



# NEFAB Project

## Feasibility Study

FULFILMENT OF REGULATION 550/2004 AS  
AMENDED BY REGULATION EC No. 1070/2009

FULLFILMENT OF REGULATION 550/2004 AS AMENDED BY REGULATION EC No. 1070/2009

The overall aim of the creation of SES is: To reduce cost for the provision of Air Traffic services, to increase efficiency of the management and operation of the airspace, to increase safety and to reduce the environmental impact created by aviation.

FABs are one of the tools to achieve these objectives. For NEFAB to be declared as a FAB it needs to substantiate that it will fulfil the requirements stated in SES regulation No. 550 Article 9/a.

The description of the FAB requirements (abbreviated as “a” to “i”) are listed below.

- a) be supported by a safety case;
- b) enable optimum use of airspace, taking into account air traffic flows;
- c) ensure consistency with the European route network established in accordance with Article 6 of Regulation (EC) No. 551/2004;
- d) be justified by their overall added value, including optimal use of technical and human resources, on the basis of cost-benefit analyses;
- e) ensure a fluent and flexible transfer of responsibility for air traffic control between air traffic service units;
- f) ensure compatibility between the different airspace configurations, optimising inter alia the current Flight Information Regions
- g) comply with conditions stemming from regional agreements concluded within the ICAO, and
- h) respect regional agreements in existence on the date of entry into force of this Regulation, in particular those involving European third countries; and
- i) facilitate consistency with Community-wide performance targets”.

The area of the NEFAB initiatives and their contribution to the fulfilment of the FAB requirements has the following cross-reference<sup>1</sup>:

		SES 9 FAB Requirements								
		A	B	C	D	E	F	G	H	I
1.	Optimisation of route structure (incl. FUA)		✓	✓	✓	✓	✓	✓		✓
2.	Optimisation of <u>sectorisation</u>					✓	✓	✓		✓
3.	Optimisation of ATS		✓		✓	✓	✓			✓
4.	Optimisation of ASM and ATFCM		✓		✓	✓	✓			✓
5.	Optimisation of Ancillary Services				✓					✓
6.	Harmonisation of Rules and Procedures	✓		✓		✓	✓			✓
7.	Optimisation of Training services	✓			✓					✓
8.	Supervision and monitoring of CNS infrastructure	✓			✓					✓
9.	Commonality of CNS/ATM systems				✓	✓				✓
10.	Joint evaluation of new technology & joint strategies/planning within CNS and ATM	✓			✓					✓
11.	Common System Maintenance	✓			✓					✓
12.	Joint procurement (of systems)	✓			✓					✓
13.	Safety Management Systems	✓							✓	

<sup>1</sup> During the Feasibility study phase Initiatives nr. 1 and nr. 2 have been merged, thus the total number of initiatives is now 1-12. All initiatives are described in separate papers and attached to the FS report.

It has to be noted that this summary of argumentation is not a stand alone document. Detailed supporting documentation is provided in the CBA, Socio/economic study and in the Initiative papers. In addition, EU guidance material supporting FAB establishment and modification process is still under development at the time of drafting the NEFAB Feasibility report.

## Documentation for fulfilment of EC regulation 550/2004 Article 9/a

### a) “Functional Airspace Blocks shall be supported by a safety case”

EC regulation 550/2004 Article 9/a requires that Functional Airspace Blocks shall be supported by a safety case. This summary and the attached NEFAB Initiative paper (Initiative 13) explain the NEFAB activities and plans in order to fulfil this requirement.

With regard to the FAB safety case the following information shall be provided:

- a) The common safety policy or plans to establish a common safety policy;
- b) A description of the arrangements dealing with the accident and incident investigation and plans on how to address the safety data collection, analysis and exchange;
- c) A description of the way in which safety is being managed to avoid degradation in safety performance within the FAB;
- d) A description of the arrangements clearly identifying and allocating the responsibilities and interfaces with relation to the setting of safety targets, safety oversight, and the accompanying enforcement measures in regard to the provision of air navigation services within the FAB;
- e) Documentation and/or statements that the safety assessment including hazard identification, risk assessment and mitigation has been conducted before introducing operational changes resulting from the establishment or modification of the FAB.

### Summary/Argumentation:

- According to a report prepared by PRC in 2008 for the European Commission, it is not a fundamental requirement to have a fully developed and specific Safety Case during a FAB declaration phase since it can only be performed when the FAB is fully specified operationally.
- The NEFAB project includes 4 ANS providers each using a Safety Management System (SMS) approved by their respective national supervisory authorities;
- The ANSPs participating in NEFAB see safety and proper management of risk as a key activity for the successful implementation of a North European FAB. In addition, it is considered that a future integration of SMS across the ANSP organisations within NEFAB can deliver safety benefits and in it can also improve cost-efficiency by sharing best practices (expensive development activities) and by sharing scarce expert resources;

Initiative 13 (attached to this summary) describes in detail the existing safety situation in the NEFAB area, and it explains the required actions/plans and possible opportunities in relation to the creation of a NEFAB-wide Safety Policy and Safety Plans. This is described in the list of implementation actions which is presented in Chapter 9 of Initiative paper13: “High level time line for realisation”;

Arrangements in place related to accident and incident investigation and safety data collection, analysis and exchange of data are also described in the Initiative 13. The following headlines of the focus areas in chapter 9 provide a list of items related to accident and incident investigation, safety data collection, analysis and exchange:

- Occurrence reporting
- Occurrence investigation
- Data exchange
- Safety assessment

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## NEFAB FEASIBILITY STUDY

- SMS documentation
- Safety monitoring
- Safety surveys
- Safety records

The activities described in the IWP-13 together with the project Safety Plan and the NEFAB Safety Case - to be developed during 2011-2012 - is considered a complete set of documentation to describe such processes and procedures necessary to avoid any degradation of safety performance in the future FAB. (See IWP-13, chapter 9, NEFAB Safety Case chapter 1.4, Safety Case Lifecycle, chapter 5 – 8 Safety Arguments and NEFAB Safety Plan chapter 4.1, Safety Assurance Process Description.)

NEFAB supports effective safety oversight by the NSA's through a set of alignment and harmonisation activities as described in the IWP 13, chapter 9. These actions (part of the NEFAB development activities) are listed below:

- Establishment of a common NEFAB safety policy
- Safety governance principles established for NEFAB prior to declaration
- Safety objectives derived for NEFAB
- Functional safety objectives derived for NEFAB
- Common Risk Classification Scheme for NEFAB developed
- Agreement on common safety assessment methodology before NEFAB moves into design and development phase
- Outline a safety culture development process for NEFAB

In summary, in similar way as the practices being done by other FABs, a phased approach in 4 steps is recommended.

- Step 1: Documentation that existing SMS for each participating ANSP has been assessed by their respective NSAs through regular safety reviews. Based on NEFAB gap analysis/assessments made by the project, it is assumed that the current certificates of the NEFAB ANSPs can satisfy the preliminary need for the FAB notification. (Current ANSP provision in the NEFAB area is safe.)
- Step 2: The gap analysis performed during the Feasibility assessment phase will be followed up by an ANSP agreement, which shall be made between the involved ANSPs focusing among other issues on the planned harmonisation/integration activities and risk mitigation before introducing any operational changes resulting from the establishment of NEFAB.
- Step 3: To develop a full Safety Case demonstrating that the NEFAB implementation is ultimately safe and the safety case satisfies all regulatory requirements. The FAB implementation can start. (estimated by early 2012)
- NEFAB 2012 and beyond: Once NEFAB is declared – based on the commonly agreed Safety Policy and Safety Plan – existing SMS could be merged and as a final goal a common regional SMS could be developed by an integrated SMS Group - depending on the agreed ambition level by the CEOs.
- The NEFAB safety case will be updated continuously and it will form the basis for future changes. These changes will be managed according to Common Requirements EC regulation 2096/2005. The formal safety case for NEFAB will cover human, procedural and equipment (hardware and software) elements of service provision in the FAB airspace.

#### **Supporting documents :**

- NEFAB SMS Initiative document
- Avinor certificate

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### **NEFAB FEASIBILITY STUDY**

Fulfilment of Regulation 550/2004 as amended by Regulation 1070/2009

- Finavia certificate
- EANS certificate
- LGS certificate

**Documentation for the fulfilment of EC regulation No 550/2004 Article 9a**

**b) “Enable optimum use of airspace, taking into account air traffic flows”**

This summary and the attached NEFAB Initiative paper (Initiatives 1, 3 and 4) explain the NEFAB activities and plans in order to fulfil this requirement. It provides detailed technical information on the following items:

- A description of the relations with the network functions, for airspace management and air traffic flow management referred to in Article 6 of Regulation (EC) No 551/2004,) including the coordination, arrangements and procedures between parties to achieve optimised use of the airspace.
- In respect of airspace management within the functional airspace block not covered by the network functions referred to in Article 6 of Regulation (EC) No 551/2004, information on:
  - The arrangements for an integrated airspace management;
  - The provisions for sharing of airspace management data;
  - The arrangements for an effective cooperative decision making;
- In respect of real time coordination within the functional airspace block:
  - A description of how cross-border activities are managed if new areas are created resulting from the establishment or modification of the functional airspace block.

**Summary/Argumentation:**

Statistics and benchmarking documentation developed by the EUROCONTROL Performance Review Unit indicates that the North European airspace is efficiently managed already today, however SAAM simulation conducted for the NEFAB project indicated additional improvement opportunities. The NEFAB 2015 Vision - based on regional capacity management and airspace design – will implement integrated management of the airspace supported with technical and operational data sharing, as required by the FAB IR.

Since 2007, as part of an overall network development approach EUROCONTROL (RNDSG) has worked in close cooperation with all FAB initiatives. This close cooperation is demonstrating the compliance with the FAB IR requirements regarding items a) and b). All the FAB initiatives utilized the Advance Airspace Scheme (AAS) and the Dynamic Management of European Airspace Network (DMEAN) operational concepts.

The airspace development with EUROCONTROL included a NEFAB-wide assessment of the existing Civil-Military coordination based on FUA. The NEFAB project will address, in close cooperation with the military partners, the validation of the NEFAB Operational Concept in 2011-2012 during the NEFAB Development phase when additional simulations and validation activities are foreseen. The EUROCONTROL Guidelines on Generic Military requirements - together with national requirements – shall provide the guiding principles for the establishment of NEFAB. FUA within NEFAB will be carried out in accordance with the principles laid down in Commission Regulation (EC) No 2150/2005 of 23 December 2005.

## Documentation for the fulfilment of EC regulation 550/2004 Article 9.a

### c) “Ensure consistency with the European route network established in accordance with Article 6 of the airspace Regulation”

This summary and the attached NEFAB Initiative papers (1, 3 and 4) explain the NEFAB activities and plans in order to fulfil this requirement:

The member States concerned shall provide information to demonstrate that route design and implementation for the functional airspace block is consistent with, and completed within, the established process for overall coordination, development and implementation of the European route network referred to in Article 6 of regulation (EC) No 551/2004.

Member States concerned may refer to information already provided to the Commission as part of the single European sky.

#### Summary/Argumentation:

Building on the RND SG airspace improvements Catalogue, EUROCONTROL supported the NEFAB airspace design as part of a coordinated development and deployment FAB support activity. This ensured that airspace modelling was fully in line with the overall pan-European network. The common work with EUROCONTROL also ensured consistency and interconnectivity inside NEFAB and in the interface with neighbouring FABs and third States, a uniform application of ASM/ATFCM procedures, a synchronised implementation of new airspace projects and operational concepts.

According to EUROCONTROL (RND SG/71 WP13) to providing NEFAB data for the Route Planning Data Base of RND SG can be considered as a formal reference on the inclusion of NEFAB development activities into the European route network.

The detailed description of the NEFAB airspace design and implementation plan for the free route operations is attached in Initiative paper 1. Further simulations are planned in the NEFAB Development phase for validation of the initial SAAM sectorisation model and for the development of real-time capacity management function for NEFAB. These simulations will include the development and validation of a NEFAB-wide Contingency Plan in order to ensure service recovery arrangements.

Airspace users and group of airspace users are represented at the RND SG meetings, thus they are aware of FABs development and part of the consultation process. In addition, the NEFAB project has made presentation/consultation with North European airspace users.

## Documentation for the fulfilment of EC regulation 550/2004 Article 9.a

### d) “Overall added value based on Cost-benefit analysis”

EC regulation 550/2004 Article 9/a requires that a Functional Airspace Block must be justified by its overall added value, including optimal use of technical and human resources, on the basis of cost-benefit analysis. This summary and the attached NEFAB Initiative paper 4 (the NEFAB Socio/economic analysis and internal ANSP CBA) explains the NEFAB activities and results in this area.

- a) The Member States concerned shall provide statements confirming that:
- b) The cost benefit analysis was conducted according to industry standard practice, using among others discounted cash flow analysis;
- c) The cost-benefit analysis provides a consolidated view of the impact of the establishment or modification of the FAB on the civil and military airspace users;
- d) The cost benefit analysis demonstrates an overall positive financial result (Net present value and/or Internal Rate Return) for the establishment or modification of the FAB;
- e) The FAB contributes to a reduction of the aviation environmental impact;
- f) Values for costs and benefits, their sources and assumptions made to develop the cost-benefit analysis were documented;
- g) The main stakeholders were consulted and provided feedback on the costs and benefit estimates which are applicable to their operations.

### Summary/Argumentation:

The attached NEFAB Socio-economic analysis and internal ANSP CBA provide detailed documentation that all above criteria have been fulfilled. In particular, NEFAB will contribute to reduction of aviation environmental impact and the CBA demonstrates an overall positive financial result of the NEFAB airspace.

## Documentation for the fulfilment of EC regulation 550/2004 Article 9a

### e) “Functional Airspace Blocks shall ensure smooth and flexible transfer of responsibility for air traffic control between air traffic service units.”

This summary and the attached NEFAB Initiative papers explain the NEFAB activities and results in this area:

Member States concerned shall provide information to demonstrate that the transfer of responsibility for air traffic control is smooth and flexible within the functional airspace block. This shall include the following information on the changes introduced by the establishment or modification of the functional airspace block:

- a) A description of the arrangements for cross border provision of air traffic services;
- b) The arrangements concluded to enhance coordination between the concerned air traffic service providers within the functional airspace block and further planned initiatives to enhance coordination;
- c) A description of the arrangements concluded to enhance coordination procedures between the concerned civil and military air traffic service providers and further planned initiatives to enhance coordination in line with the concept of flexible use of airspace;
- d) A description of the arrangements concluded to enhance coordination procedures with the concerned adjacent air traffic service providers, and further planned initiatives to enhance coordination.

### Summary/Argumentation:

In the NEFAB, sector boundaries will be established according to traffic flows and regardless of FIR boundaries in order to be free of flight level constraints or coordination points constraints. The procedures for smooth and flexible transfer of responsibility have been assessed in Initiative papers 1 and 3 and will be further refined in the NEFAB Development phase.

The air traffic service providers in the NEFAB are committed to apply procedures that ensure seamless transfer between their sectors. These procedures are already in place and they will be harmonised in order to ensure a safe, smooth and flexible transfer of responsibility in the NEFAB environment.

In current operation all flightplans are sent to military air defence units and relevant flightplans are sent to military air traffic service units at military airfields. In the NEFAB there is no military air traffic services provision to en-route traffic. By December 2012 NEFAB expects that all adjacent air traffic service providers have installed necessary functionality in their ATM systems to ensure compliance with EC 1032/2009.

Further enhancement of the coordination procedures will be examined in the NEFAB Development phase.

The procedures will be documented in Annexes to Letter of Agreements. Further enhancement may be developed in the NEFAB Development Phase and will be the subject of negotiation with the adjacent air traffic service providers in the time span 2013 to 2015.

In the development phase of NEFAB, analysis of existing and already planned Medium Term Conflict Detection systems (MTCD) in order to assess if these systems can provide sufficient safe support to ATCOs in connection with smooth and flexible transfer between ATS units.

As a minimum all transfers will respect the EC 1032/200X requirements and a cost benefit analysis of the possibility to upgrade ATM systems in order to make full use of the community specification “OLDI version 4.1”, including optional functionality will be carried out in the NEFAB Development Phase.

## **Documentation for the fulfilment of EC regulation 550/2004 Article 9.a**

### **f) “Ensure compatibility between the different airspace configurations, optimising inter alia the current Flight Information Regions”**

This summary and the attached NEFAB Initiative papers explain the NEFAB activities and results in this area:

The Member states concerned shall provide information to demonstrate that the airspace organisation and classification are harmonised across the functional airspace block. This shall include the following information:

- a) The principle for airspace classification and airspace organisation for the FAB;
- b) The changes of airspace configuration resulting from the harmonisation within the FAB.

#### **Summary/Argumentation:**

During the NEFAB Feasibility study phase both of the above issues have been thoroughly assessed by initiatives 1 and 4. It was found that principles used for airspace classification (ICAO) are the same in each NEFAB States. The organisation of the national airspace is based on operational requirements. However, different applications of airspace classification and different organisation of air traffic services do exist within the NEFAB area. The current airspace design (including the differences in the application of airspace classification) is the result of national priorities and needs. To overcome these differences, during the FAB development phase, optimisation of sector alignments and TMA-/en-route interface as well as common application and access rules of class C airspace above FL 95 in continental en-route airspace is envisaged.

Harmonisation of airspace classification will facilitate cross-border sectorisation and thereby avoid complexities involved with applying different rules and procedures.

Some of the NEFAB states are involved in preparation of common Transition altitude. The results of this activity will be included in NEFAB development. More detailed technical information on airspace configurations and the proposed way forward can be found in Initiatives 1 and 4.

## Documentation for the fulfilment of EC regulation 550/2004 Article 9.a

### g) “Comply with conditions stemming from regional agreements concluded within ICAO”

The Member states concerned shall provide the list of existing regional agreements concluded in compliance with the framework established by Annex 11 to the Convention on International Civil Aviation which are of relevance with respect to the establishment and operations of the functional airspace block.

#### Summary/Argumentation:

The existing regional agreements concluded with ICAO, which are of relevance with respect of NEFAB, are the following:

- 1) State level agreement between Kingdom of Norway and ICAO in respect of Air Navigation Service provision in the North Atlantic (NAT) region.

#### Additional information:

The SES initiative has been developed in line with the obligations stemming from the membership of the Community and its member States of EUROCONTROL and ECAC and it is in line with the principles laid down by the 1944 Chicago Convention on International Civil Aviation (EC 549/2004 item 4)

The establishment of NEFAB in accordance with SES regulations will thus be in conformance with the ICAO provisions. Existing regional agreements (as listed above) will be fully respected and compliance between NEFAB and NAT will be ensured. NEFAB interface activities are included in the proposed initiatives to be conducted during the NEFAB Development phase.

## Documentation for the fulfilment of EC regulation 550/2004 Article 9.a

### h) “The FAB must respect regional agreements in existence on the date of entry into force of EC regulation 1070/2009, in particular those involving European third countries”

The Member States concerned shall provide a list of existing regional agreements concluded by one or more of the Member States concerned, including those with European third countries, which are of relevance with respect to the establishment and operations of the functional airspace block.

The existing regional agreements, which are of relevance with respect of NEFAB are the following:

- State level agreement between Kingdom of Norway and ICAO in respect of Air Navigation Service provision in the North Atlantic (NAT) region;
- Existing bilateral State level agreements and LoAs between the NEFAB states and other neighbouring third countries (e.g. Russian Federation).

### Summary/Argumentation:

All of the participating States of the NEFAB initiative are members of ICAO, but not all are member of the Community. However, on 1st of October 2008, the European Commission adopted a Communication taking stock of the progress made in the development of a broader Common Aviation Area with the neighbouring countries by 2010. Norway is a signatory to the ECAA and is therefore committed to implement the SES regulations.

Other existing agreements concluded with third countries will be fully respected. The NEFAB project will during the next phase establish close cooperation with neighbouring FABs and third countries which are of relevance for the establishment and operation of NEFAB. Proposed interface arrangements will be developed and included in the NEFAB Operational Concept document.

## Documentation for the fulfilment of EC regulation 550/2004 Article 9.a

### i) “FAB must facilitate consistency with Community-wide performance targets”

The Member States concerned shall provide information on the arrangements concluded in order to facilitate consistency with European Union-wide performance targets referred to in Article 11 of Regulation (EC) No 549/2004.

#### Summary:

a) As the overriding principle, NEFAB targets must be in compliance with the 11 ICAO key performance areas listed in ICAO Doc 9883 and used as framework for the performance target setting in the SESAR program. In addition the target setting must comply with EC Regulation 691/2010. For reference the European-wide SESAR 2020 targets are:

- Enable a threefold increase in capacity
- Improve safety by a factor of 10
- Reduce by 10% environmental impact per flight
- Cut ATM costs by 50%

b) The European wide performance targets for the first reference period (2012 – 2014) have been approved by the Single Sky Committee at their meeting on 3rd December 2010. The targets are defined for 3 areas: Environment, Capacity and Cost efficiency. (safety targets are not defined for the first reference period)

c) The ANSPs of NEFAB as from 2011 shall produce annual reports to their respective NSAs, demonstrating compliance with the European performance targets. NEFAB Member States could therefore refer to these reports as means of compliance, until the second reference period when performance targets have to be established at FAB level. For the North Atlantic (NAT) airspace it may be required to adopt performance targets set by ICAO which may be different from EU-wide targets.

**Argumentation:**

Each of the ANSPs participating in NEFAB has already set their own performance targets in their Business Plans, which are approved by the appropriate national authorities.

Based on the findings of the NEFAB feasibility report (CBA, Socio/economic study and the chosen scenario) it can be stated that NEFAB performance objectives are consistent and comparable with those being defined by EU at European level;

According to the ATM benchmarking data (ACE 2008 - published in autumn 2010) the Nordic ANS providers are among the best performing in the ECAC area regarding safety, capacity, environment initiatives and performance. Cost efficiency in the NEFAB area – at average – is very close to the European average level.

The NEFAB ANSPs approved the NEFAB Vision/target: “to become the best performing airspace in Europe by 2015 measured by regional performance targets”. The NEFAB CBA and Socio-economic analysis provide the estimated figures regarding cost efficiency and possible performance improvements in 2015 and 2020 perspectives. These figures provide a solid basis for the performance target setting for the NEFAB project.