being handled by air navigation service providers.
 - Datalink. The first phase will fulfill the Datalink Implementation Rule whilst benefits are expected beyond it. NEFAB will pursue the second phase to extend the NEFAB data link area and services in order to enhance safety and increase capacity.
- Implementation of NEFAB 2015 Target Concept is a step-wise process and requires adaptation of rules, regulations and ATC-procedures to support the implementation. The Concept has been taken over by NEFAB air navigation service providers which are responsible for local implementation activities.

▲ Airspace management and airspace reservation process

Airspace management and airspace reservation topic was presented by Juha Holstila, Manager ATS Provision Project, with Knut-Bjarne Klaussen, Manager Airspace Project, and Stefan Gerris (Eurocontrol), Workstream Leader Airspace at NEFAB Programme.

The Airspace Management aims at the optimisation of the network capacity and reaching the best performance while sharing the airspace between the main user groups - military and civil stakeholders. It was discussed that:

- Airspace is the responsibility of the States, and States are setting national priority rules. National rule can consider the heavy traffic flows in certain times and areas and therefore it can set priority to civil traffic over the military in particular times in these areas.
- Airspace reservation process contains several steps such as a request from militaries, issue of the Airspace Use Plan (AUP) that lists all the active TSAs (time/flight level). If reservations change, an Updated Use Plan (UUP) will be issued. In addition, ATC can tactically guide an airplane through a Temporary Segregated Area (TSA) to shorten the route if possible (e.g. TSA not yet active, or has become available earlier than planned).
- The dimensions of the Flight Buffer Zone (FBZ), i.e. the associated area applied to a reserved/restricted airspace, may differ due to national rules, as buffers are defined by the states. As values differ on national basis, the buffer zones will be published in the AIP not with a value but with coordinates. Activation of a TSA takes into account the whole buffer zone.
- The volume of data will increase due to implementation of FRA and TSAs, hence Airspace Users may need to review their flight planning system capacities.
- The NEFAB ANSPs will use the LARA tool in the ASM process FAB-wide. The tool (a EUROCONTROL software package) has been developed in order to improve airspace management processes by providing mutual visibility on civil and military requirements. It was explained at the meeting that the intention is by the use of the LARA to prepare both, Airspace Use Plans (AUP) and Updated Use Plans (UUP). However, the LARA tool is only the airspace reservation tool and there still will be activation and updates by

NOTAMs and AUPs. The communication before issuing an AUP will be more efficient.

- Network Manager will check the flight plans against the airspace configuration. If the planned route is penetrating the flight plan buffer zone area, it will be rejected by the IFPS. Operator will be informed about the rejection and the reason, enabling them to file a new flight plan. Current systems do not provide automatic proposals for new routings. FRA intermediate points will be published on the corners of the Flight Buffer Zones, by using 5 letter name codes to ease flight planning around.
- Customers raised a question whether the system can differentiate and prioritise a flight based on whether the flight plan has been filed within or outside the IFPS zone. It was clarified that the IFPS can send a message to the operator that has filed the flight in another region but cannot reject their flight plan.
- All major overbooking of the airspace is a result of the lack of civil-military cooperation in the state. To enhance efficient airspace management, EUROCONTROL have issued the Airspace Management Handbook (a part of the European Route Network Improvement Plan) with main principles (recommendations) whilst the states issue their local ASM handbooks to set priority rules in the particular state. These rules are result of negotiation between the civil and military stakeholders on the state level; air navigation service providers play no role in setting the rules. According to the Performance Scheme, the apportionment of reserved and actually used airspace is being constantly measured. The states are urged to react if according to the statistics, militaries are overbooking more than 50%, as unnecessary reservations lead to less efficient commercial air traffic. There is always a challenge to keep the right balance between the flexibility and the actual needs.

▲ **Free Route Airspace: November 2015**

Introduction into Free Route Airspace was provided by Knut-Bjarne Klaussen, Manager Airspace Project.

- **Definition: Free Route Airspace (FRA)** is 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.
- In November 2015, the FRA will be implemented above FL 95 in Estonia, Finland and Latvia, and above FL 135 in Norway, due to terrain issues (FL 195 in Bodö Oceanic). NEFAB and DK/SE FAB will connect their free route airspace above FL 285 in a seamless manner so that customers perceive it as single free route airspace. The interface between the two airspaces is known as NEFRA, the North-European FRA Programme.

▲ **Airspace modelling (EUROCONTROL SAAM) and effects – where to fly**

The airspace modelling activities were presented by Stefan Gerris (Eurocontrol), Workstream Leader Airspace at NEFAB Programme.

- The airspace modeling has been carried out to show the fixed network vs shortest trajectories, and the effects. Traffic reassignment has been modelled considering all the options on top of the ATS routes network.
- The SAAM used for trajectory modelling can be compared to the flight path finder in the IFPS. It is not the exact copy of the flight plan; however, in most cases they match. The SAAM is the traffic and environment simulation system for operation planning and stands for 'System for traffic Assignment and Analysis at a Macroscopic level'. It is an integrated system for network-wide or local design, evaluation, analysis and display of air traffic, civil/military airspace and TMA scenarios.
- It was stressed that 'preferred trajectories' is a much broader concept than a DCT denoting that trajectories can be planned according to several variables, such as winds, unit rates, time or distance, not necessarily being the shortest trajectory. Therefore an area where only DCTs may be filed should not be called a FRA. In a full FRA environment, operators will be able to plan according to their needs and preferences, the shortest trajectories being only one of the options.
- Examples were shown live for participating airlines to enable comparison in terms of potential savings.

▲ Flight planning rules in the Free Route Airspace

Flight planning rules were presented by Knut-Bjarne Klaussen, Manager Airspace Project.

- The eligible flights for free route are those above FL95 in Estonia, Finland and Latvia, and FL 135 in Norway (FL 195 in Bodö Oceanic). As long as the cruising level is requested within the FRA area, it will be possible to plan a flight according to FRA rules even before entering the FRA.
- A summary of rules for entering or exiting the FRA was presented in the table (see below), supplemented by samples (please see slides). It was also explained that FRA entry/exit points are those points to enter or exit the NEFAB airspace from the lateral side, whilst the intermediate points are the points for circumnavigating TSAs. Conditions will apply as most of the points will be both entry and exit, whilst some will be entry or exit only.

From	To	Remark
FRA Entry Point (E)	FRA Exit Point (X).	Flight plan DCT or via one or several additional points. Such an additional point can be either a NAV aid/waypoint or entered as lat/long coordinates.
	FRA Arrival Transition Point (A).	
	FRA Intermediate Point (I).	
FRA Departure Transition Point (D)	FRA Exit Point (X).	
	FRA Arrival Transition Point (A).	
	FRA Intermediate Point (I).	
FRA Intermediate Point (I)	FRA Exit Point (X).	
	FRA Arrival Transition Point (A).	
	FRA Intermediate Point (I).	

- The application of LARA, the EUROCONTROL airspace management tool is expected to support considerably in managing the NEFAB airspace more efficiently, by allowing airspace reservation requests being made and visible to all stakeholders.

- It was emphasized that the Concept is still being validated. Once the modelled design is taken on board and transferred to real environment, adjustments might be needed whilst the main principles are already there.

▲ Technical changes

Technical changes were presented by Juha Holstila, Manager ATS Provision Project.

- Air navigation service providers need to update their ATM systems, with technical validations accomplished well before the implementation of the FRA.
- It was emphasized that introduction of FRA operations into one state is simple whilst FRA within multiple FIRs/states is technically more complex.
- ATM systems in the NEFRA states (NEFAB states + Sweden and Denmark) must have detailed information about the total FRA (i.e. flight plan area) to enable them to manage flights within the area. Validation activities between different ACCs and systems will take place next year.
- The Network Manager system is being upgraded to support FRA concept. The CRCO has undergone validation to support the FRA. The system will split the route according to FIRs and will make exact calculations.
- It was explained that there is a distinction between FIR boundaries and operational boundaries. IFPS works with regard to the operational boundaries. If a DCT segment in a flight plan is fully aligned with the boundary of the operational segment between the ACC sectors, it will be rejected.
- It is expected that the Implementing Rule on FRA above FL 315 will be issued by 2022 hence NEFAB will be well ahead of the schedule.

▲ Publication process

Publication process was discussed by Knut-Bjarne Klaussen, Manager Airspace Project.

- NEFAB has been cooperating with DK/SE FAB to have a harmonized publication in national AIPs, where information about the FRA shall be accessible in all respective states AIPs. Users shall, as far as practical, be able to have access to the information using the AIP of any state concerned. A common FRA chart (map) will show entry/exit points; intermediate points should also be included for circumnavigation.
- The participants requested that information is supplied in the AIPs with illustration of possible trajectories from transition points.

▲ Meeting summary

A summary of all sessions was provided by Programme Office. In addition, it was emphasized that:

- NEFAB will continue airspace developments beyond 2015. New activities will be initiated in 2015 in cooperation with other FABs and states. This includes cooperation with ANSP partners to implement a Free Route Airspace vision, encompassing NEFAB, Danish/Swedish FAB, UK/Ireland FAB and Iceland (Borealis Free Route Airspace vision).
- The Borealis Free Route Airspace vision will be pursued in consecutive steps in order to ensure a seamless FRA in the Northern Europe by 2019. These

steps are FRA implementation in NEFAB and seamless connectivity with the DK/SE FAB above FL 285 (NEFRA) in 2015; followed by FRA implementation in UK Prestwick Airspace in 2017; and concluded by FRA implementation in UK London FIR in 2019.

▲ Conclusions by customers

- Operators appreciate NEFAB efforts towards implementation of the free route operations and recognise the potential savings. NEFAB has also been urged to continue cooperation with the Danish/Swedish FAB in order to lower the limits of the free route airspace in Denmark and Sweden to allow for more benefits.
- Flight planning systems may already be capable to enable operators benefit from the free route airspace. However, validations have to be performed to ensure that the systems are able to handle the free route operations properly.
- The Implementation of the Performance Based Navigation in the NEFAB airspace was also mentioned as a valuable deliverable.
- Military airspace users recognise that customer consultations have provided valuable information. They appreciate the objective for changing the airspace as it is expected to increase the operational effectiveness of military operations and allow for better planning.