INFORMATION PROVIDED TO THE EUROPEAN COMMISSION ON THE ESTABLISHMENT OF THE DANUBE FAB

Edition Number	**:**	**1.0**
Edition Date	**:**	**29.05.12**
Status	**:**	**FINAL**
Intended for	**:**	**General Public**

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

DOCUMENT CHARACTERISTICS

TITLE		
INFORMATION PROVIDED TO THE EUROPEAN COMMISSION ON THE ESTABLISHMENT OF THE DANUBE FAB		
	Publications Reference:	
Document Identifier	**Edition Number:**	0.16
1.2.4	**Edition Date:**	29th May 2012
Authors		
DANUBE FAB Project Management Office (PMO)		
Contact Persons	**Tel**	**Unit**
VESELIN STOYANOV	+359 2 937 1238	BULATSA
ADRIAN FLOREA	+40 21 2083 221	ROMATSA

STATUS, AUDIENCE AND ACCESSIBILITY					
Status		**Intended for**		**Accessible via**	
Working Draft	☐	General Public	☑	Internet	☐
Draft	☐	Stakeholders	☐		
Proposed Issue	☐	Restricted Audience	☐		
Released Issue	☑	*Printed & electronic copies of the document can be obtained from The DANUBE FAB Project management office (PMO)*			

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

DOCUMENT APPROVAL

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

AUTHORITY	NAME AND SIGNATURE	DATE
FOR THE MINISTRY OF TRANSPORT, INFORMATION TECHNOLOGY AND COMMUNICATIONS, REPUBLIC OF BULGARIA	MR. KAMEN KITCHEV	1.6.2012
FOR THE MINISTRY OF TRANSPORT AND INFRASTRUCTURE, ROMANIA	MR. VALENTIN PREDA	30.05.2012
FOR THE MINISTRY OF NATIONAL DEFENCE, ROMANIA	COL. ADRIAN CODI	29.05.2012
FOR THE MINISTRY OF DEFENCE, REPUBLIC OF BULGARIA	BRIG. GEN. RUMEN RADEV	29.05.2012
FOR THE DIRECTORATE GENERAL CIVIL AVIATION, MINISTRY OF TRANSPORT AND INFRASTRUCTURE	MR. CATALIN RADU	
FOR THE MINISTRY OF TRANSPORT, INFORMATION TECHNOLOGY AND COMMUNICATIONS, REPUBLIC OF BULGARIA, DIRECTORATE GENERAL CIVIL AVIATION ADMINISTRATION	MR. MINTCHO TZVETKOV	29.05.2012
FOR THE ROMANIAN CIVIL AERONAUTICAL AUTHORITY	MRS. CLAUDIA VIRLAN	29.05.2012
BULATSA DIRECTOR GENERAL	MR. DIYAN DINEV	29.05.12
ROMATSA DIRECTOR GENERAL	MR. ALEODOR FRANCU	29.05.12
ROMATSA PROJECT LEADER	MR. ADRIAN FLOREA	29.05.2012
BULATSA PROJECT LEADER	MR. VESELIN STOYANOV	29/05/2012

The released issue of this document was prepared in 2 (two) identical originals.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

DOCUMENT CHANGE RECORD

The following table records the complete history of the successive editions of the present document.

EDITION NUMBER	EDITION DATE	REASON FOR CHANGE	PAGES AFFECTED
0.01	09/03/12	Initial version	All
0.05	12/03/12	Immature draft, for information only	All
0.11	21/04/12	First draft for review by WGs	All
0.13	04/05/2012	Second Draft including extensive comment from WGs and implicated parties	All
0.14	09/05/2012	Mature version, for final comment and approval by WGs	All
0.15	18/05/2012	Finalised Document with all comments addressed – Submitted to Steering Committee	All
1.0	29/05/2012	Released document, updated and approved by DANUBE FAB Steering Committee	All

BULATSA Headquarters
1 Brussels Blvd.
1540 Sofia
Bulgaria
Tel: +359 2 937 1238
Fax: +359 2 945 9168
E-mail: veselin.stoyanov@bulatsa.com

ROMATSA Headquarters
10, Ion Ionescu de la Brad Blvd.
P.O. Box 18-90
013813 Bucharest
Romania
Tel: +40 21 208 32 21
Fax: +40 21 230 35 68
E-mail: adrian.florea@romatsa.ro

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Executive Summary

The objective of the DANUBE FAB, in the airspace under the responsibility of Romania and the Republic of Bulgaria, is to improve capacity, cost-efficiency and environmental protection by harmonising and optimising provision of ATM/ANS and civil-military cooperation in a process of sustainable development, while maintaining or increasing the level of safety. This objective has the highest level of political commitment in both States and forms part of the legal basis of FAB establishment (Article 4 of the State Agreement (Annex A)).

This overview section provides a summary of the DANUBE FAB, including: how and why the FAB was developed and a description of the key features and benefits. The summary also includes sections on the implementation plan, civil-military cooperation, and European engagement and coordination with other FABs.

The information included in this document is accurate up until 29th May 2012.

How the DANUBE FAB was developed

On the 21st of October 2004 in Bucharest, at the second meeting of the Steering Committee of ACE (ATM Co-Operation in South - Eastern Europe[1]) the air navigation service providers (ANSPs) of the two States, presented the "*Initiative for creating the prerequisites for the establishment of a functional airspace block*" for consideration by the signatory ACE Parties. The Initiative was proposed by the two ANSPs with the purpose of commencing the necessary activities to identify and fulfil the prerequisites for the establishment of a functional airspace block by Republic of Bulgaria and Romania.

On the 25th of February 2005 ,in Sofia, the Initiative received political support from the governments of both States when a "*Joint Statement on the initiative for creating the prerequisites for the establishment of a functional airspace block*", was signed by the Deputy Minister of Transport and Communications of the Republic of Bulgaria and the Secretary of State, Ministry of Transport and Infrastructure of Romania, in the presence of the DG of EUROCONTROL.

In September 2006 the Minister of Transport of the Republic of Bulgaria and the Minister of Transport and Infrastructure of Romania signed a Declaration on "*a common vision for co-operation in the context of preparation for applying Single European Sky Concept, including establishment of Functional Airspace Blocks*". This formal act established the framework for further developments and facilitated the process of signing agreements at subsequent levels.

As a result of these steps, the DANUBE FAB Project was initiated and the following phases were defined in the feasibility study of the future Danube FAB:

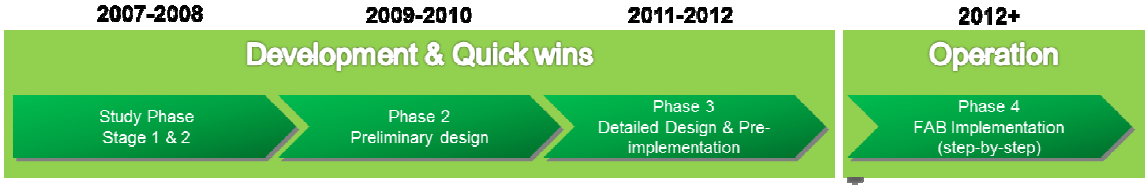


Figure 1: DANUBE FAB project phases

[1] The ACE initiative was established by an MoU signed on 21st July 2003 in Strasbourg

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

During the development phase, cooperation between the parties involved was enabled through a legal framework consisting of:

- Memorandum of Understanding (MoU) between the Ministries of Transports of both States (signed 26th February 2010);
- MoU between the National Supervisory Authorities (NSAs) of both States (signed on 19th October 2010); and
- MoU between BULATSA and ROMATSA (signed on 10th August 2010).

These agreements enabled a project structure to be set up as follows:

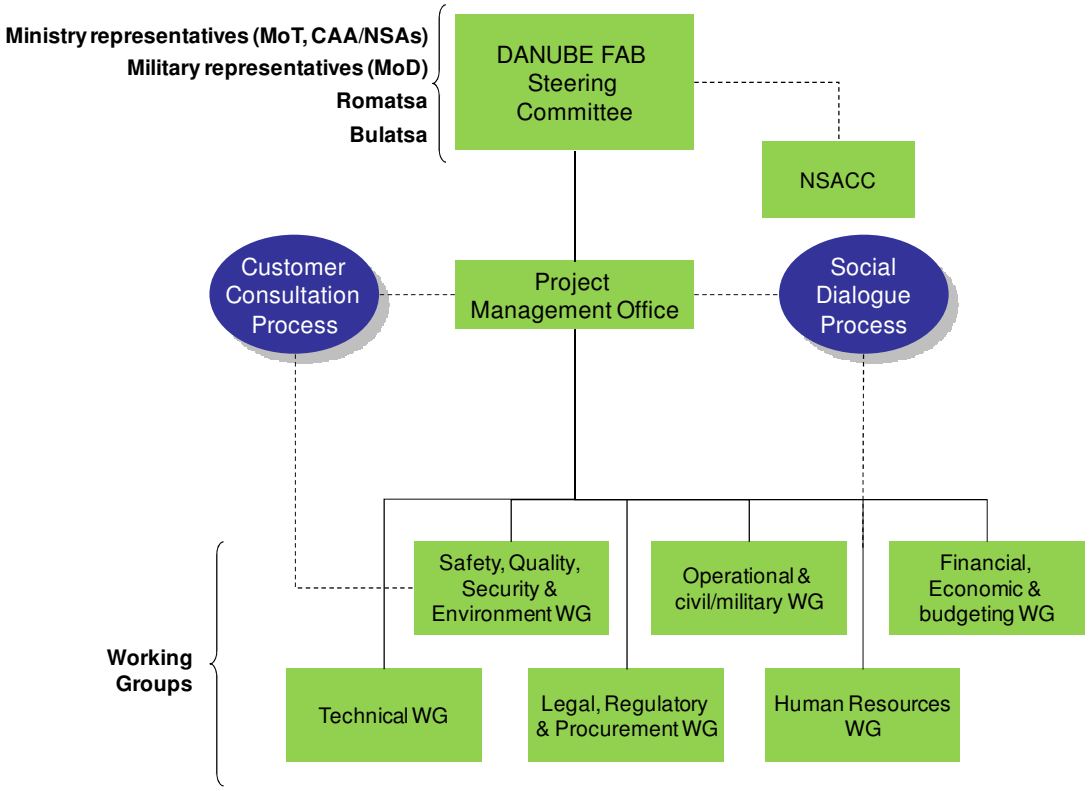


Figure 2: DANUBE FAB project structure

Steering Committee	The strategic level of decision-making for the development of DANUBE FAB is entrusted to a Steering Committee. The Steering Committee is co-chaired by the State Secretary of the Ministry of Transport and Infrastructure of Romania and a Deputy Minister of the Ministry of Transport, Information Technology and Communications of the Republic of Bulgaria, and comprises, *inter alia*, representatives from the Ministries of Transport, Ministries of Defence, the Civil Aviation Administrations / NSAs and the ANSPs.
National Supervisory Authorities Coordination Committee (NSACC)	The NSACC is co-chaired by appropriate officials from Bulgarian and Romanian CAAs and comprises representatives from the NSAs involved with the appropriate expertise relevant to the regulatory and supervision functions to be performed in respect of the development and further implementation of DANUBE FAB. It provides a formal coordination and interface forum between the NSAs involved on the on-going compliance of the ANSPs and related matters.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Project Management Office (PMO)	The Project Management Office (PMO) is responsible for the day-to-day execution of the planned activities during the development of the FAB up until establishment (before 4th December 2012). The PMO consists of the Project Leaders from ROMATSA and BULATSA, their deputies, contact persons, and Project Management Support.
Working Groups (WG)	The PMO manages and coordinates the work at the expert level, which during development is performed by six Working Groups (WGs) comprising representatives of both ANSPs, along with stakeholders from the military, NSAs and the Network Manager for the SQSE and operational WGs: • Operational and Civil/Military Coordination WG; • Technical WG; • Safety, Quality, Security & Environment WG; • Financial, Economic & Budgeting WG; • Legal, Regulatory & Procurement WG; • Human Resources WG.
Consultation mechanisms (social dialogue, customer consultation)	The FAB has been developed coherent with the requirements of the airspace users, fully compliant with the EC regulation and the initiative of both the ANSPs. As such several consultation meetings have taken place and feedback has been taken on board, through 'customer consultation processes' for airlines, and a 'social consultation forum' for staff. Details on these mechanisms are provided in sections 2.5 and 2.6 respectively.

Table 1: DANUBE FAB Governance during development phase

Key features and benefits of the DANUBE FAB

The aim during the development of the DANUBE FAB was, for lower, upper and terminal airspace, to:

- consider, propose and assess the extent to which cooperation in the FAB was feasible and beneficial
- develop the feasible cooperation initiatives to the point of implementation
- enable the gradual reduction of the number of ACCs (initiated at the early stages of the FAB) from seven in 2003 to two by the end of 2012. This also responds to contingency needs at FAB level.

Key to achieving this has been the common development of a DANUBE FAB operational concept (ConOps). This document is included in Annex D and has been developed by civil and military operational experts as a major output of the operational working group. It describes the operational principles agreed by the Partners and provides a high-level presentation of the target concept meant to support enhanced performance of the ATM network in the region in terms of safety, capacity, efficiency and protection of the environment. It also considers the future developments at European level both up to and after 2015, and is developed in line with the European ATM Master Plan, the ICAO Global Plan and SESAR Target Concept. The ConOps considers military requirements in the context of the implementation of functional airspace blocks and EUROCONTROL guidance material on this subject.

The ConOps represents an essential reference for the DANUBE FAB in terms of identification of functions and processes, their corresponding interconnections and information flows, the actors concerned and their roles and responsibilities.

The purpose is to describe the DANUBE FAB operational environment and associated operational improvements planned up to and after 2015, in a structured form, thus providing the reader with a general understanding of essential operational matters for FAB operations.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

The ConOps describes:

- the DANUBE FAB airspace structure and the associated pre-defined scenarios and modus operandi;
- the collaborative process and harmonised ATS procedures aiming to support flexible management of the airspace;
- an integrated approach to airspace organisation, flow and capacity management;
- processes aiming to support civil-military cooperation;
- demand-capacity balancing;
- DANUBE FAB network improvements, while being constantly and pro-actively aware of Pan-European Network developments;
- processes to support performance monitoring and sharing of best practices with a view to further improvements; and
- ESSIP objectives and operational improvements derived from the European ATM Master Plan.

Building on the agreed operational concept, the remainder of this section describes the key features and benefits of the DANUBE FAB, organised into the following categories:

- Airspace
- Governance
- Technical and Common Procurement
- Safety
- Training

For each category, the main initiatives are described below, along with quantified costs and benefits. A summary of the quantified NPV breakdown resulting from the detailed analysis of the perceived costs and benefits, for airspace users and for ANSPs is provided in the table below. Full details on the financial impact of the FAB on ANSPs can be found in section 6 (along with equivalent information related to Airspace Users).

Initiatives	NPV
Airspace	€15.3 M
Governance	*(€2.8 M)*
Technical	€4.2 M
Safety	€4.3 M
Training	Minor
Total	**€21 M**

Table 2: Summary of Baseline ANSP NPV

Airspace

The principal focus during the development of the DANUBE FAB has been to re-design airspace, taking due account of operational improvements and ensuring optimisation is achieved. This process has taken into account requirements from all airspace users, European Regulation, efficiency criteria and principles of airspace design, regardless of existing boundaries (see Annexes P, Q and R for airspace design documentation). The DANUBE FAB airspace may thus be considered, at this stage of development, as one single continuum across its geographical area. The transfer of responsibility for provision of ATS is smooth and unconstrained by national boundaries/FIR borders. This is as a result of a more efficient route network with significant improvements regarding operations and flight efficiency for all airspace users. Cooperation has also been established at the FAB level to

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ensure a common approach to airspace utilisation rules and to civil/military airspace utilisation procedures.

The re-designed airspace and optimised route network have been developed, in the context of DANUBE FAB project, by the DANUBE FAB Airspace Design and Operations Development Expert Group (ADODEG) which is a Subgroup of the DANUBE FAB Operational and Civil / Military Coordination Working Group (WG).

The DANUBE FAB fixed route network is included in and compliant with the European ATS Route Network Version-7 (ARN v.7) and has been developed to easily ensure further integration into the future European Route Network Improvement Plan ARN V8 (now in development stage). The main objectives in developing of each Route Project were to shorten the flying distance within the DANUBE FAB, reduce costs, increase flight efficiency, reduce environmental impact and increase capacity. All those objectives were accomplished taking into account the harmonisation and optimisation of operational procedures, and keeping ATCO's workload to acceptable levels, while maintaining a high level of safety standards. The FAB route network has been developed in accordance with the European ATM Master Plan and the Single European Sky (SES) regulations. It enables an optimisation of the air traffic flows in the DANUBE FAB airspace and opens the possibility for further refinement and optimisation to be coherent with further changes at European level.

The DANUBE FAB ADODEG representatives are members of the Network Manager expert groups dedicated to the route network design function (RNDSG, ASMSG and NETOPS), thus ensuring consistency with the European Route Network and with developments in other FABs. The DANUBE FAB ADODEG representatives also participate in the appropriate ICAO working arrangements (RDGE) to align the DANUBE FAB network within the ICAO European region.

During the design phase, several airspace organisations (scenarios) were simulated in real time at the EEC (Eurocontrol Experimental Centre) in Bretigny, France. This was undertaken in order to assess the proposed route network and collect valuable data in support of further decisions regarding implementation (see Annexes J and K for the reports from the RTS).

The result of the DANUBE FAB operational working group activity is 95 new and dedicated DANUBE FAB route Projects, 88 of which are currently agreed for implementation. These route Projects have been developed under the DANUBE FAB project and they will continue to be adapted to the evolving situation in respect of traffic flows and the European route network. This is the main task of the ADODEG Subgroup part of the Operational and Civil Military Coordination Group of the DANUBE FAB. 41 route projects have already been finalised and implemented, and an implementation plan has been agreed for the remaining projects, which extends up to 2020. Based on the results of the RTS further development of the planned future routes may be performed. The free route airspace implementation will follow the initial implementation step of night free route operations and will be in-line with the implementation of the Free Route concept at European level. The implementation of free route operations within DANUBE FAB airspace is scheduled to begin in the summer of 2014.

The DANUBE FAB airspace design initiatives reduce the route distance flown, resulting in flight time and fuel savings for airspace users. In the period 2008 to 2030 the savings from the airspace design perspective sum up to a total Net Present Value (NPV) of €570M. By 2030, an average of 1.14 minutes, more than 47kg fuel and around 150kg of CO_2 per flight are saved. Taking into account the sensitivity of discount rate, fuel cost, CO_2 cost and traffic provides a minimum saving of €446M and a maximum of €821M.

For the ANSPs, the new airspace structures enable longer term efficiencies in ATCO numbers due to more efficient airspace and greater ATCO productivity. This results in a saving of an estimated 29 ATCOs and their associated training and employment costs by 2030. Taking account of pre-implementation and one-off costs, this results in an NPV of

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

€15.5M from this initiative alone. The ANSP NPV including all other airspace initiatives is €21M.

Governance

The DANUBE FAB States have concluded a State Level Agreement (Annex A) which puts in place the overarching legal framework for governing the FAB. Once the State Level Agreement enters into force, a governance structure will be established to manage the FAB.

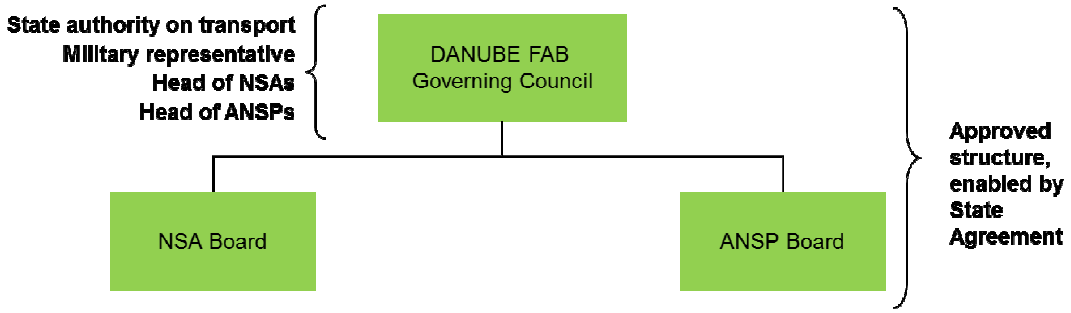


Figure 3: FAB governance

The governance structure will be made up of three core governing bodies:

- **Governing Council**: provides oversight and approval of key FAB documentation (DANUBE FAB Strategic Plan and Annual Plan, safety policy, airspace policy, performance plans, etc.). The Governing Council will be composed of one high-level representative of the State authority on transport of each Party, one representative from the authority responsible for military aviation in each Party, the Heads of both NSAs and the Heads of both ANSPs.
- **NSA Board:** oversees the NSA supervisory activities. It will be composed of the heads of the NSAs of both Member States. Details of NSA cooperation are included in the NSA Agreement (Annex B)
- **ANSP Board:** oversees implementation at the ANSP level via the ANSP agreement. The Board will be composed of representatives from both ANSPs. Details of ANSP cooperation are included in the ANSP Agreement (Annex C).

These bodies may set up additional specialised Standing Committees or other supporting bodies, in accordance with their respective Terms of Reference/Rules of Procedure.

The execution at the ANSP level is through the ANSP agreement (Annex C) in which a number of committees will be established.

The ANSP Board will take decisions on the basis of proposals from a **Strategies and Planning Standing Committee (SAPSC).** The SAPSC will provide support on FAB strategic planning, implementation of strategic tasks, identification and assessment of new initiatives, coordination and reporting tasks. It will be composed of experts from operational, technical, HR, safety, legal and financial domains of both ANSPs. The SAPSC will be able to define tangible cooperation tasks with clear objectives, timescales and outcomes and assign 'task forces' to drive progress. It will include administrative/secretarial support to deliver its tasks. Provision is made in the ANSP Agreement (Annex C) whereby individual representatives from the SAPSC may directly approach the ANSP Board if there are issues arising related to safety matters.

The **Operational Standing Committee (OSC)** is a standing committee on operations (including training) and technical initiatives. The **Safety, Quality, Security and Environment Standing committee (SQSESC)** is a standing committee dealing with safety, quality, security and environmental initiatives. Both committees will be composed of a pool of experts that can be assigned to FAB initiatives on a part-time basis.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

The benefits of this structure include good cross-domain coordination at the practical level (rather than at the managerial or director level) and easy management due to the minimal number of committees. This enables decisions to be taken in a coherent manner and promotes a culture of trust and cooperation between both ANSPs which will continue to evolve through the application of the ANSP agreement.

The on-going cost of the management and governance activities is computed to have an NPV of -€2.83M up to 2030.

Technical

Following a detailed analysis, the Technical Working Group developed a Strategic and Harmonisation Plan for CNS Assets and a DANUBE FAB technical architecture (Annex L). As a result of the FAB, cooperation is taking place at the technical level in several areas, including:

- An agreement has been reached to commonly procure a data-link solution for air-ground communication services
- Radar cost avoidance in 2012: ROMATSA was able to avoid the purchase of one new radar covering the South-Western Romanian airspace since coverage and data sharing is available from a BULATSA radar system. Future procurement for normal lifecycle replacement will be avoided. There is a bi-lateral agreement in place “For the reciprocal exchange of the radar data”.
- Optimisation of navigation infrastructure removes the need for BULATSA to acquire three DMEs for RNAV capability, thus saving DME costs. An agreement has been signed between the two ANSPs covering the shared use of radio navigation aids for area navigation which includes DMEs (Annex M).
- Additional contingency is available through sharing each other’s AFTN services using the DANUBE FAB communication infrastructure in common.
- Taking into account the stages in the lifecycle of the existing ATM systems, the ANSPs are considering possible common procurement of an ATM system starting from the 2017/2020 timeframe and in-line with European ATM Master Plan objectives. A firm commitment has not yet been made and no benefits from this future initiative have been included in the CBA.
- Where possible, both ANSPs have agreed to develop harmonised specifications for future procurement of technical systems and related services.
- Common procurement is likely to be further aligned once the ANSP Board is established and the first ‘Common Strategic and Harmonisation Plan’ is developed.

Common CNS strategy and planning, coupled with agreed initiatives in common procurement contribute **€4.2M** to the NPV of the ANSP until 2030. This is principally made up of capital and operating cost avoidance during the period.

Safety

Safety has been adequately considered at all phases of the development of the DANUBE FAB and addressed in the Agreements signed between the States, NSAs and ANSPs.

Comprehensive activities for the development of safety assurance for the establishment of the DANUBE FAB have been carried out and this is reflected in the DANUBE FAB Safety Case (Annex E). It provides the justification, with extensive argument and evidence, for the overall safety claim: “ANS provision in the DANUBE FAB will remain safe”. The safety case is a living document which will be revised and maintained as necessary throughout the lifetime of the DANUBE FAB.

The “SMS Roadmap for the Harmonisation and Enhancement of BULATSA and ROMATSA Safety Management Systems within DANUBE FAB” (Annex F) lays down a complete plan of

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

activities and schedule of milestones for aligning and harmonising the Safety Management Systems of the DANUBE FAB ANSPs.

The DANUBE FAB Safety Policy (Annex G) has been released. The main safety objective of the DANUBE FAB entities is to ensure that the number of accidents, serious or risk bearing incidents induced by ANS provision do not increase, and whenever possible, decrease. Safety has priority over commercial, operational, environmental or social pressures.

The scope of the DANUBE FAB safety assurance documentation goes beyond the criteria derived from the requirements of the Regulation No 176/2011 regarding the information to be provided to European Commission before the establishment of a FAB. The DANUBE FAB Safety Case brings arguments that those elements of safety that are required to ensure compliance with all applicable safety regulations and safe service provision in the FAB airspace are adequately addressed by the DANUBE FAB establishment and management arrangements.

ANSP cooperation in the safety domain contributes €4.3 M to the ANSP NPV during the period to 2030, as per the "DANUBE FAB Cost Benefit Analysis" (Annex H). The main reasons are the avoidance of staff costs and training that would have been needed in the no-FAB scenario.

Training

Based on extensive analysis of training programmes within both ANSPs, a common agreement has been reached to harmonise aspects of ATCO staff training, licensing and training of engineering personnel (ATSEPs), and training of meteorological, safety, security, environment and quality experts.

In this respect, topics were debated regarding national structure of training and compliance with international requirements. Extensive analysis of training programmes within both ANSPs was undertaken and the conclusions were reflected in the DANUBE FAB documents and studies which describe selection and training design methods based on objectives and suitable for highly cognitive activities.

Regarding the training organisations, it was agreed that it is more efficient to keep the prerogatives of the existing ones that are approved by NSAs.

Furthermore, in order to have a coherent approach on training in Danube FAB, a Training Policy will be developed and further adopted in Danube FAB, establishing the training principles and approach for all staff mentioned above.

The approaches regarding the major activities, and the different results reached are detailed in dedicated sections of this document. For the time being, the agreements in training contribute only €22K to the NPV of the ANSPs until 2030.

Implementation Plan

The DANUBE FAB will be established before the end of 2012. By the 4th of December 2012 all the necessary steps to ensure that the governance structures and supporting material are in place to begin operations will be completed. In particular, the entry into force of the State Level Agreement (Annex A) represents a major milestone and will enable the Governing Council to take over from the Steering Committee and to begin their task to oversee the implementation phase through the NSA and ANSP Boards.

Following the submission of this document and in accordance with article 10.5 of the State Level Agreement (Annex A) the DANUBE FAB parties will develop and adopt a DANUBE FAB Strategic Plan and Annual Plan in which detailed implementation steps for the period following establishment will be elaborated. As part of the Strategic Plan and Annual Plan, DANUBE FAB will continue to look for benefits to expand and improve the FAB. In the meantime a detailed set of dates has already been committed to for the implementation of airspace routes (as described in section 4), for safety initiatives (see SMS roadmap in Annex

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

F), for technical initiatives (see DANUBE FAB Technical Architecture in Annex L) and for several other initiatives identified in this document. A summary of some of the key dates are included in the figure below.

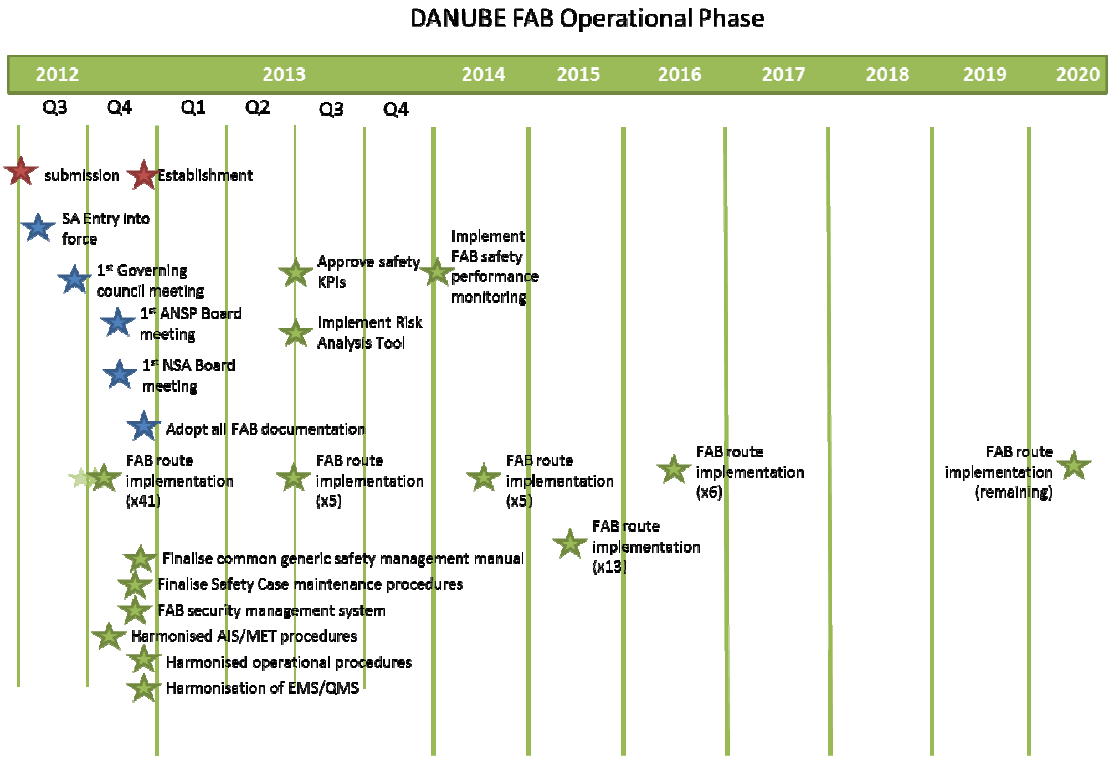


Figure 4: DANUBE FAB operational phase

Civil-military cooperation

The DANUBE FAB Concept of Operations (Annex D) was developed, agreed and signed by the managements of both the civil and the military ANSPs in Bulgaria and Romania. The legal arrangements for cooperation between civil and military authorities are contained in Article 5 (b), (c), and (k), and Articles 7, 27 and 28 of the DANUBE FAB State Level Agreement (Annex A).

Military involvement is also ensured through their participation in the Governing Council of the DANUBE FAB.

A good example of civil-military cooperation within DANUBE FAB concerned a SHABLA exercise which requires frequent activation of danger areas close to the boundary between Sofia FIR and Bucuresti FIR. Alternate ATS routes were therefore developed through close coordination between Bulgaria and Romania. The purpose was to optimize the civil-military coordination and to improve the flight planning process when danger areas are activated. The agreements reached will be published in the AIP and the procedural issues including coordination regarding activation will be implemented before summer 2012 [36].

Furthermore, a High Level Airspace Policy Body, is envisaged as a joint civil-military body. Specific military involvement is also ensured in DANUBE FAB activities including but not limited to airspace design, simulation and ATFCM and ASM processes. Furthermore, Operational Improvements (OIs) and related technical enablers attributable to the Military Authorities were taken into consideration during the development of the DANUBE FAB Technical Architecture (Annex L).

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

European Engagement and Coordination with other FABs

Engagement of the DANUBE FAB with European stakeholders has been an important element of the FAB development process. Representation of the DANUBE FAB is ensured in the European Commission FAB Focal Point Group, both at the FAB Coordinators level and at the expert level. The review of draft documents and draft legislation concerning the FAB is carried out on a joint basis to ensure coordinated responses are provided.

Preparatory work to support interfaces with the FAB System Coordinator are also carried out at a FAB level. DANUBE FAB positions are coordinated in many other European meetings such as the SSC and its working groups and the Network Management Board (NMB).

The DANUBE FAB is represented on the NMB by the ROMATSA`s Director General as the DANUBE FAB NMB voting member and the BULATSA`s Director General as the alternate member. Additionally, DANUBE FAB partners are taking a FAB approach to the cooperative decision making processes of the Network Management Function by coordinating input and attendance at the EUROCONTROL expert teams that will support the NMF consultation arrangements. For example DANUBE FAB representatives are members of the Network Manager expert groups dedicated to the route network design function (RNDSG, ASMSG and NETOPS), thus ensuring consistency with the European Route Network and with developments in other FABs.

Furthermore, the DANUBE FAB is represented on the IDSG (SESAR Interim Deployment Steering Group) by the BULATSA Deputy Director General Operations (member) and ROMATSA Deputy Director General Technical and Development (alternate member). IDSG representation is complimented by one operational expert from ROMATSA (member) and one operational expert from BULATSA (alternate member) within the IDSG Expert Group.

At ICAO level the FAB is represented in the work of RDGE (Route Development Group - Eastern Part of the ICAO EUR Region), thus ensuring the connectivity of the DANUBE FAB airspace with the other parts of ICAO EUR Region outside the European Union.

Through the State Level Agreement the DANUBE FAB remains open to the accession of any interested State. Several initiatives have been undertaken with neighbouring countries including Serbia/Montenegro, FYROM, Republic of Moldova, Republic of Turkey, Hungary and Greece.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

CONTENTS

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

List of figures

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

List of tables

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

1 Introduction

The Republic of Bulgaria and Romania have come together to develop the DANUBE Functional Airspace Block (FAB). The DANUBE FAB is compliant with the EU Single European Sky (SES) legislation and brings about integrated and harmonised provision of air navigation services in the airspace under the responsibility of the Republic of Bulgaria and of Romania, being an "operationally-driven" FAB with the primary objective of delivering enhanced efficiency and reduced costs for airspace users, and by reducing the impact of aviation on the environment, all with due regard to safety of traffic.

The Republic of Bulgaria and Romania invite the European Commission, EASA, the EU Member States and other interested parties, to consider the information provided in this document and to put forward their comments and observations to ensure the success of DANUBE FAB.

1.1 Purpose of this Document

This document describes the Danube FAB and presents the changes introduced by the Member States, the National Supervisory Authorities, Military and the Air Navigation Service Providers in establishing the FAB. Specifically it provides information, including supporting documentation, pertaining to the SES requirements for FABs and specifically Article 9a of Regulation (EC) No 550/2004[2].

The development of the FAB has involved many people over many years and the FAB has been tailored to support stakeholders' comments. The project will deliver a large volume of justification studies and implementation material. This volume of work extends beyond the requirements specified in the Annex of Regulation (EU) No 176/2011. For this reason some degree of consolidation and alignment has been necessary in order to present the right amount of material as a demonstration of compliance with the regulation.

The aim of this particular document is to bring together in a single coherent and concise document the key aspects of the FAB, structured around the requirements of the annex of Regulation (EU) 176/2011. In particular, it summarises the key achievements of the FAB, the approach taken, including the consultation processes followed, the overall justification for the changes introduced and the impact on operations following legal establishment.

Working groups, along with stakeholders from the military and CAA organisations, identified the documentation within their work streams that they considered as supporting evidence for compliance with each of the requirements in the annex of Regulation (EU) 176/2011. This input was collated in order to develop this paper. Additional details considered necessary for this submission have been included in a series of supporting annexes.

[2] Amended by Regulation (EU) 1070/2009

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

1.2 Layout of this Document

The structure of this document is as follows:

Section	Contents
1	Introduction
2	General information about DANUBE FAB
3	DANUBE FAB Safety Case
4	DANUBE FAB Optimum use of Airspace
5	DANUBE FAB European Route Network Consistency
6	DANUBE FAB Added Value
7	Smooth and Flexible Transfer of ATC Responsibility between Air Traffic Service Units
8	DANUBE FAB Compatibility between Airspace Configurations
9	DANUBE FAB Regional Agreements within the ICAO
10	DANUBE FAB Existing Regional Agreements
11	DANUBE FAB Consistency with European Union-wide Performance Targets
12	References
13	Glossary

Table 3: Document structure

The document is supplemented by a series of annexes as follows:

Annex	Contents
A	State Agreement
B	NSA Agreement
C	ANSP Agreement
D	Concept of Operations
E	Safety Case
F	SMS Roadmap
G	Safety Policy
H	CBA
I	Business Case
J	RTS Report
K	RTS Safety Report
L	Technical Architecture
M	DME Agreement
N	Communications Infrastructure Study
O	Environmental Impact Assessment Study
P	Airspace Plan Phase 1
Q	Airspace Plan Phase 2
R	Airspace Plan Phase 3
S	Operational Procedures Harmonisation Plan

Table 4: Annexes to this document

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

2 General information about DANUBE FAB

2.1 Point of Contact

Regulation (EU) No. 176/2011 Article 3, Annex Part 1, 1 (a)

The point of contact for the DANUBE FAB is:

E-mail: **focalpoint@danubefab.eu**

Note: This e-mail is accessed by State, CAA, Military and ANSP representatives

Name, address and telephone:

Aleodor Francu	**Diyan Dinev**
Director General	**Director General**
ROMATSA Headquarters	**BULATSA Headquarters**
10, Ion Ionescu de la Brad Blvd.	**1 Brussels Blvd.**
P.O. Box 18-90	**1540 Sofia**
013813 Bucharest	**Bulgaria**
Romania	
Tel: +40 21 2083 102	**Tel: +359 2 937 1102**

2.2 Dimensions

Regulation (EU) No. 176/2011 Article 3, Annex Part 1, 1 (b)

As per the State Agreement, the dimensions of the "DANUBE FAB airspace" comprises the national airspace of the Republic of Bulgaria, the national airspace of Romania and the airspace included in the scope of the international legal obligations of the Republic of Bulgaria and Romania, over those parts of the high seas for which they are responsible for provision of air traffic services. This airspace is defined by the 'Bucharest FIR' and 'Sofia FIR' and the FIR boundaries are published in the national Aeronautical Information Publications (AIPs).

2.3 Service Providers

Regulation (EU) No. 176/2011 Article 3, Annex Part 1, 1 (c), (d)

The following air navigation service providers, having valid certificates, are designated as air traffic service providers in specific airspace blocks within DANUBE FAB airspace and as meteorological service providers within their respective areas of responsibility:

Service provider	Certified services	Area of Responsibility
ROMATSA	ATS, MET	Bucureşti FIR
BULATSA	ATS, MET	Sofia FIR

Table 5: Certified ANSPs

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

The en-route air traffic services within DANUBE FAB airspace will be provided from two existing ACCs based in Bucharest and Sofia. Meteorological services will be provided from the two existing Meteorological Watch Offices (MWO) located also in Bucuresti and Sofia.

Within DANUBE FAB airspace, there are no providers of air traffic services providing services without certification (according with Article 7(5) of Regulation (EC) No 550/2004).

2.4 Legal Basis of Establishment and Modification

This section provides details on the governance and legal arrangements between different authorities including Member States, NSAs, ANSPs and the military. The overarching legal document for establishing the FAB is a State level agreement (Annex A) between Romania and the Republic of Bulgaria. This Agreement is described in section 2.4.1. Once the agreement enters into force, several governing bodies will be established. The three core governing bodies are shown in the diagram below and comprise the following:

- Governing Council
- NSA Board
- ANSP Board

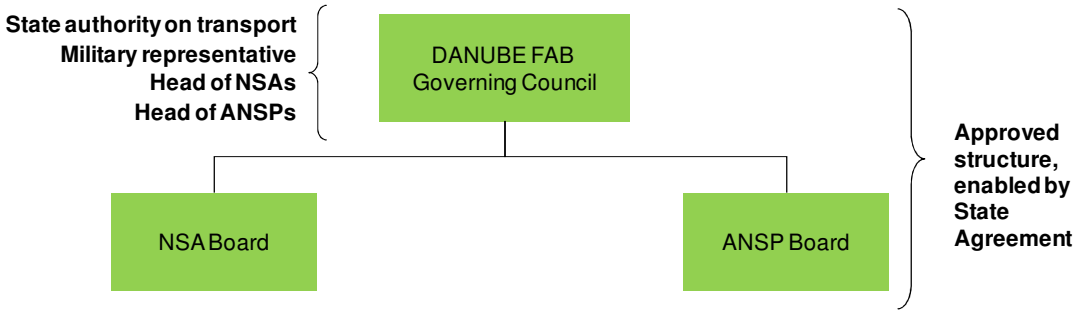


Figure 5: DANUBE FAB governance structure

Governing council	The DANUBE FAB Governing Council will be set-up once the State Level Agreement enters into force and shall be composed of: a) one high level representative of the State authority for transport of each Party, duly mandated by the respective authority; b) one representative from the authority responsible for military aviation in each Party, duly mandated by the respective authority; c) the Heads of the NSAs of the Parties; and d) the Heads of the ANSPs of the Parties. The Governing Council (Annex A, Art. 10) provides oversight and approval of key FAB documentation (annual plans, safety policy, airspace policy, performance plans, etc.). Beneath this council sits the NSA Board (Annex A, Art. 11) and the ANSP Board (Annex A, Art. 12). The Governing Council replaces the existing Steering Committee and will meet at least twice a year.
NSA Board	The NSA Board is composed of the heads of the NSAs of both Member States , as well as by representatives nominated by them. Representatives of national authorities and of the air navigation service providers/relevant stakeholders may be invited, as necessary, to attend the NSA Board meetings, as observers (Annex A, Art. 11). The NSA Board oversees the NSA supervisory activities (Annex A, Art. 23, 24) and operates within the framework laid down in the NSA Agreement as described in section 2.4.2.
ANSP Board	Implementation at the ANSP level is overseen by the ANSP Board composed of representatives from both ANSPs (Annex A, Art. 12). Execution will be via the ANSP agreement as detailed in section 2.4.3.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Table 6: DANUBE FAB governance

In addition to the three bodies specifically mentioned above, the State Level Agreement includes an article (Annex A, Art. 9.3) for setting up additional specialised standing committees or other supporting bodies should the need arise. One such body that is already envisaged and will be established after entry into force of the State Level Agreement is the *High Level Airspace Policy* Body, which is discussed further in section 4.

2.4.1 Between Member States

Regulation (EU) No. 176/2011 Article 3, Annex Part 1, 2 (a)

The mutual agreement between the Republic of Bulgaria and Romania to establish the functional airspace block is provided in the "State Agreement for the establishment of the DANUBE FAB" (Annex A).

The State Level Agreement was ratified in Bulgaria on 27th March by promulgation in the State Gazette, Issue 25/27.03.2012 of ordinance No. 110/20.03.2012 of the President of the Republic of Bulgaria.

Ratification in Romania is still on-going but is expected to be completed by the end of June 2012. After ratification in both States, exchange of diplomatic letters will take place, soon after which the Agreement will enter into force.

A copy of the State Level Agreement is provided in Annex A. It is a comprehensive legal document comprising 40 Articles and was developed by experts from the ANSPs, NSAs, Military and State representatives of both countries. The chapters and key articles in the agreement are as follows:

- Chapter I (general provisions) including definitions, applicability, sovereignty, objective, the main areas of cooperation, safety, airspace and procedures (Annex A, Art. 1-8)
- Chapter II (governance) including governing bodies, Governing Council, NSA Board and ANSP Board (Annex A, Art. 9-12)
- Chapter III (service provision) including ANSP agreement, ATS, CNS services, AIS/AIM, MET services, joint designation and cross-border ANS (Annex A, Art. 13-20)
- Chapter IV (other cooperation areas) including joint undertakings and joint procurement (Annex A, Art. 21-22)
- Chapter V (supervision) including NSA cooperation and general principles (Annex A, Art. 23-24)
- Chapter VI (performance) (Annex A, Art. 25)
- Chapter VII (charging principles) (Annex A, Art. 26)
- Chapter VIII (flexible use of airspace & civil-military cooperation) (Annex A, Art. 27-28)
- Chapter IX (incident and accident investigation and search and rescue) (Annex A, Art. 29-30)
- Chapter X (modification) including accession of third countries, general modification and suspension (Annex A, Art. 31-33)
- Chapter XI (other provisions) including secondment, disputes, amendment, termination, registration, communication and entry into force (Annex A, Art. 34-40)

In order to ensure transparency and to minimise any risk of non-compliance with the FAB SES Regulations, the State Level Agreement was submitted to the Single Sky Committee for comments in September 2011. As a result, changes were incorporated in the final version before it was submitted for ratification.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

2.4.2 Between National Supervisory Authorities

Regulation (EU) No. 176/2011 Article 3, Annex Part 1, 2 (b)

Cooperation at the NSA level in DANUBE FAB is enabled by an agreement between the Directorate General "Civil Aviation Administration" of the Republic of Bulgaria and the Romanian Civil Aeronautical Authority (RCAA) and the Directorate General for Infrastructure and Air Transport, Ministry of Transport and Infrastructure of Romania (MTI/ DGIAT) (Annex B).

The agreement provides a detailed legal basis and lays down the milestones for cooperation between the NSAs in the framework of the DANUBE FAB. It facilitates harmonisation of NSA rules and procedures and mutual recognition of supervisory tasks. It also encourages NSAs to conduct all their work related to the agreement in English. Cooperation is identified in areas including supervision, oversight, safety, coordination with the Network Manager and stakeholder consultation.

The general principles of the agreement are formulated in a manner to ensure the active role and commitment of all participating NSAs in the process of harmonisation of the rules and procedures and in the fulfillment of the obligations of the NSAs within a FAB.

More specifically the NSA agreement enables the following:

- Coordination on all matters of major importance in the FAB environment including supervision of air navigation services providers, in particular those providing cross-borders services, oversight of ATM/ANS, assessment and endorsement of the DANUBE FAB common safety policy and harmonisation of respective party's rules and procedures
- Establishment of a formal coordination forum between NSAs enabling a common line for preparation for international meetings and cooperation on the preparation of the Annual Plan and Reports on SES legislation
- Establishment of consultation mechanisms for identifying and minimising or eliminating:
  - differences among rules and regulations;
  - inconsistencies in ICAO differences, including ICAO Regional Air Navigation Plan and other agreements
  - differences concerning certification and oversight of training organisations including personnel licensing and training
- Mutual recognition of supervisory tasks including:
  - Supervision of certified ANSPs providing services in airspace of another state
  - Review and advice on the acceptance of ANSP safety related changes affecting both NSAs
  - Supervision regarding interoperability of EATMN systems
  - Certification of training organisations
  - Performance scheme
  - Cooperation to support and fulfil the tasks of the NSA Board
  - Temporary secondment of employees to other NSAs for certain activities in relation with FAB matters
  - The establishment of common working groups or expert teams
  - A common format for safety regulatory audit reports and classification of the findings.
  - The exchange of information relevant to the agreement. This may typically be via the NSA Board and would occur under several situations, including: changes of ANSP legal status; amendment/revocation of certificates; when ANSP penalties

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

are imposed and for safety related obligations. Information will also be shared concerning safety occurrences, safety data collection, investigation and analysis. Further details on the mechanism for exchange will be detailed 30 days following signature of the agreement.

- Cooperation on oversight tasks as per Implementing Regulation (EU) 1034/2011. This ensures cooperation in the monitoring/oversight tasks related to: safety occurrence reporting; safety oversight/survey and in monitoring the process of achieving convergence and harmonisation of the safety management systems (SMSs).

In addition, and limited to cross border sectors only, the NSA agreement enables:

- Participation of each NSA in oversight tasks carried out by the certifying NSA
- The right of each NSA to request direct participation in oversight tasks carried out by the certifying NSA, with justification
- Notifications to the other NSA of new ANSP systems or system changes
- Notification and joint approval of safety arguments in which potential hazard effects, allocated severity class 1 or 2, are identified
- Each NSA to issue licenses (ATCO, MET and other ANS/ATM personnel) for a jointly designated ANSP under the NSAs supervision
- Prior consultation between both NSAs on formal reporting before publication
- Sharing of information: The provisions aim to ensure the quickest and most adequate exchange of relevant information between the NSAs, especially in the case of cross-border provision of services. The intention is to prevent cases where lack of information could affect safety. Information will also be shared on specific request; and concerning transmission of formal decisions to the NSAs concerned.

The agreement will enter into force following approval of the NSA Board and will be reviewed annually to evaluate the effectiveness of its implementation.

Detailed information on the arrangements between the national supervisory authorities is provided in the NSA Agreement in Annex B.

2.4.3 Between Air Traffic Service Providers

Regulation (EU) No. 176/2011 Article 3, Annex Part 1, 2 (c)

Cooperation at the ANSP level has involved putting in place an agreement signed at the level of Director General and ensuring that staff are properly consulted and informed of the FAB and its impact.

The organisation and functioning of BULATSA and ROMATSA following establishment of the FAB is enabled through a cooperation agreement (the 'ANSP agreement') representing the cooperation interests of both members. This solution was agreed within DANUBE FAB as it could be established relatively quickly and flexibly. The ANSP Agreement is included in Annex C.

The ANSP agreement enables effective day-to-day management and cooperation between BULATSA and ROMATSA and ensures that the DANUBE FAB will continue to develop as new regulations emerge or additional opportunities are identified.

The ANSP agreement can be modified with the agreement of the signatory parties and in accordance with any changes to the regulatory environment. The DANUBE FAB agreement includes sufficient detail to secure commitment across the organisations, but sufficient flexibility that it can be modified in response to changing circumstances (for example, as the scope of cooperation widens). In particular, a permanent inter-ANSP structure was foreseen with the flexibility to define and allocate tasks according to the priorities at that time. This structure is described, in brief, below.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

The **ANSP Board** is a decision making body, which reports directly to the FAB Governing Council (Annex A, Art. 12). DANUBE FAB will continue to look for benefits to expand and improve the FAB and as such both ANSPs are committed to driving change with a FAB agenda that demonstrates a strong and clear vision. This vision is encapsulated in a FAB Strategic Business Plan that will be developed following entry into force of the State Level Agreement and that will be aligned with the European ATM Master Plan and the SESAR Target Concept. It will be presented annually to the Governing Council for adoption. The plan will contain detailed implementation steps for the period following establishment. These steps will build upon the detailed set of dates committed to for the implementation of airspace routes (as described in section 4), safety initiatives (described in the SMS roadmap in Annex F), technical initiatives (described in the DANUBE FAB Technical Architecture in Annex L) and several other initiatives identified in this document. A summary of some of the key dates are included in the figure below.

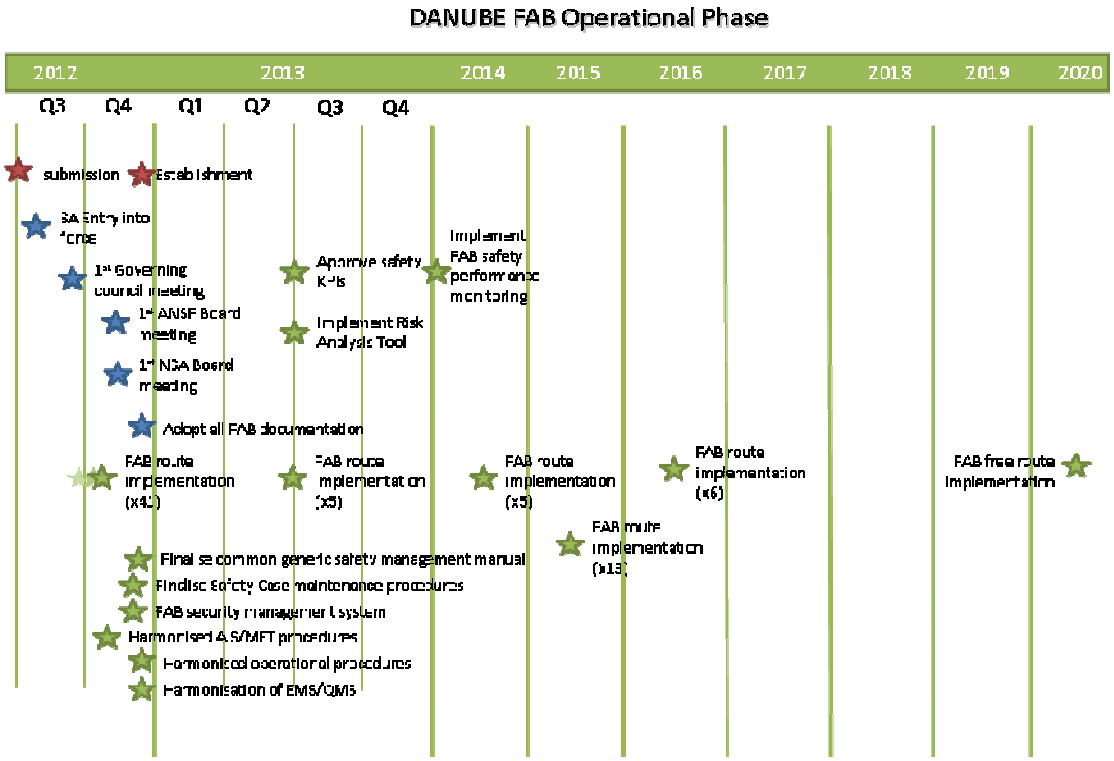


Figure 6: DANUBE FAB operational phase

The ANSP Board takes decisions on the basis of proposals from the **Strategies and Planning Standing Committee (SAPSC).**

To deliver against the agreed FAB vision, the ANSP agreement establishes the SAPSC to provide support on FAB issues related to *inter alia* strategic planning, implementation of strategic tasks, identification and assessment of new initiatives, coordination and reporting tasks. It will be composed of experts from the operational, technical, HR, safety, legal and financial domains of both ANSPs.

The SAPSC is empowered such that it is able to identify new FAB opportunities and solve strategic issues as well as monitor those already being implemented. It is minimal in size but sufficiently cross-disciplinary to make proposals in all areas of ANSP investment and development. The SAPSC includes administrative/secretarial support to deliver its tasks and it reports periodically to the ANSP Board.

For new initiatives, the SAPSC is able to define tangible cooperation tasks with clear objectives, timescales and outcomes and assign 'task forces' to drive progress. These task

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

forces will be fit for purpose with appropriate expertise assigned from different areas/units from both ANSPs. The task forces will deliver against a clear set of objectives and within Terms of Reference (ToR) that are aligned to the objectives of the FAB. Task forces will exist for as long as needed to meet the task objectives and will be dismantled once those objectives are met. Tasks forces may also be combined where appropriate.

Provision is made in the ANSP Agreement (Annex C) whereby individual representatives from the SAPSC may directly approach the ANSP Board if there are issues arising related to safety matters.

The Operations Standing Committee (**OSC)** is a committee on operations (including training) and technical initiatives. The Safety Standing Committee (**SQSESC)** is a committee on safety, quality, security and environmental initiatives. Both committees will be composed of a pool of experts that can be assigned to FAB initiatives on a part-time basis.

The structure is beneficial because it allows good cross-domain coordination, facilitates an efficient management, due to the small number of committees, such that decisions can be taken in a coherent manner in line with a common strategic vision. Coordination at the technical level (rather than at the managerial or director level) is therefore strongly supported and promotes a culture of trust and cooperation between both ANSPs. The Agreement optimises the number of contact points and groups/task forces to make working together manageable and effective.

The 'FAB mind-set' will continue to evolve through the application of the ANSP agreement, but in the meantime, the selection of staff for appropriate roles will be on the basis of their expertise, openness to change and ability to commit time and effort when it is required.

Further detailed information on the arrangements between the Air Navigation Service Providers is provided in the ANSP Agreement in Annex C.

2.4.4 Between Civil and Military authorities

Regulation (EU) No. 176/2011 Article 3, Annex Part 1, 2 (d)

A detailed description of the arrangements between competent civil and military authorities in respect of their involvement in the governance structures of the functional airspace block is provided in Chapter 4 of the DANUBE FAB Concept of Operations (ConOps), which was agreed and signed by the managements of both the civil and the military ANSPs in Bulgaria and Romania. The ConOps is included in Annex D and is a living document that will be maintained and aligned with the European ATM Master Plan, the ICAO Global Plan and the SESAR Target Concept. Further details of the scope and purpose of the ConOps are included in section 4.

The legal arrangements for cooperation between civil and military authorities are contained in Article 5 (b), (c), and (k), and Articles 7, 27 and 28 of the DANUBE FAB State Level Agreement (Annex A).

The military involvement is also ensured through their participation in the Governing Council of the DANUBE FAB.

Furthermore, the High Level Airspace Policy Body as detailed in section 4, will be a joint civil-military body.

Details of civil-military cooperation at the tactical level are included in section 7.4. Further details of specific military involvement are included throughout this document, for example in airspace design (section 4), simulation (section 8) and ATFCM and ASM processes (section 4.3).

2.5 Consultation with ANSP staff

Ensuring that social partners are regularly informed and consulted on the DANUBE FAB has been a fundamental objective from the outset. Recognising the importance of this issue, a dedicated working group was established to deal with HR issues. A change management

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

study was undertaken by this working group, addressing organisational structure, employment, working conditions and the social impact of establishment of the FAB. As a result of this study a DANUBE FAB Social Consultation Forum (SCF) was established in 2010. The SCF is a permanent body tasked with the implementation of social cooperation within the framework of the DANUBE FAB Project. The following SCF meetings took place during the development of DANUBE FAB:

- 15-16th April 2010 in Sinaia, Romania;
- 20-21st October 2010 in Veliko Tarnovo, Bulgaria;
- 10-12th October 2011 in Sighişoara, Romania;
- 3-4th May 2012 in Velingrad, Bulgaria.

Key issues raised by social partners, and how they were taken into account during the development of the FAB, are described below:

- In order to ensure on-going social dialog, the Steering Committee decided that the social dialogue process would be managed by the PMO supported by the HR WG. The HR WG proposed the establishment of the Social Consultation Forum, as a mechanism to enable the social dialogue process, and developed a draft of the SCF Terms of Reference and Rules of Procedure (SCF ToR). An initial Social Consultation Meeting was organised by mid April 2010 and, on that occasion, the proposed SCF ToR were adopted by the management of the two ANSPs and the social partners.
- Social partners were invited to provide comments on a proposed DANUBE FAB HR Policy on the occasion of SCF meetings in Veliko Tarnovo 2010 and Sighişoara 2011. Following the SCF in October 2011, the DANUBE FAB HR Policy document was updated and finalised in December 2011. The signature process concluded in February 2012.
- Social partners registered their interest in receiving information and presentations on the work carried out by BULATSA and ROMATSA related to the performance plans. This led to regular updates being provided at future meetings.
- Social partners requested the establishment of a legal framework and the Terms of Reference to ensure a continuous social dialogue process once the DANUBE FAB was established. The Steering Committee agreed with this request. The State Level Agreement ensures this through Article 10.5 (k). Furthermore a specific article within the ANSP agreement was included to ensure on-going Social Consultation.

2.6 Customer Consultation Process

One of the key objectives of DANUBE FAB is to deliver enhanced efficiency and reduced costs for the airspace users. DANUBE FAB have therefore placed important emphasis on communicating the goals and progress of the FAB with airspace users; other external stakeholders and international organisations (European Commission, ICAO, EUROCONTROL, CANSO, IATA, IACA, non-EU Member States, focal points of other FAB initiatives, airports and manufacturers).

As part of a DANUBE FAB communications plan, dissemination of information takes place regularly through, for example, the DANUBE FAB website (see below). In addition, dedicated customer consultation meetings with stakeholders have taken place with the objective to:

- inform the participants about the expected results (e.g. financial, environmental, etc.) of the DANUBE FAB study;
- promote a common understanding of the DANUBE FAB initiative among the stakeholders involved in the future implementation of a FAB in the Republic of Bulgaria and Romania;
- provide both ANSPs with views and comments on the project and its orientation.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

The following consultations with airspace users have taken place:

2007	2nd November in Bucharest 4th December in Sofia
2008	28th May in Sofia 1st July in Bucharest
2011	5th May in Bucharest (including consultation on national performance plans and targets as required by Art. 10 (b) of Regulation (EU) 691/2010) 5th October in Sofia, dedicated workshop to assess the environmental impact of DANUBE FAB (attended by airport and airline representatives)
2012	19th April in Bucharest, dedicated workshop for CBA and business case results

Table 7: List of consultations with airspace users

2.7 Communication with external parties

The establishment of the DANUBE FAB has a wide-ranging effect on many stakeholders, including airspace users. The key stakeholders, including the European Commission, EASA, Member States, trade unions, international trade bodies, and others have, and will continue to be, involved at each stage. The communication with key stakeholders is described throughout this information package and is clearly itemised for the development of the numerous deliverables associated with the establishment of the FAB. However, there is not only a need for close coordination and communication with the stakeholders, but also a need to include a wider audience and the general public.

During the course of 2011, it was considered as part of the communication activities foreseen in the Project Management Plan (PMP) that additional communication with the European Commission would benefit the DANUBE FAB and would provide a means for de-risking the evaluation phase in 2012. The Commission welcomed this initiative and an extensive DANUBE FAB pre-information package was presented for information to the Single Sky Committee meeting 43 in September 2011.

A Communication Plan has been developed as part of the DANUBE FAB PMP which identifies many promotional and profile raising activities to help raise awareness and understanding of the DANUBE FAB throughout the wider community.

Through the Communication Plan, it was possible for all stakeholders to freely access the necessary information and to provide a better basis for collaborative decision making. Also, in compliance with Article III.2.3 of the TEN-T EC Decision for granting Community financial aid to DANUBE FAB, it has been ensured that suitable publicity was given to the financial aid granted in order to inform the public of the role of the Community in the implementation of the DANUBE FAB actions.

The DANUBE FAB web-site (www.danubefab.eu) remains a key resource for publication of information related to the FAB. The DANUBE FAB web-site as well as the BULATSA and ROMATSA web-sites have been continuously updated with various press-releases, regular newsletters and information regarding forums and events.

Some of the more recent specific pro-active publicity and informational activities include:

- Publicity about the financial aid granted to the Project by the TEN-T Programme.
- A video presentation promoting DANUBE FAB was presented throughout the International Exhibition and Conference ATC Global in March 2011 in Amsterdam. BULATSA and ROMATSA jointly organised the production of the presentation.
- The DANUBE FAB Real Time Simulation (RTS) activity in November 2011 at the EUROCONTROL Experimental Centre in France comprised an open Visitors Day

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

involving more than 60 high-level representatives from a wide-range of International organisations, ANSPs, NSAs, Military and various TV channels.

- The DANUBE FAB was presented at the Team Resource Management (TRM) User Group meeting, held in Sofia on 12 April 2011.
- In coordination with the Transport Ministries of Romania and the Republic of Bulgaria a response to the EC was prepared and sent, regarding information material for DANUBE FAB as discussed at the session of the EC Transport Ministers in June 2011 in Brussels.
- The DANUBE FAB was presented and discussed at a high-level meeting between BULATSA and the Macedonian ANSP, M-NAV, in December 2011 in Sofia which included discussion regarding possible accession of M-NAV to DANUBE FAB.
- An official ceremony for the signature of the State Level Agreement took place on 12 December 2011 in Brussels, at the EU Transport, Telecoms and Energy Council meeting and was widely covered in the press and on TV.
- DANUBE FAB also regularly participates in international fora to discuss opportunities with other FABs, for example the FFPG. Further details are included in section 10.2.

Promotional materials including DANUBE FAB branded stationary and brochures have been produced and disseminated at various forums.

A wide range of other presentations and publicity related activities for DANUBE FAB have taken place (and are on-going throughout 2012). Examples of these are itemised and documented in the DANUBE FAB ASRs (Action Status Reports).

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

3 DANUBE FAB Safety Case

In accordance with the Service Provision Regulation 550/2004, Art. 9a (2), any FAB that is established must be supported by a Safety Case. The Member States concerned are required to provide information and supporting documentation to the European Commission with regard to the FAB Safety Case. The full DANUBE FAB Safety Case Report (Annex E) (referred to as The Safety Case) including supporting documentation is then provided to interested parties. The Safety Case illustrates, by means of arguments and supporting evidence, that safety has been adequately considered during all phases of the establishment of the DANUBE FAB to prove the main safety argument that "ANS provision in the Danube FAB will remain safe." The Safety Case also illustrates that operations will remain safe following establishment.

The Safety Case is the documented assurance of how achievement and maintenance of safety have been planned, organised and managed at State, NSA and Service Provider levels. The Safety Case is a living document which will be maintained and updated throughout the complete lifecycle of the DANUBE FAB.

Development, review and maintenance of the DANUBE FAB Safety Case remains the joint responsibility of ROMATSA and BULATSA through their ANSP Board, it requires endorsement by the NSA Board and subsequent approval by the DANUBE FAB Governing Council as set out in the State Level Agreement provided as Annex A to this submission.

The Safety Case report is complete and is considered to present sufficient evidence, going beyond the information provision requirements of Commission Regulation (EU) No 176/2011, to support the claims that the regulatory framework, the safety oversight and the safety management within the DANUBE FAB were adequately managed and planned to allow the safe establishment of the DANUBE FAB. The Safety Case report is comprehensive and presents the safety related claims and arguments in a clear qualitative manner, following this up with evidence to support the claims and subsequent arguments.

Particular attention has been paid to areas in the safety domain stated in Commission Regulation (EU) 176/2011, Annex A, Part II, Sections 1, requirements a, b, c, d and e [20];

a. Common safety policy;
b. Accident and incident investigation, safety data collection, analysis and exchange;
c. Safety management to avoid degradation of safety performance;
d. Responsibilities and interfaces for safety targets, safety oversight and enforcement measures;
e. Safety assessment including hazard identification, risk assessment and mitigation;

where the DANUBE FAB achieves enhanced co-operation, collaboration and coordination between the ANSPs.

The Safety Case uses the commonly adopted 'goal structured notation' approach to align the safety arguments with clear evidence to back up the high level claim that "ANS provision in the DANUBE FAB will remain safe". This overall safety claim is considered in three sub-arguments:

- Regulatory framework in DANUBE FAB is sufficient and appropriate;
- Safety Oversight in DANUBE FAB is sufficient and appropriate; and
- Safety Management in DANUBE FAB is sufficient and appropriate.

The overall Safety Argument is presented in the following diagram. The Safety Case elaborates on all of the arguments with evidence.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

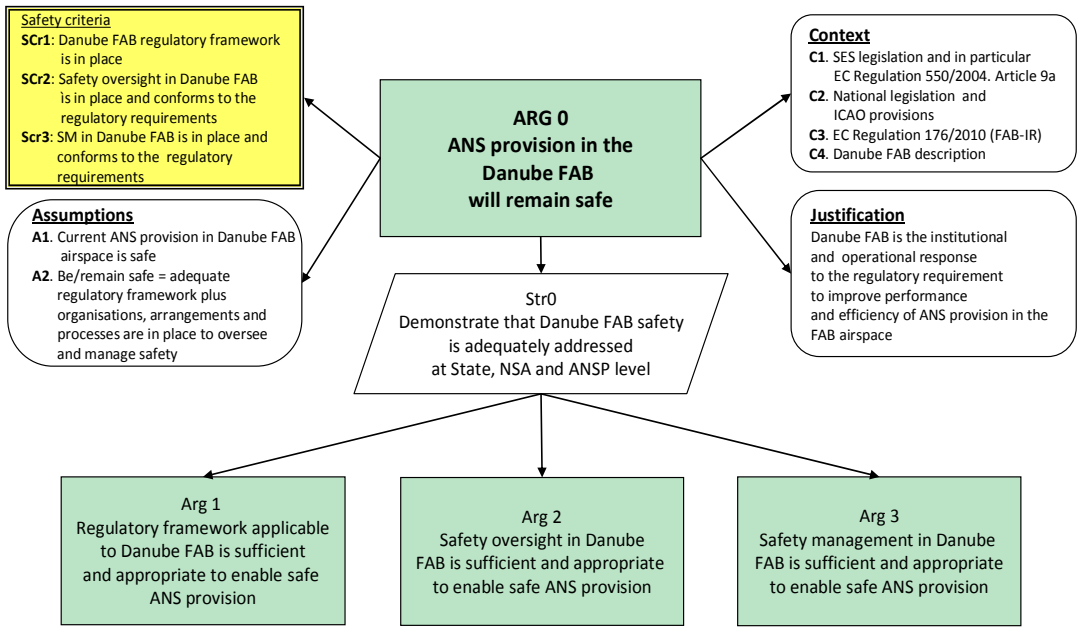


Figure 7: Illustration of DANUBE FAB Safety Argument

It is important to note once again that the Safety Case is a living document which will be maintained and amended as the DANUBE FAB develops to ensure that the safety argument is valid throughout the lifetime of the FAB. The SMS Roadmap, contained in Annex F of this information package, sets out a clear plan and related actions for how this will be managed.

3.1 Common Safety Policy

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 1 (a)

The "DANUBE FAB Safety Policy" (The Safety Policy), provided as Annex G to this submission document, has been developed and clearly lays down the approach and commitment from all entities involved in activities related to the DANUBE FAB, at State, NSA and ANSP levels, to improve the current levels of safety within the DANUBE FAB.

The Safety Policy is approved and promulgated by the DANUBE FAB Steering Committee until such time as all of the DANUBE FAB governing bodies have been formally established.

3.2 Accident and Incident Investigation, Safety Data Collection, Analysis and Exchange

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 1 (b)

3.2.1 Accident and Incident Investigation

The DANUBE FAB State Level Agreement (Annex A) between the Republic of Bulgaria and Romania contains detailed provisions with regard to accident and incident investigation. In the case that an incident should occur in the national airspace under the responsibility of one State and controlled by an ANSP other than the provider(s) whose principal place of operations is/are located on the territory of the State of occurrence, investigation of occurrence shall be conducted according to the provisions in ICAO Annex 13 and relevant European regulations. The ANSP Cooperation Agreement (Annex C) and SMS Roadmap (Annex F) include implementation actions whereby, in case of cross-border service provision, the safety occurrence reporting and investigation procedures implemented by the FAB

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANSPs will be reviewed and updated accordingly, in order to ensure adequate coordination (arrangements) of occurrence reporting, and of investigation methods and techniques.

3.2.2 Safety Data Collection, Analysis and Exchange

Going beyond the existing ANSP Safety Management Systems (SMS), Bulgaria and Romania shall jointly ensure the improvement of safety occurrence reporting and enhancement with an open reporting / "Just Culture" environment, exchange of information concerning reported safety occurrences, safety data collection, investigation and analysis, harmonisation of safety occurrences severity assessment and integration and dissemination of safety data at European level.

This cooperation is also covered by the commitment and plans of ANSPs to harmonise their SMSs and produce a common, generic, DANUBE FAB Safety Management Manual. The plans and schedule for this activity are clearly defined in the SMS Roadmap.

3.3 Safety Management to Avoid Degradation of Safety Performance

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 1 (c)

Management of safety is considered as the top priority at State, NSA and ANSP levels. This is reflected in existing and future arrangements between ANSPs, NSAs and Ministries of Transport (MoUs and Agreements). The commitment of these entities is to improve safety management through continuous safety oversight / survey and monitoring processes carried out at NSA / ANSP level in order to avoid degradation in safety performance within the DANUBE FAB.

This is covered by:

- the NSA Cooperation Agreement (Annex B);
- ANSPs' plans to harmonise their existing Safety Management Systems; and
- States' commitments to harmonise their relevant national rules and procedures for General Air Traffic (GAT) and civil-military coordination within the DANUBE FAB.

The SMS Roadmap details the planned extension and harmonisation of the safety performance monitoring and performance measurement mechanisms and processes of both ANSPs. The SMS Roadmap is aligned with EU safety management and safety performance requirements. There is a commitment to use the same common European tools for this purpose.

The DANUBE FAB Safety Policy (Annex G) states that managing the safety monitoring and performance aspects is of top priority at all levels.

3.4 Responsibilities and Interfaces for Safety Targets, Safety Oversight and Enforcement Measures

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 1 (d)

State, NSA and ANSP responsibilities regarding safety are dictated by existing international, European and national legislation while cooperation within the DANUBE FAB will lead to harmonisation of regulations, rules and procedures.

DANUBE FAB governance will comprise its Governing Council, the NSA Board and ANSP Board and their responsibilities are defined in the State Level Agreement. Decisions issued by the Governing Council shall be binding on the DANUBE FAB Parties.

The State Level Agreement stipulates that in order to maintain a high and uniform level of safety within the DANUBE FAB, the States commit to cooperate and take the appropriate measures, including enforcement measures, to ensure that DANUBE FAB will be established and managed safely, in accordance with all relevant legal and safety requirements.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

The setting of safety targets will be jointly ensured by both States while safety oversight will be carried out in a cooperative and coordinated manner between the NSAs nominated by the Republic of Bulgaria and Romania for the DANUBE FAB.

The SMS Roadmap foresees the cooperation of the ANSPs for the development of common safety targets.

3.5 Safety Assessment including Hazard Identification, Risk Assessment and Mitigation

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 1 (e)

Processes related to risk assessment and mitigation for ANS system changes (operational, equipment, procedures and human resources organised to perform a function within the context of ATM/ANS) are sound and documented in the BULATSA and ROMATSA Safety Management Manuals. They are continuously supervised by the respective NSAs of Bulgaria and Romania.

The DANUBE FAB establishment, on its own, does not constitute an operational change to the existing ROMATSA and BULATSA ANS systems. This does not necessitate changes to the existing technical systems, operational and technical manuals, LoAs with adjacent units or service level agreements with external providers of services to the operational units of both ANSPs.

However, the enhanced cooperation between the DANUBE FAB parties in the context of the FAB establishment has led to optimisation of current operations and, as a result, a number of operational changes have been already implemented (pre-FAB scenario) or are planned to be introduced after FAB establishment (FAB scenario).

Such changes include, but are not limited to:

- phased implementation of Free Route Operations in the whole DANUBE FAB airspace;
- enhancement of the FAB route network in line with ARN version 7.0;
- optimisation of ATC sector design.

The changes have been subject to extensive validation activities, including fast-time simulations and a large scale real-time simulation that took place in November-December 2011 at the EUROCONTROL Experimental Centre in France (see section 8.2 for details) . According to the EU legislation (e.g. Commission Regulation (EU) 1034/2011) implementation of the changes will be subject to the safety oversight processes of the NSAs to ensure operations remain acceptably safe.

3.6 Regulatory Requirements & Compliance Matrix

A summary of the derived requirements on the content of the DANUBE FAB Safety Case, as described in the 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, is provided below to aid traceability and show that the requirements have been adequately addressed in this Safety Case report.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

	FAB IR	Interpretation (evidence)	Safety argument reference	Safety case evidence reference
	With regard to the functional airspace block safety case, the following information shall be provided:			
1	*(a) the common safety policy or plans to establish a common safety policy*	DANUBE FAB Safety Policy document or plan to establish a common FAB safety policy	Arg 1-7 Arg 1-7-1 Arg 1-7-2	E23; E24
2a	*(b) a description of the arrangements dealing with accident and incident investigation*	Dedicated arrangements must be in place for the reporting and investigation of accident and incidents, at State (if appropriate at NSA) and ANSP level, including for the case of cross-border service provision	Arg 1-4 Arg 1-4-1 to 1-4-3 Arg 3-1-2 Arg 3-1-2-1 Arg 3-1-2-2	E9 to E13 E45; E46; E47
2b	*and arrangements for addressing safety data collection, analysis and exchange*	Arrangements between the FAB parties or plan must be in place for the collection, analysis and exchange of safety data for the purpose of accident prevention	Arg 1-4 Arg 1-4-4 Arg 2-2-5 Arg 3-1-2 Arg 3-1-2-3	E14; E15 E37 E47; E48
3	*(c) a description of the way in which safety is being managed to avoid degradation in safety performance within the FAB*	Safety management systems, including arrangements, procedures and processes deployed by the FAB ANSPs	Arg 1-5 Arg 1-7 Complete Arg 3	E5 E23; E24 E40 to E67
4	*(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*	Safety regulatory framework and arrangements related to safety target setting and ANS safety oversight in the FAB States	Arg 1-6 Arg 1-6-1 to 1-6-3 Complete Arg 2	E16 to E22 E25 to E39
5	*(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*	Documented risk assessment procedures, list of identified operational changes resulting from the FAB establishment and related safety assessment reports	Arg 2-2-3 Arg 3-1-3 Arg 3-1-3-1 to Arg 3-1-3-3 Arg 3-1-3-2-1 to Arg 3-1-3-2-5	E33; E34 E50 to E53 E54 to E57

Table 8: Summary of derived requirements on the content of the DANUBE FAB Safety Case

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

4 DANUBE FAB Optimum use of Airspace

This chapter elaborates on how the DANUBE FAB lower, upper and terminal airspace has been optimised through airspace design, relationship with the Network Manager (NM), ATFCM, ASM, route and sector design, free routes, terminal airspace developments, real time coordination and cross border activities.

The airspace organisation in DANUBE FAB was developed by the DANUBE FAB Operational WG and in particular a sub-group called the Airspace Design and Operations Development Expert Group (ADODEG[3]).

This ADODEG Sub Group has the full support and participation of EUROCONTROL Experts from the Network Manager. The ADODEG members are civil and military operational experts from both Member States and are responsible for development and evaluation of the DANUBE FAB operational concept and airspace improvements.

The route network has been optimised to be included in and compliant with the **European ATS Route Network Version-7** (ARN v.7) and to easily ensure further integration into the future European Route Network Improvement Plan ARN v.8. The basic structures of airspace have been defined on the basis of the EUROCONTROL ASM Handbook [35] to minimise coordination and increase capacity for an acceptable amount of workload.

The airspace design provides an optimal air traffic flow and is fully compatible with the European ATM Master Plan and the Single European Sky (SES) regulatory framework including Regulation (EC) No 551/2004 (as amended by Regulation (EC) No 1070/2009). It is completed in accordance with the following Regulations:

- Commission Regulation (EC) No 2150/2005 laying down common rules for the flexible use of airspace.
- Commission Regulation (EC) No 730/2006 on airspace classification and access of flights operated under visual flight rules above flight level 195.
- Commission Regulation (EC) No 255/2010 laying down common rules on air traffic flow management.
- Commission Regulation (EU) No 691/2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005 laying down common requirements for the provision of air navigation services.
- Commission Decision (2011/121/EU) setting the European Union-wide performance targets and alert thresholds for the provision of air navigation services for the years 2012 to 2014.

The design process took and will continue to take into account traffic demands, airspace complexity and national performance plans (including aggregated FAB targets) and involved consultation with airspace users and military authorities based on a commonly agreed DANUBE FAB concept of operations.

[3] Airspace Design Operational Development Expert Group was established on 16 June 2009 by a Common Decision of the establishment of ADODEG-SG of the Operational and Civil-Military Coordination WG for the DANUBE FAB project. It comprises civil and military operational experts from both Member States and is responsible for development and evaluation of DANUBE FAB operational concept and airspace improvements. ADODEG will continue its operation after the FAB is implemented.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

4.1 DANUBE FAB Common Concept of Operations concerning optimum use of airspace

At the heart of the DANUBE FAB initiative has been the common development of a DANUBE FAB operational concept (ConOps). This document is included in Annex D and has been developed by civil and military operational experts as a major output of the operational working group. It describes the operational principles agreed by the Partners and provides a high-level presentation of the target concept to support enhanced performance of the ATM network in the region in terms of safety, capacity, efficiency and protection of the environment. It also considers the future developments at European level both up to and after 2015, and is developed in line with the European ATM Master Plan, the ICAO Global Plan and SESAR Target Concept. The ConOps considers military requirements in the context of the implementation of functional airspace blocks and EUROCONTROL guidance material on this subject.

According to the ConOps, the DANUBE FAB vision relies on the underlying principles of flexibility, standardisation and partnership between stakeholders, and on the availability of a realistic set of components capable of responding to the various requirements of the ECAC region. The following operational aspects regarding ATS are taken into consideration in the ConOps:

- The DANUBE FAB service providers (BULATSA and ROMATSA) will continue to provide ANS/ATM services in the FAB airspace.
- En-Route Air Traffic Services will be provided from the two existing ATC centres in Bucharest and Sofia, jointly operating in the DANUBE FAB.
- Terminal ATS will be provided by ROMATSA and BULATSA respective ATSUs
- Free-route airspace operations are considered for gradual implementation within DANUBE FAB airspace. This implementation will ensure enhanced capacity and a more efficient use of airspace by all airspace users, whilst ensuring optimised flight profiles and minimum flying time.

4.2 Relations with the Relevant Network Functions

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 2 (a)

The ATM network functions (design of the European route network and coordination of scarce resources within aviation frequency bands used by general air traffic[4]) are managed by EUROCONTROL as the designated Network Manager (NM). A productive cooperation process was therefore established with EUROCONTROL on airspace design aspects with the clear understanding that the joint work with the States concerned forms part of the pan-European network airspace design process. During this process a catalogue was developed containing a large number of airspace design proposals covering the short, medium and long-term[5] implementation. These proposals were integrated, taking into account the overall European ATS route network evolution, and also the implementation of more advanced concepts (Free Route or Free Route-like). The proposals are described in Section 5. EUROCONTROL were also involved in developing the ConOps for DANUBE FAB (Annex D) and in validating DANUBE FAB route network proposals by Real Time Simulation.

Close engagement with the Network manager during FAB operation is ensured through the appointment of a single DANUBE FAB representative to the high level Network Management Board (NMB). DANUBE FAB representatives are also actively participating in the Network Directors of Operations (NDOP) Forum under Network Management Board. This ensures

[4] as per Article 6 of Regulation (EC) No 551/2004

[5] Short term – implementation by 2012 (objective is completed); medium term – implementation by 2016+; long term – implementation by 2020+

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

that coordination is regularly made in the framework of the working arrangements[6] for Capacity Planning, Route Network Development, Airspace Management, ATM Procedures, Airport Operations, Safety Management and Air Traffic Flow and Capacity Management.

The relationship between the DANUBE FAB and the NM is supported by Article 7 of the State Level Agreement (Annex A) which ensures both "*coordination with the NM*" as well as airspace design/management and ATFCM taking "*due account of collaborative processes at the international level*".

4.3 Arrangements for Integrated ATFCM and Airspace Management Through Integrated CDM

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 2 (b)

The integrated Airspace Management (ASM) and Air Traffic Flow and Capacity Management (ATFCM) process within the collaborative air traffic management framework will be fully applied within the DANUBE FAB area through the following:

- The gradual integration of ASM and ATFCM functions at FAB level;
- ASM and ATFCM elements (see Annex D section 4.2.2**)** which will be applied in a common way within the DANUBE FAB area in collaboration with the NM;
- Enhanced civil-military coordination through:
  - the optimisation of modularity in the reorganisation of reserved/restricted areas;
  - an increase in the use of conditional routes (CDRs) to optimise ASM;
  - an agreement to implement Local And sub-Regional Airspace Management support system (LARA[7]) within DANUBE FAB. LARA is currently being tested at national level prior to implementation at FAB level. Implementation at FAB level will be defined following national implementation (in accordance with the ATM Technical Architecture Deployment Roadmap included in the "DANUBE FAB Refined FAB Architecture" document). The implementation of LARA offers the opportunity to enhance CIV-MIL ATM performance in DANUBE FAB and, at the same time, enable compliance with articles 5.3 and 6.2 of Commission Regulation (EC) No 2150/2005 laying down common rules for the Flexible Use of Airspace (FUA).
- Cooperative decision-making (CDM) processes executed through the agreed DANUBE FAB structures and involving all partners (ACCs/FMPs, military ATSUs, AMCs and the NM).

4.3.1 ASM/ATFCM Framework Within DANUBE FAB

The implementation of an ASM/ATFCM process at FAB level will involve all levels: **strategic**, **pre-tactical** and **tactical**, in collaboration with airspace users. In particular:

- the **strategic level** (level 1) - includes widespread cooperation between the existing national strategic-level bodies in order to regulate the use of the DANUBE regional airspace regardless of the existing boundaries, and to address the related ASM-ATFCM activities;
- the **pre-tactical level** (level 2) – uses current national structures empowered with additional ATFCM functionalities and a widespread coordination network between themselves for DANUBE FAB purposes;

[6] The European Network Operations Plan 2012-2014 (EUROCONTROL) is addressing these arrangements in detail at European network and local FAB level

[7] LARA is a EUROCONTROL program which aims to deliver software, technical documents and a deployment service to support airspace management at State and/or FAB level.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

- the **tactical level** (level 3) – operations are improved by: strong integration among the existing national civil-military structures at an operational level with additional ATFCM functionalities; flight plan processing and flight planning assistance with the purpose of guaranteeing each airspace modification; suitable addressing of ATFCM measures affecting flight plans and proper assistance to airspace users when changes to the available routes require the recommendation of different options.

These joint ASM/ATFCM processes enable:

- an increased level of cooperation between all the ATM partners, namely the NM, Area Control Centres (ACCs), Flow Management Positions (FMPs) and Airspace Management Cells (AMCs), in collaboration with airspace users;
- the adoption of harmonised procedures for the planning and management of both route structures/re-sectorisations and airspace reserved for military activities; and
- the extension of the pre-tactical ASM/ATFCM interventions closer to the time of operations.

The added value of the dynamic airspace management process will result in:

- more equitable treatment in the management of airspace and trajectories required at short notice, achieved through the optimum use of all available resources both at network and at FAB level;
- more accurate airspace situational awareness on the part of airspace users, obtained through a better knowledge of all the routing options obtained by the dynamically updated data exchange between NM and DANUBE FAB.

4.3.2 Strategic ASM / ATFCM

The application of FUA Regulation (Commission Regulation (EC) No. 2150/2005) ensures efficient cooperation between civil and military entities responsible for ATM in DANUBE FAB. The relevant stakeholders will make full use of this enhanced civil-military coordination process to ensure consistency between the planning and utilisation of airspace required for civil use and military activities. This process relies on airspace configurations as a set of predefined, adaptable airspace structures, able to accommodate the common ATM partners' operational requirements through coordinated ASM regardless of national borders.

This collaborative planning for airspace for civil and military use accommodates the requirements of all the airspace users and ensures that the most appropriate decision is made in respect of the concerned stakeholders. As a result, the DANUBE FAB airspace structure covers both the areas reserved for military activities (status, availability, adaptability and permeability) and the FAB route network (including network scenarios using permanent/conditional routes and/or, where applicable, Reduced Coordination Airspaces (RCAs)).

As specified in the DANUBE FAB Concept of Operations (ConOps), the body within which the strategic collaborative process takes place is named the "DANUBE FAB High-Level Airspace Policy Body". This entity is agreed and will be created once the State Level Agreement enters into force; the Governing Council is established; and the formalities of the High-Level Airspace Policy Body structure are concluded. Its tasks have been defined in the ConOps (Annex D) and include coordinating the DANUBE FAB Network Operations Plan (NOP) with the pan-European NOP. The body will be composed of civil and military representatives nominated by the civil and military state authorities of both States, NSAs, and ANSPs. Further details of this body are included in section 4.3.

4.3.3 Pre-tactical ASM / ATFCM

Within the DANUBE FAB, the pre-tactical level will be handled by the current national joint civil-military Airspace Management Cells (AMC).

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

In terms of pre-tactical airspace management, a strong inter-coordination process among AMCs will be able to permanently identify solutions for increasing the efficiency of the airspace within the FAB, balancing civil and military requirements.

The process is based on the application of harmonised procedures, rules, criteria and protocols. Subject to finalisation of these procedures, an output of the process will be the DANUBE FAB daily Network Operation Plan. Furthermore, better connectivity between AMCs will be deployed, through implementation of LARA, providing both direct communication facilities and access to advanced planning tools. A LARA implementation plan is included in the DANUBE FAB ATM technical architecture deployment roadmap (see ANNEX L).

In conducting these activities, AMCs shall be supported by both the ACCs/FMPs and the Network Manager for the eventual activation of airspace scenarios to better handle military operational needs, while trying to ensure that ATM capacity is not consistently affected. The Network Manager shall also be involved in the provision to the AMCs of wider information about the overall traffic demand.

4.3.4 Tactical ASM / ATFCM

Dynamic airspace management (ASM level 3) translates into practice the set of rules and measures undertaken at the previous ASM level 1 and then further refined during the ASM level 2 negotiations.

Within the DANUBE FAB, the tactical level is handled by national ACCs/FMPs together with the Military ATS Units concerned. This is under the framework of the Network Manager, ensuring consistency with the other DANUBE FAB states' ACCs/FMPs/military ATS units if Cross Border Areas (CBAs) are established or large-scale military activities are carried out.

The process at this level deals with all the activities carried out to cope with short notice or real-time events or measures that could require the modification of the airspace allocation decided during the previous pre-tactical phase.

The ACCs/FMPs together with the Military ATS Units concerned will continue to promptly react to any short-notice and/or real-time requirements; activating/deactivating or reallocating specific tactical scenarios and, at the same time, establishing and activating the most appropriate airspace configurations. When dynamic airspace management[8] is implemented, the most suitable flight trajectory/profile, together with short notice military requirements, will be accommodated through dynamic routes and airspace availability.

The capability to react to specific short-notice requirements, in turn, allows the achievement of significant benefits, resulting in:

- route network optimisation;
- better accommodation of airspace user needs/requirements; and
- more flexible ATM.

4.4 Provisions for Sharing of Airspace Management Data

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 2 (b)

Airspace management data is currently provided to EUROCONTROL (Network Manager) separately by each ANSP. Within the DANUBE FAB structure the sharing of airspace management data will be enabled by:

- Letter of Agreement (LoA) between AMCs
- The creation of the "DANUBE FAB High-Level Airspace Policy Body"

[8] based on enhanced FUA through a collaborative decision making (CDM) process involving all the partners at tactical level (ACCs/FMPs, military ATSUs, AMCs and the NM)

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

- The implementation of LARA supporting system as a civil-military ASM coordination tool at tactical level (see previous section)

The DANUBE FAB High-Level Airspace Policy Body will supervise the creation/drafting of the DANUBE FAB Network Operations Plan (NOP), which will correspond with the pan-European NOP.

The DANUBE FAB High-Level Airspace Policy Body (as described in Annex D) will ensure exchange of ASM data regarding the FUA application within the FAB.

4.5 Criteria for Route and Sector Design in DANUBE FAB

Common principles and criteria for route and sector design within the DANUBE FAB were agreed and applied to ensure the safe, economically efficient use of airspace taking due account of the environmental impact, namely:

- design on the basis of operational requirements;
- delineations free from the constraints of national borders;
- performance-driven optimisation of the provision of air traffic services and related functions; and
- enhanced coordination between BULATSA and ROMATSA.

Each option developed for an optimised ATS route was based on these agreed principles and included consideration of military requirements. The options considered included cross-border sectorisation and establishment of free route airspace, initially during night hours and subsequently 24hrs. In order to agree on the most effective solution and to determine the best implementation, all options were validated through an extensive real time simulation (RTS) activity [see Annex K].

4.6 ATS Route Implementation in DANUBE FAB

The route network structure of DANUBE FAB has been developed according to the requirements set by the Single European Sky legislation. The results of the RTS provide valuable information for further optimisation of DANUBE FAB airspace. The main criteria was to optimise flows of traffic and to deliver the required capacity while maintaining or improving the actual level of safety. Operational criteria have been considered when designing the sectors and national borders were not considered as constraints. Route projects within Danube FAB airspace have been developed in accordance to the European ATM Master Plan and the Single European Sky (SES) regulations.

The result is 95 new and dedicated DANUBE FAB route projects, 88 of which are currently agreed for implementation. These are listed in the Catalogue of ATS Route Network Proposals[9].

The agreed route projects have been developed within the Danube FAB project and will be further refined and revised by the ADODEG. 41 route projects have already been implemented[10].

[9] DANUBE FAB Airspace Design - Phase 2: Catalogue of ATS Route Network Proposals, ver. 1.4., 14. 04. 2012

[10] All implemented routes are listed in the European ATS Route Network Catalogues (the number in parenthesis indicates more than one proposal under a single identifier):

ARN V7 Proposal IDs: 69.006b and c / DN001; 69.072 / DN0016; 69.073a / 12.004a / DN0018; 69.073b / 12.004b / DN0019; 69.076a / 12.003a / DN0029; 69.076b / 12.003b / DN0030; 62.056 / 09.015 / DN0033; 69.005b / DN0037; 69.081 / DN0059; 71.009 / DN0076; 69.073b / 12.004b / DN0019

ARN V6 Proposal IDs: 56_26 / DN002; 62_16; 59_02a; 60_21 (3); 59_02b;

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

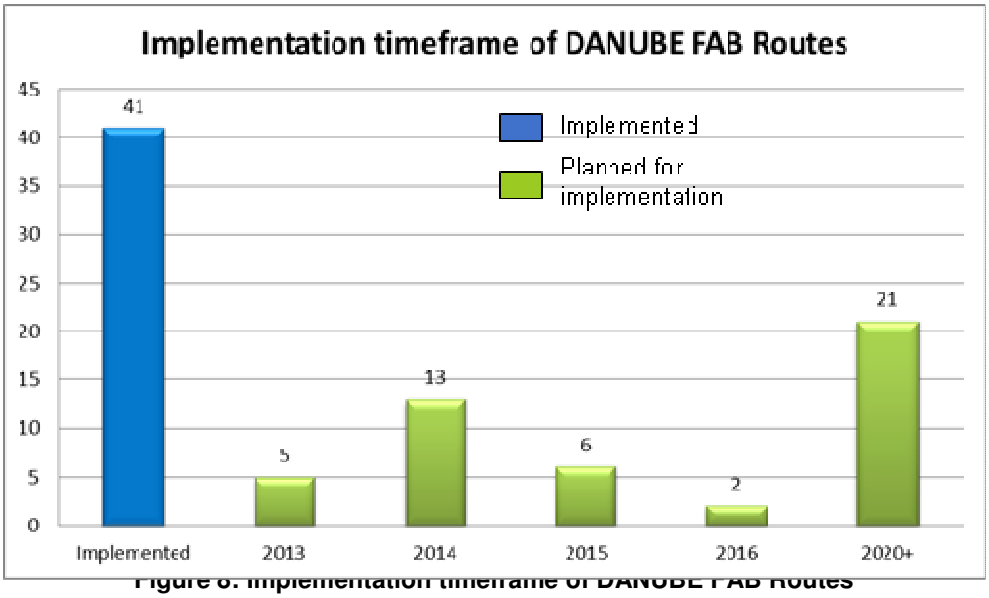


Figure 8: Implementation timeframe of DANUBE FAB Routes

The 41 route projects currently implemented in DANUBE FAB are already providing operational benefits, in terms of flight efficiency, to airspace users. Remaining route projects proposals from the Catalogue are planned to be implemented in stages, before 2020, as shown in Figure 8. The Danube FAB route catalogue is constantly updated and revised with new proposals. Terminal airspace projects are also part of the DANUBE FAB development (see section 4.8 for further details).

Free route operations are planned to be deployed across the entire DANUBE FAB airspace before 2020 in accordance to the European free route implementation and based on the DANUBE FAB Airspace Design Working Plan phases 1-3 (Annexes P-R).

The routes with proposal identifiers: DN020; DN021; DN023; DN040; DN042; DN043; DN044; DN045; DN046; DN047; DN048; DN049; DN050; DN051; DN052; DN053; DN054 DN081 DN083 DN084 DN085 DN086 DN092 are created as a result of fine tuning of the existing route network within the national borders and are described in Phase 2 - ATS route network proposals – v.1.4

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

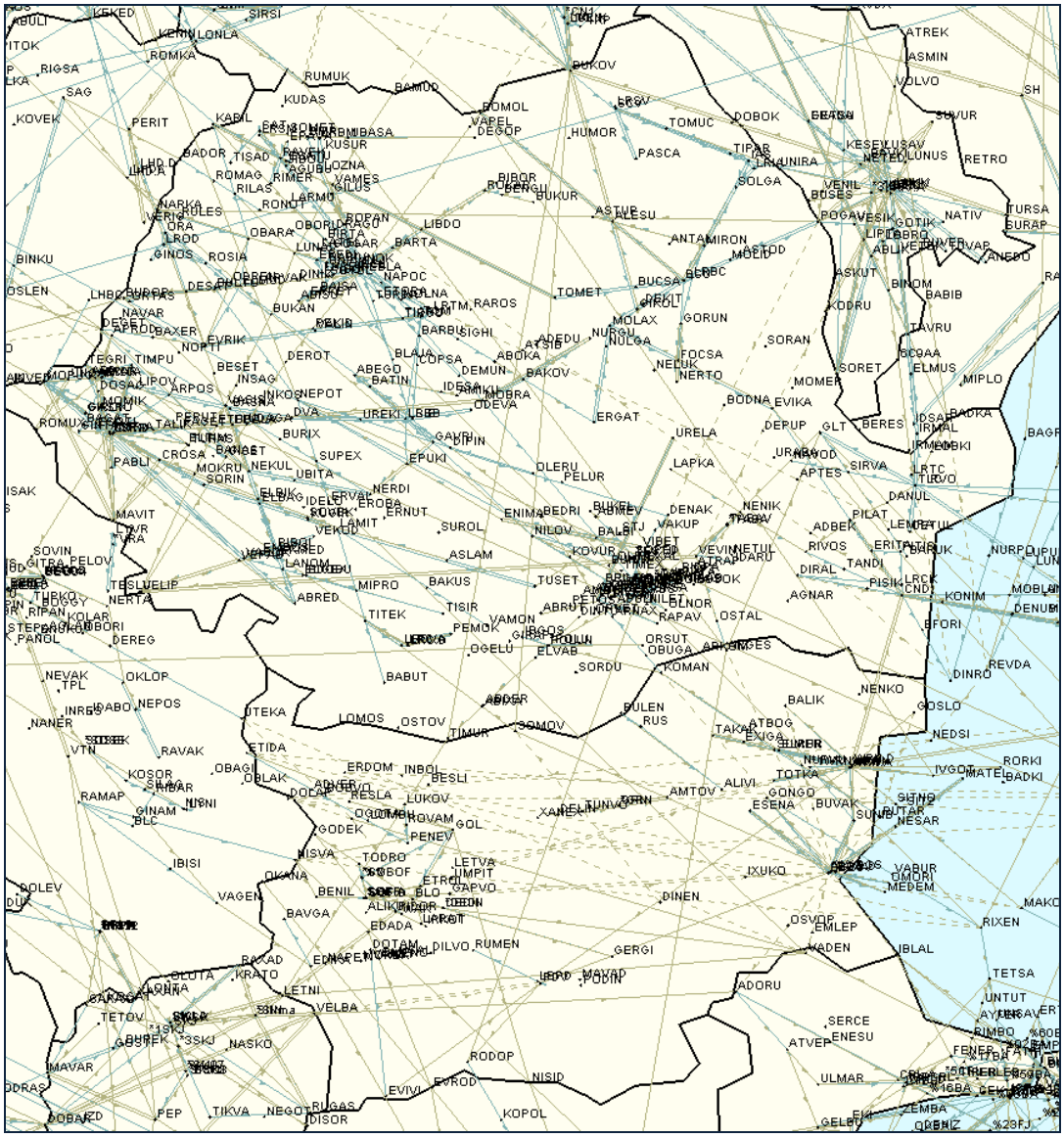


Figure 9: Implemented and projected for implementation routes from 2009-2020

4.7 Free Route Operations in DANUBE FAB

The DANUBE FAB parties have agreed to implement Free Route Operations airspace to ensure flight efficiency and greater environmental protection, along with decreased operations costs for airline operators and the safe and efficient transfer of flights to the fixed route network in adjacent airspace, where Free Route Operations is not applied. The free route operations airspace sectors will be:

- unconstrained by FIR/UIR or State boundaries; and
- capable of being reconfigured to meet demand.

The implementation of Free Routes (FR) in the DANUBE FAB will comprise of three phases:

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Phase 1: **Summer 2014**	Night direct ATS routes between entry/exit points of DANUBE FAB.
Phase 2: **Summer 2016 (+)**	Night Free Route Airspace within DANUBE FAB Night ATS routes between entry/exit points & major TMAs of Sofia FIR and Bucuresti FIR.
Phase 3: **2020 (+)**	Free Route Airspace (24H) within DANUBE FAB

Table 9: Implementation phases of Free Routes in DANUBE FAB

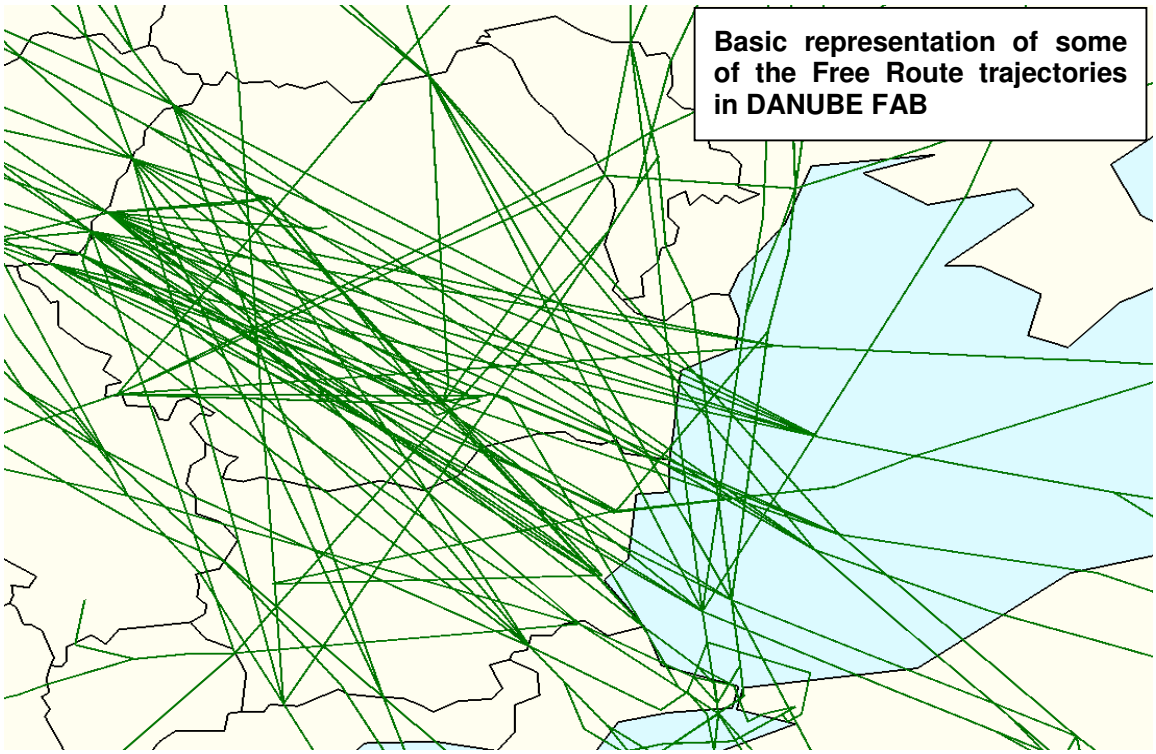


Figure 10: Basic representation of some of the Free Route trajectories in DANUBE FAB

The diagram above shows some of the possible FR trajectories in DANUBE FAB which will be available during FR implementation Phase 2. The FR trajectories shown are based on reference traffic during the night hours (22:00 – 03:00 UTC) on 3 – 4 July 2011. The fixed route network is not shown.

The implementation of FR airspace for daytime operations will follow the initial implementation of night FR operations and will depend on the success of implementing the FR concept at European level. The implementation will initially be at national level in the summer of 2014, and subsequently at FAB level in the summer of 2016.

4.8 Terminal Airspace Developments

The design of the en-route airspace included consideration of the needs for an efficient access to/from terminal airspace within the DANUBE FAB and in neighbouring countries (e.g. Istanbul, Thessaloniki, Belgrade, etc.). The DANUBE FAB has developed airspace design projects that take into account evolution towards future terminal airspace systems. These projects are based on new navigation applications and consider, with a high priority, environmental benefits.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Examples of such projects include Varna-Burgas, Timishoara-Arad, Cluj-Tg.Mures-Sibiu, Sofia-Plovdiv and Bucharest TMA. These projects include evolution towards future CDA operations (for further details on CDAs, see section 11.4).

4.9 Real Time Coordination

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 2 (b)

For coordination purposes on a tactical level, instantaneous (last-minute) airspace users' activities (not subject to ASM Level 2 action) in DANUBE FAB would be possible in accordance with airspace availability. In this case, the entire coordination process is handled at tactical level by the tactical civil-military (level 3) units.

For real time coordination purposes the following will be available to both ACCs in DANUBE FAB:

- automated coordination and transfer processes (e.g. SYSCO);
- radar identification maintained throughout the DANUBE FAB area of application;
- harmonised DANUBE FAB radar separation minima, including separation at transfer of radar control, as far as possible;
- direct ATCO-ATCO coordination capability (SYSCO, phone, hotline);
- consistency of flight data, ensured by enhanced interoperability; and
- coordinated contingency procedures.

Building on the success of basic OLDI, all routine coordination between the Units within the FAB, including tactical coordination, will be conducted using OLDI-SYSCO messages within the context of the framework of Commission Regulation (EC) No 1032/2006. SYSCO will be the first step towards the improvement of interoperability between ACCs[11]. It will be available to both tactical (executive) and planner controllers.

The implementation of SYSCO will enable a reduction of longitudinal separation minima from 10NM to 5NM by 2015 at the latest (see ConOps (Annex D)). The reduction of separation was tested and validated as part of the RTS activities and its feasibility was confirmed, with resulting capacity benefits.

4.10 Cross Border Activities

One of the airspace organisations considered within the Real Time Simulation (see section 8.2) included cross-border service provision in airspace managed by 6 sectors. The results showed that, as arranged, the simulated cross-border organisation should not be retained for initial FAB implementation, but that further options for cross-border sectors should be considered and analysed. Cross-border sectors are considered as part of the development and implementation process of the airspace routes described above.

Further details on cross border activities are covered under section 7.1.

[11] Voice coordination via direct telephone or intercom remains available as required.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

5 DANUBE FAB European Route Network Consistency

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 3

From the very beginning DANUBE FAB has been and continues to be committed to achieving consistency with the European Route Network. Both DANUBE FAB service providers, BULATSA and ROMATSA, are involved in the pan-European process of coordinated improvements at the ATM network level under the auspices of the EUROCONTROL Network Operations Team (NETOPS), where the Route Network Development Sub-Group (RNDSG) is the focal point for airspace development, agreement and implementation in Europe. Changes to the ECAC airspace are coordinated, validated and agreed for implementation within the RNDSG[12].

Compliant to Article 6 of Regulation (EC) 551/2004 and Commission Regulation (EU) 677/2011, the aspects of airspace design that are addressed at the level of DANUBE FAB take into account traffic demands and complexity, and the requirements of airspace users and military authorities (see Section 4 for further details).

The consistency of the route structure of DANUBE FAB with the European route network is ensured through the integration of the DANUBE FAB projects in the European Route Network Improvement Plan over the period 2012-2014, ensuring a smooth transition to ARN V8. The **common principles and criteria for route and sector design** within the DANUBE FAB are in line with the airspace design methodology of the European Route Network Improvement Plan.

The DANUBE FAB also takes into account proposals from the network perspective, by providing for cooperative decision making processes with the Network Manager. Close engagement with the Network manager is ensured through the appointment of a single DANUBE FAB representative to the Network Management Board (NMB). This is supported by Article 7 of the State Level Agreement (Annex A). Coordination takes place with other ANSPs and with other FABs (e.g. via FFPG) as input to the NM activities.

Consistency with the European Route Network is also ensured through the integration of all airspace projects into RNDSG/RDGE online planning database and the fact that DANUBE FAB ADODEG representatives are also members of the Network Manager expert groups dedicated to the route network design function (RNDSG, ASMSG and NETOPS).

Furthermore, the DANUBE FAB ADODEG representatives participate in the appropriate ICAO working arrangements (RDGE) thus ensuring consistency of the DANUBE FAB network with the ICAO European region-wide network.

The airspace projects developed in the context of the DANUBE FAB were included in:

- ARN V7 for the projects implemented up to the end of 2011
- European Route Network Improvement Plan (ARN V8) 2012-2014 for the projects planned for implementation over this period.

The result is 95 new and dedicated DANUBE FAB route projects, 88 of which are currently agreed for implementation. These are listed in the Catalogue of ATS Route Network Proposals (Annex R).

These route projects have been developed within the Danube FAB project and will be further refined and revised by the ADODEG. 41 route projects have already been implemented[13].

[12] Members of the RNDSG include ANSPs from all the European and some adjacent States, FAB representatives, airspace users, military organisations, ICAO and flight planning service providers.

[13] All implemented routes are listed in the European ATS Route Network Catalogues (the number in parenthesis indicates more than one proposal under a single identifier):

ARN V7 Proposal IDs: 69.006b and c / DN001; 69.072 / DN0016; 69.073a / 12.004a / DN0018; 69.073b / 12.004b / DN0019; 69.076a / 12.003a / DN0029; 69.076b / 12.003b / DN0030; 62.056 / 09.015 / DN0033; 69.005b / DN0037; 69.081 / DN0059; 71.009 / DN0076; 69.073b / 12.004b / DN0019

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

The 41 route projects currently implemented in the DANUBE FAB are already providing operational benefits, in terms of flight efficiency, to airspace users. Remaining route projects proposals from the Catalogue are planned to be implemented in stages by 2020. Danube FAB route catalogue is constantly updated and revised with new proposals. Terminal airspace projects are also part of the DANUBE FAB development.

Free route operations are planned to be deployed across the entire Danube FAB airspace before 2020 in accordance with the European free routes implementation.

The ConOps for Free Routes is based on the ConOps described in ARN V7 and in the European Route Network Improvement Plan design methodology.

ARN V6 Proposal IDs: 56_26 / DN002; 62_16; 59_02a; 60_21 (3); 59_02b;

The routes with proposal identifiers: DN020; DN021; DN023; DN040; DN042; DN043; DN044; DN045; DN046; DN047; DN048; DN049; DN050; DN051; DN052; DN053; DN054 DN081 DN083 DN084 DN085 DN086 DN092 are created in result of fine tuning of the existing route network within the national borders and are described in Phase 2 - ATS route network proposals – v.1.4

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

6 DANUBE FAB Added Value

DANUBE FAB added value has been determined through independent analysis at two separate stages in the project and by two separate and independent external consultancies. In each case, both quantitative and qualitative aspects were taken into account and with airspace users were consulted on the results.

- A preliminary CBA (Cost Benefit Analysis) and a Business Case were prepared by Integra as part of the feasibility study in 2008 "*to provide an evaluation and estimate of the potential revenues, cost structures and cost savings for a new set up with an integrated operational structure for the FAB traffic and for the two continuing national ANSPs*" [34]. As part of this initial study, a detailed Stakeholder Analysis was undertaken, which assessed the economic effects for airline operators and passengers as a result of shorter flying distances and flight times in the FAB.
- Final CBA and business cases were performed in April-May 2012 by Advanced Logistics Group (ALG).

These documents are included in Annexes H and I respectively to this information package.

This Section provides details on the results of the most recent CBA, developed in April-May 2012, which takes into account the airspace user feedback provided during a workshop in the same month, and provides a synopsis of the results and recommendations from the Business Case activity.

Based on this consultation process, a number of additional inputs were recorded and appropriate modifications were made to the CBA results as follows:

- the assumed airline operating costs were modified;
- airline operating cost growth rate was revised; and
- traffic figures were included as a sensitivity variable for the internal (ANSP) model.

The DUNUBE FAB Business Case (Annex I) provides a detailed analysis of the impacts that the creation of a FAB will have on stakeholders. It uses the quantitative figures from the CBA as its main input and puts them into the overall context of FAB implementation, considering qualitative impacts on transversal areas such as safety, environment, security, human resources and social dialogue.

The main objective of the analysis was to provide the decision makers with additional elements to assess the scope, complexity and performance improvements offered by different options for FAB implementation, providing the rationale for identifying the most suitable option and provide a comprehensive assessment of the related benefits, costs, risks, mitigating measures and critical success factors of the options.

6.1 Summary of Quantitative Results of the CBA

The added value of DANUBE FAB for stakeholders was determined via two distinct business models: one for external stakeholders (Airspace Users) and one for internal stakeholders (ANSPs). These two models were specifically tailored to the DANUBE FAB scenario, based on the European Model for ATM Strategic Investment Analysis (EMOSIA) templates and EUROCONTROL CBA Process.

The timeframe examined for the CBA is the period from 2008 to 2030 (the pre-implementation period is considered to have started in 2008). The operational period spans the 18 years from 2013 to 2030 but does not consider the high probability of continued DANUBE FAB operations beyond 2030 due to uncertainty on the projected forecasts beyond this timeframe.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

There are five key benefit initiatives at the core of each business model developed, for which the monetary impact of DANUBE FAB has been assessed against a baseline scenario to implement LSSIP commitments and SESAR Operational Improvements (OIs) individually rather than at FAB level:

1. airspace design & management and common operational concept;
2. common training system;
3. harmonised management systems for SQSE;
4. common CNS strategy; and
5. common procurement.

The results of the CBA calculated that the establishment of the DANUBE FAB will bring about benefits for each of the two categories of stakeholders included:

- Airlines are already experiencing economic benefits and will continue to do so through enhanced flight efficiency permitted by the optimised DANUBE FAB Route Network. The Net Present Value (NPV) for airlines until 2030 **gives an added value of €570M**.
- The CBA calculated that ANSPs would have a pay-back period, with a break-even point in 2017. The investment costs result from the initiation of design, implementation and deployment of operational improvements and associated procedures introduced by the FAB concept. These are later outweighed by improved cost-effectiveness as a result of cost avoidance in several areas, due to cooperation between ANSPs and harmonisation of several functions. The CBA concludes that the overall NPV for ANSPs until 2030 **gives an added value of €21.0M** with an **IRR of 29%** and a **break-even point in 2017**.

The results are illustrated below:

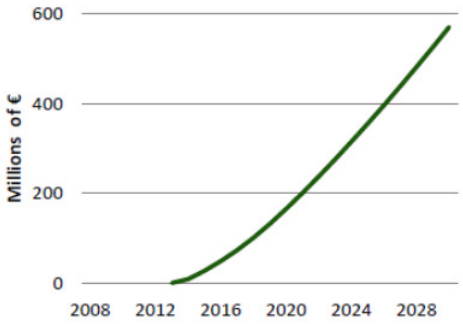


Figure 11: Airspace Users NPV

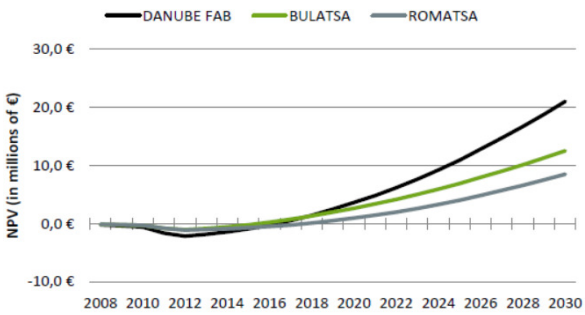
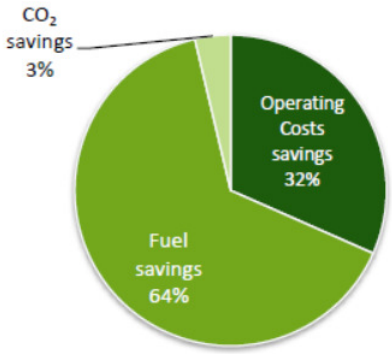


Figure 12: ANSPs NPV Summary

The net costs (-ve) and benefits (+ve) can be broken down as follows:

Co-financed by the European Union
Trans-European Transport Network (TEN-T)



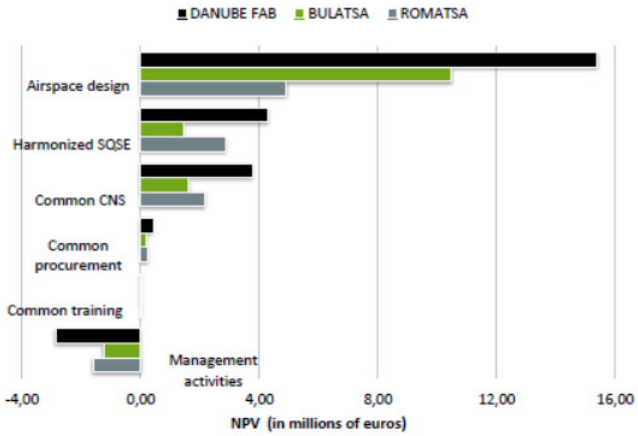


Figure 12: Breakdown of airline NPV

Figure 13 Breakdown of ANSP NPV

For the airspace users, one of the key initiatives of the five from which benefits are derived is the 'Airspace Design & Management and Common Operational Concept'. The route structure (as described in Section 5) was applied to a yearly traffic scenario consisting of 74% of an average traffic day in 2010[14], 13% peak[15] and 13% low[16], with a growth rate as per STATFOR estimates. By 2030, this results in **savings per flight of 1.14 minutes, more than 47kg fuel and in excess of 150kg of CO_2**.

For the ANSPs, the summary of key costs and benefits is shown in the table below:

[14] 19th October 2010

[15] 2nd July 2010

[16] 1st January 2010

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Initiative	NPV (€)	Details of Initiatives Enabled by the FAB Co-operation	
		Costs	Benefits
Airspace Design & Management and Common Operational Concept	€15.4M	Pre-implementation costs One-off training costs	ATCO cost avoidance (29 ATCOs avoided by 2030) Initial training cost avoidance
Common Training System	-€22K	Pre-implementation costs	ATCO initial training savings
Harmonised Management Systems for SQSE	€4.3M	Pre-implementation costs	Staff cost avoidance (9 SQSE staff avoided by 2025) SQSE training cost avoidance (12 SQSE staff by 2025)
Common CNS Strategy	€3.8M	Pre-implementation costs	Capital cost avoidance (1 Radar, 3 DMEs) Operating cost avoidance (Radar, DMEs, AFTN optimisation)
Common Procurement	€0.5M	Pre-implementation cost	Common procurement of datalink solution
Other	-€2.8M	Pre-implementation costs ANSP Board implementation costs	
Total	**€21.0M**		

Table 10: The summary of key costs and benefits for the ANSPs

In some areas, there is scope for further savings in the future. For example, common procurement is likely to be more aligned once the ANSP Board is established and the first DANUBE FAB Strategic Plan and Annual Plan is developed. Such harmonisation is also likely to facilitate any common targets that may be required by the performance scheme. One example of this could be common procurement of a future, SESAR compliant, ATM system. BULATSA underwent a major hardware and software upgrade in 2011 and it is therefore not possible to commit to a common upgrade at this stage. Both ANSPs will however be considering a major upgrade in the 2017-2020 timeframe. Therefore, subject to further study, there may be an opportunity for such a common procurement. In the meantime, the agreement to commonly procure and develop a datalink solution, gives the opportunity to refine the processes and procedures that are put in place for subsequent common procurement.

6.2 Risk and Sensitivity Analysis

In order to address any possible uncertainties in the CBA figures, sensitivity and risk analysis was performed on both the internal (ANSP) and external stakeholder (Airspace User) business models.

The variables considered and results obtained are summarised in the tables below. All monetary figures are expressed in Millions of Euros (M€).

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

For the Airspace Users, the (cumulative discounted) uncertainties are summarised in the following table:

Scenario	Discount rate 4%	Discount rate 8%
Best case	821 M€	446 M€
Nominal	570 M€	312 M€
Worst case	360 M€	200 M€

Figure 14: Uncertainty Analysis Summary of CBA Results for Airspace Users

In addition to analysis of sensitivity to the discount rate, where 4% corresponds to the EUROCONTROL standard value and 8% corresponds to the worst case, other uncertainty factors were examined, including:

- Fuel Cost
- CO_2 Cost
- Operating Cost
- Traffic Impacted

These figures, extracted from the CBA document, are illustrated in the following table:

Variables to Which Sensitivity Analysis Was Applied	NPV Worst Case Reduction	NPV Best Case Increase
Fuel Costs	€118 M	€109 M
CO_2 Costs	€74 M	€73 M
Operating Costs	€34 M	€42 M
Traffic Impacted	€5 M	€6 M

Figure 15: Airspace Users – Other Sensitivity Factors Quantified

For the ANSPs, the (cumulative discounted) uncertainties involve different uncertainty factors but are summarised in the following table:

Scenario	Discount rate 4%	Discount rate 8%
DANUBE FAB	NPV in M€	
Best case	24,1	12,2
Nominal case	21,0	10,6
Worst case	18,1	9,1

Figure 16: Uncertainty Analysis Summary of CBA Results for ANSPs

In addition to analysis of sensitivity to the discount rate, where 4% corresponds to the EUROCONTROL standard value and 8% corresponds to the worst case, other uncertainty factors were examined, including:

- ATCOs Avoided
- SQSE Staff Avoided
- Additional Conversion Training Days
- Savings in Initial Training

These figures, extracted from the CBA document, are illustrated in the following table:

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Variables to Which Sensitivity Analysis Was Applied	NPV Worst Case Reduction	NPV Best Case Increase
ATCOs Avoided	€2.34 M	€2.46 M
SQSE Staff Avoided	€0.44 M	€0.46 M
Add'l Conversion Training Days	€0.04 M	€0.06 M
Savings in Initial Training	€0.04 M	€0.06 M

Table 11: ANSPs – Other Sensitivity Factors Quantified

6.3 Business Case

The DANUBE FAB Business Case is provided as Annex I to this document. The Business Case utilises quantitative input from the CBA and takes a detailed, qualitative approach to the impact on areas such as safety, environment, security, human resources and social dialogue. This supports decision makers by providing additional information regarding possible impacts on stakeholders other than the ANSPs and the main Airspace Users, such as the Militaries of the States, General Aviation, NSAs and Airports.

The Business Case examines the impact on the 11 ICAO Key Performance Areas (KPAs) and concludes positively on all KPAs through comparison with relevant Key Performance Indicators (KPIs). The study also includes a financial analysis of options for financing the costs of the establishment of the FAB.

The Conclusion of the document states that: "The DANUBE FAB initiative is based on a well-established and consolidated cooperation activity between Romania and Bulgaria, which traces back to 2004, when BULATSA and ROMATSA presented the 'Initiative for creating the prerequisites for the establishment of a functional airspace block'".

Some recommendations have been established for areas or phases that the implementation strategy should encompass following the above conclusion:

1. Negotiation of the scope and operation of the FAB
2. Development of an Implementation Plan
3. Implementation of the FAB

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

7 Smooth and Flexible Transfer of ATC Responsibility between Air Traffic Service Units

DANUBE FAB establishes a smooth and flexible transfer of ATC responsibility between air traffic services units by setting up common ATC procedures and enhancing EATMN system interoperability, whilst also ensuring alignment with the operational requirements of the airspace users. Both of these areas are discussed in this section.

7.1 Arrangements for Cross Border Provision of Air Traffic Services

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 5 (a)

The establishment of cross-border airspace is provided for in Article 20, Cross-border Air Navigation Services Provision, of the State Level Agreement. The ANSP Board may therefore propose to the Governing Council, after endorsement by the NSA Board, the establishment of cross-border sectors within DANUBE FAB airspace.

The cross-border sectors shall be considered established by the signature of the joint designation act(s) which will be issued by the DANUBE FAB Member States and notified to the European Commission in accordance with European Union legislation.

One of the airspace organisations considered within the Real Time Simulation (see section 8.2) included cross-border service provision. The results showed that, as arranged, the simulated cross-border organisation should not be retained for initial FAB implementation, but that further options for cross-border sectors are being considered and analysed. Cross-border sectors are considered as part of the development and implementation process of the airspace routes described in section 4.

7.2 Coordination Procedures Between Air Traffic Service Providers

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 5 (b)

Common ATM procedures, encompassing harmonised civil/civil and civil/military procedures, allow the DANUBE FAB to be perceived as one single airspace continuum. A DANUBE FAB Operational Procedures Harmonisation Working Plan (Annex S) was therefore elaborated in order to ensure that harmonised procedures are consistent with the ICAO SARPs. This working plan was developed by BULATSA and ROMATSA experts taking into account:

- Procedures for Air Navigation Services – Air Traffic Management (ICAO Doc 4444 PANS – ATM);
- Regional Supplementary Procedures - European Region (ICAO Doc 7030 EUR Regional and Supplementary Procedures);
- Procedures for Air navigation Services – Operations (ICAO Doc 8168 PANS – OPS);
- Commission Regulation (EU) 255/2010 of 25 March 2010 laying down common rules of air traffic flow management – Art 1, Art 4, Annex: List of the ICAO provisions of air traffic flow management (ICAO 4444).
- Commission Regulation (EC) No 1033/2006 of 4 July 2006 laying down the requirements on procedures for flight plans in the pre-flight phase for the single European sky; and
- Commission Regulation (EU) 929/2010 of 18 October 2010 amending Commission Regulation (EC) 1033/2006 laying down the requirements on procedures for flight plans in the pre-flight phase for the single European sky – as regards the ICAO provisions referred to in Art 3 (1).

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

The DANUBE FAB Operational Procedures Harmonisation Working Plan (Annex S) includes an analysis of the transposition of PANS ATM Doc 4444, 15th Edition, amendments 2 and 3 and ICAO Doc 7030, ed. 5.0, against procedures applied in day to day operations. The differences are stated, together with proposed actions and justification for the proposals.

The document concludes that despite minor differences PANS ATM and Regional Supplementary Procedures are seamlessly applied by both ANSPs.

The transfer of control procedures between ACC Sofia and ACC Bucharest as ATS Units, are established via Letters of Agreement (LoA), which will be updated by December 2012 to include the new operational arrangements for enhanced coordination in DANUBE FAB. These new operational arrangements include:

- harmonised DANUBE FAB radar separation minima, including separation at transfer of radar control (in line with the future air traffic demand, the target lateral separation minima is envisaged/expected to be 5 NM);
- direct ATCO-ATCO coordination (SYSCO, phone, hotline); and
- contingency procedures[17].

The updated LoA will be elaborated in line with the EUROCONTROL Common Format Letter of Agreement between Air Traffic Services Units, ed. 4.0, 2012.

Other ATS procedures are expected to be harmonised in future, including:

- P-RNAV, RNP, APV;
- Continuous Descent Approaches and use of borderless concept of operation; and
- Additional contingency procedures as necessary.

The automated coordination and transfer processes (e.g. full OLDI and SYSCO) are yet to be tested and implemented.

Future developments of DANUBE FAB procedures will also take into account the Commission Regulation on Standardised European Rules of the Air (SERA)[18].

Aspects of real-time coordination are also covered by section 4.9 of this document.

7.3 System Interoperability

A number of European Regulations impact the interoperability requirements for the DANUBE FAB establishment. Both ANSPs are compliant with essential and specific requirements laid down by EC Interoperability Regulation 552/2004. This has formed the basis for the DANUBE FAB implementation.

In addition, looking forward to complying with the requirements of SESAR and the ATM Master Plan, the DANUBE FAB "Refined Target Architecture 2016" (Annex L) has been developed.

The future DANUBE FAB implementation will be in line with the ATM Master Plan. In this regard the System enablers applicable for the DANUBE FAB context will be implemented or planned separately or commonly at the FAB level (see the Refined target Architecture document in Annex L).

7.3.1 Areas of Technical Cooperation

The following cooperation is taking place at the technical level as a result of the FAB:

- An agreement has been reached to commonly procure a datalink solution for air-ground communication services.

[17] Addressed in DANUBE FAB Contingency of ATM Service, 1.0, March 2010

[18] Commission Implementing Regulation laying down the common rules of the air and operational provisions regarding services and procedures in air navigation and amending Regulations (EC) No 1035/2011, (EC) No 1265/2007, (EC) No 1794/2006, (EC) No 730/2006, (EC) No 1033/2006 and (EU) No 255/2010.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

- Radar cost avoidance in 2012: ROMATSA was able to avoid the purchase of one new radar, covering the South-Western Romanian airspace sicne coverage and data sharing is available from a BULATSA radar system. Future procurement for normal lifecycle replacement will be avoided. There is a bi-lateral agreement in place “for the reciprocal exchange of the radar data’. Benefits arising from this data sharing are presented in Section 6.1.
- DME cost avoidance: Optimisation of navigation infrastructure removes the need for BULATSA to aquire three DMEs for RNAV capability, thus saving DME costs. An agreement has been signed between the two ANSPs covering the shared use of radio navigation aids for area navigation which includes DMEs. Benefits arising from this data sharing are presented in Section 6.1.
- Additional contingency is available through sharing each other’s AFTN services using the DANUBE FAB communication infrastructure in common. Benefits arising from this data sharing are presented in Section 6.1.
- Taking into account the stages in the lifecycle of the existing ATM systems, the ANSPs are considering possible common procurement of an ATM system starting from the 2017/2020 timeframe. A firm commitment has not yet been made, so benefits from this future initiative have not been included in the current CBA.
- Where possible, both ANSPs have agreed to develop harmonised specifications for future procurement of technical systems and related services.
- Common procurement is likely to be further aligned once the ANSP Board is established and the first DANUBE FAB Strategic Plan and Annual Plan is developed.

7.3.2 Implementation of Ground – Ground Automated Coordination Process

Pursuant to relevant ESSIP objectives and SESAR IP1 Operational Improvements (OIs), all routine data exchange and coordination between the ACCs within the FAB, including tactical coordination, will be conducted using a wider range of OLDI-SYSCO messages (as compared to before the FAB when OLDI was used predominantly for exchange of flight data). These messages within the context of the framework of Commission Regulation (EC) No 1032/2006 will be instrumental to the improvement of interoperability between ACCs.

For smooth and seamless ATC operations within the DANUBE FAB, the following coordination capabilities will be available to the ATS units:

Coordination Dialogue	Negotiation of non-standard levels or routes requiring the explicit approval of the accepting sector. Counter-proposals and unsolicited proposals may also be made by the accepting controller. Where coordination is agreed electronically, updating of the flight data processing system can be automatic.
Transfer of Communication	Changing a flight’s radio frequency, either as notified by the transferring controller or as requested or assumed by the accepting controller. A range of services are provided to allow tactical conditions to be coordinated with the accepting controller, such as ability for the accepting controller to request particular transfer conditions. Methods are also provided to allow a flight to be released from the agreed transfer conditions, either as notified by the transferring controller or as a request dialogue initiated by the accepting controller.
Area of Interest (AoI)	Information on aircraft operating in the vicinity of the boundary between the areas of responsibility of adjacent ATC units, and which could affect the coordination of other flights crossing the boundary, may be exchanged, allowing it to be correlated with radar data in the receiving unit. This will also make it possible to conduct conflict detection in the relevant portions of the AoI.

Table 12: Coordination capabilities available to the ATS units in the future

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

7.4 Civil – Military Tactical Coordination

Safe and efficient FUA level 3 operations in DANUBE FAB will be achieved by:

- SYSCO for electronic exchange of flight data to improve the coordination dialogue between civil and military ATS units and in order to reduce the requirement for controller-to-controller verbal coordination.
- Airspace crossing procedures for coordination in the form of a notification of crossing intentions or a crossing request. This coordination dialogue includes the responses: accept, reject or make a counter-proposal for the crossing conditions.
- Implementation of LARA supporting system as the civil-military ASM coordination tool at tactical level.

These coordination arrangements will also increase the situational awareness of the military sectors for their Area of Interest (AoI) by receiving updates of the flight details and intentions.

7.5 Coordination with the ACCs Adjacent to DANUBE FAB

The establishment of the DANUBE FAB also addresses the coordination procedures and interoperability interface with the adjacent ACCs. The coordination procedures that exist today concerning the Republic of Bulgaria and Romania and the neighbouring ACCs are outlined in LoAs and will continue to be effective.

DANUBE FAB is, and will continue to be, open to consider opportunities for further collaboration with other neighbouring States or FABs (see section 10 for further details).

In terms of system interoperability with the adjacent ACCs the following arrangements are in place:

State	Messages exchanged within the FAB	Messages exchanged with the ACCs adjacent to the FAB
REPUBLIC OF BULGARIA	ACT/ABI/LAM /REV/PAC/MAC	ACT/ABI/LAM messages are exchanged with all neighbouring ACCs REV/PAC/MAC messages are exchanged with Skopje ACC/Simferopol ACC/Ankara ACC/Istanbul ACC/Bucharest ACC.
ROMANIA	ACT/ABI/LAM /REV/PAC/MAC	ACT/ABI/LAM messages are exchanged with all adjacent ACCs. REV/PAC/MAC messages are exchanged with Sofia ACC/ Budapest ACC/Simferopol ACC/LVIV ACC/Belgrade ACC. Phone coordination (No OLDI connections) with CHISINAU ACC.

Table 13: Arrangements of the system interoperability with the adjacent ACCs

Both systems support the transfer of communication messages (ROF/MAS/COF/TIM/HOP/ SDM) and coordination dialogue messages (RAP, RRV, SBY, ACP, RJC, CDN).

Plans are in place to begin the operational use of those messages to enable the silent radar transfer between SOFIA ACC and BUCHAREST ACC (reduction of separation minima to 5 NM over the border).

When other adjacent ACCs are capable of processing the transfer of communication messages and coordination dialogue messages over the border, the operational use of the messages will be extended to include communications with other neighbouring States or FABs. This will enable the usage of 5NM minimum radar separation over the border, which will lead to increased capacity.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

7.6 Common Training System

Based on extensive analysis of training programmes within both ANSPs, a common agreement has been reached to harmonise aspects of ATCO staff training, licensing and training air traffic services electronic personnel (ATSEPs), and training of meteorological, safety, security, environment and quality experts.

Furthermore, in order to have a coherent approach on training in Danube FAB, a Training Policy will be developed and further adopted in Danube FAB, establishing the training principles and approach for all staff mentioned above.

Extensive analysis of training programmes within both ANSPs was undertaken and the conclusions were reflected in the DANUBE FAB documents and studies which describe selection and training design methods based on objectives and suitable for highly cognitive activities.

ATCO staff training is established through national rules and regulations, according to international requirements. In this respect, a common approach has been developed for basic training in all operational domains, based on analysis of training programmes and this resulted in a common agreement to harmonise several aspects of ATCO and AMP selection and basic training.

Operational training is focused on ICAO Annex 1 and European Commission Regulation 805/2011 and the training directions are oriented to activities regarding the following services:

- Air Traffic Control (ATC),
- Aeronautical Information (AIS)
- Aeronautical Meteorology (MET)

7.6.1 ATCOs Training

Extensive analysis of training programmes within both ANSPs was undertaken through DANUBE FAB documents and studies which describe selection and training design methods based on objectives and suitable for highly cognitive activities.

These documents and studies resulted in a common agreement to harmonise several aspects regarding ATCOs basic training based on Annex 1 ICAO and European Commission Regulation 805/2011 requirements that are considered the major training directions:

- **DANUBE FAB Training Standard and Methodology**: describes a system approach method to analyse training needs and create training packages
- **DANUBE FAB common selection requirements**; common selection requirements used for candidates applying to become ATCO [according to national rules and regulations] based on licensing requirements set by ICAO and EU Provisions
- **DANUBE FAB Specification of Training and Certification Requirements**;
    - specification of training and certification requirements - intends to support activities related from entry into training process up to rating training applicable in the common training system at all its locations
    - establish mutual recognition for training and training organisations;
- **DANUBE FAB training catalogue*:*** the range of basic training products and services available within the DANUBE FAB
- **EUROCONTROL Training syllabus** [Edition 1.0/ 21.10.2008]
    - DANUBE FAB Training Syllabus study: basic training according to EU requirements [Eurocontrol Common Core Content as the applicable training syllabus]
    - common training plans for basic training

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Both ANSPs are responsible for delivering continuation training internally and development training internally or at other organisations. The content, length and frequencies vary per year and depend on operational needs.

All of the documents mentioned above have been completed. The formal adoption will take place following the ratification of the State Level Agreement and after the initial meeting of the Governing Council, NSA Board and ANSP Board.

A summary of timescales in the training domain is as follows:

1. Bulgarian National regulation No. 1 is expected to be updated. This update will include modified procedures for mutual recognition of training organisations;
2. Studies for training and certification requirements part 1 and 2 will be reviewed by the DANUBE FAB legal group and Governing Council Before December 2012;
3. Common selection requirements have been elaborated and signed by the management of BULATSA and ROMATSA;
4. Training Standard and Methodology have been elaborated and signed by the management of BULATSA and ROMATSA.
5. Training catalogue have been elaborated and signed by the management of BULATSA and ROMATSA.
6. Training syllabus has been agreed by the management of BULATSA and ROMATSA.

Regarding the training organisations, it was agreed that it is more efficient to keep the structures and prerogatives of the existing ones that are certified by CAA/NSAs.

The approaches regarding the ATCO staff training activities, and the different results reached are detailed in dedicated sections of this document.

Also, it will be taken into account the harmonisation of the basic and qualification training air traffic services electronic personnel (ATSEPs) and also for training of safety, quality, security and environment experts. Both ANSPs are compliant with ESARR5 using ATSEP licensed by the local CAA. The ANSPs, in collaboration with the CAAs, are working towards future harmonisation and integration of training procedures for ATSEP.

7.7 Aeronautical Information Services

Aeronautical Information Services (AIS) have been identified as an area of potential cooperation in the future. Currently AIS provision (except PIB) in Romania is under the responsibility of the Romanian CAA and it has been agreed to expand the opportunities for cooperation once the AIS provision will be fully transferred to ROMATSA.

Nevertheless, areas of future cooperation have already been identified and include:

- **Harmonisation of data and information** is necessary for the improvement of data effectiveness and integrity. Assessments have already revealed that aeronautical publications and static data for Bulgaria and Romania are maintained in EAD - modules PAMS DP/DU and SDO DP/DU since 2010.
- **Harmonisation of products**: A comparison on the format of aeronautical information products, including creation and maintenance of aeronautical publications in electronic format, has already been undertaken.
- **Harmonisation of procedures and working methods**: An identification of possible areas for establishment of best practices, including compliance with ICAO requirements on AIS provision has been undertaken.

7.8 Meteorological Services

An on-going activity within the DANBE FAB is to enhance safety and improve common decision making by ensuring a harmonised provision of all required MET information to ATM

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

and airspace users. BULATSA and ROMATSA have already achieved a high level of standardisation of the current MET services, in accordance with the requirements of Annexes 1 and 3 to the Chicago Convention. Following a detailed analysis of the possible opportunities for harmonisation and establishment of best practices for the MET services within the Danube FAB, the parties concluded the following:

Regarding the competence

- BULATSA and ROMATSA are ensuring that in the DANUBE FAB the meteorological activities are fulfilled only by properly qualified AMP, which remains ultimately the key factor in decision making processes in MET domain.
- There is a high degree of similarity between the corresponding meteorological units from BULATSA and ROMATSA which implies no significant changes in order to harmonise the AMP's duties.
- Basic instruction, training, competence and assessment approaches are very similar and coherent with ICAO and WMO requirements. The differences regarding frequency of refresher trainings are not significant, taking into account the competencies.
- In order to make developments regarding the assessment tools and adaption of competencies to the WMO requirements, a long term plan will be established by both organisations.
- The current structures to provide training for AMP will be maintained.

Regarding aeronautical MET products and services

- ROMATSA and BULATSA have identified common KPIs that can be used in the future DANUBE FAB and agreed to identify other common KPIs and improve their objectives for MET.
- Both organisations agreed to develop a common procedure containing the effective measures and actions in order to fulfill the need for issuing coherent SIGMETs.
- ROMATSA and BULATSA intend to use the same form of LLSIGWX in the DANUBE FAB.
- Some specific activities shall address both automation and human assistance, with a trend for a continuous extension of the automation, but without the elimination of human assistance, particularly for those areas sensitive to safety.
- BULATSA and ROMATSA agreed on a set of meteorological data to be exchanged bilaterally to meet the operational needs and provision for mutual access to databases.
- Both organisations set up and exchanged the details for online access to the MET Briefing data and agreed on the guidelines for further developments.

Regarding contingency

- The basic meteorological information dataflow necessary for ensuring the specific needs for DANUBE FAB in a contingency situation has the required technical support and will be covered by specific agreements between BULATSA and ROMATSA.
- Regarding weather watch and forecast, BULATSA and ROMATSA agreed that through national contingency plans, the contingency situations are currently ensured at a high level of efficiency in terms of human resources and technical support and, therefore, at this stage it is not necessary to develop a common contingency plan for taking over the duties of the other MWO.
- BULATSA and ROMATSA agreed to develop and implement the Minimum Level of Service concept for their meteorological services for those possible exceptional situations when a service degradation may occur within an acceptable level of quality and without prejudices to safety.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Further development and implementation of best practices in the MET domain, including setting up common support networks and contingency, will take place during the course of 2012.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

8 DANUBE FAB Compatibility between Airspace Configurations

The airspace configuration in DANUBE FAB consists of different adaptable sectorisation scenarios applied according to the traffic demand. Free route configuration will be applied in a phased manner to the maximum extent (See Section 5.3, Free Route Operation in DANUBE FAB).

In order to optimise use of the airspace (addressed in sections 4.3 and 4.5) dynamic management of sectors will be applied. This will be through an integrated CDM process at network, regional and FAB levels to meet the different user requirements.

The section below details the airspace classification and airspace organisation in DANUBE FAB.

In terms of civil-military cooperation, due to frequent activation for military purposes of danger areas situated over High Seas close to the boundary between Sofia FIR and Bucuresti FIR (SHABLA exercise), alternate ATS routes to the current ATS route network were developed and coordinated between Bulgaria and Romania. The purpose of these alternate ATS routes is to optimise the civil-military coordination and to improve the flight planning process when danger areas are activated.

As the area is very close to the border, close coordination was required to meet the operational requirements for the next year's exercises. This process was done with NM coordination (EUROCONTROL and CFMU). The agreements reached will be published in AIP and the procedural issues including coordination regarding activation will be implemented before this summer [36].

Future developments concerning DANUBE FAB airspace configurations will also take into account the Commission Regulation on Standardised European Rules of the Air (SERA).

8.1 Principles for Airspace Classification

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 6 (a)

The airspace in DANUBE FAB area is classified in accordance with the provisions of ICAO Annex 11.

The airspace of Sofia FIR is classified as C and G, while the airspace of Bucuresti FIR is classified as A, C and G. CTR/TMA operations in the FAB are conducted in class A and class C airspace. It is not planned to implement airspace classes B, D, E and F in the DANUBE FAB. Class G is implemented as published in the Republic of Bulgaria and Romania AIPs.

In compliance with Commission Regulation (EC) No 730/2006, all ATS routes above FL 195 in the DANUBE FAB are contained in class C airspace. ATS airspace is contained in class C for Bucharest FIR above FL 105, and above FL 095 for Sofia FIR. The **airspace classification above FL105 is harmonised within the FAB**. The class C upper limit in the DANUBE FAB is FL 660.

The differences that exist in the upper limit of class G airspace are attributed to local specifics of radar and radio coverage. At this division between class G and class C there are very few flights, typically VFR performed by light (small) aircraft, and the classification of airspace related to the level of service does not hinder smooth transfer and efficient ATS provision for IFR flights.

The difference between lower and upper airspace is of even smaller significance and so both Romania and the Republic of Bulgaria have decided not to differentiate between lower and upper airspace.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

8.2 Principles for Airspace Organisation and Simulation

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 6 (a)

Currently, the Danube FAB airspace is allocated to 29 sectors controlled by 2 ACCs – Bucharest and Sofia. However, the airspace organisation analysis carried out by the ADODEG has proposed a number of new routes, with many already implemented (see section 4).

Taking into account the planned changes to the route network and the forecast traffic increases, the conclusion was drawn that airspace sectorisation and organisation should be reviewed and modified accordingly. Analysis identified some potential problem areas (hot spots) within and at the interface to the DANUBE FAB area for which improved airspace design scenarios could be developed and evaluated[19]. A simulation and validation process was undertaken in order to determine the most appropriate sectorisation for DANUBE FAB and possible difficulties with the proposed organisation.

After considerable airspace design work supported by the EUROCONTROL Network Management Operations Planning Unit, using various simulation and modelling tools such as NEVAC, SAAM and RAMS, an initial Danube FAB Airspace Plan was delivered. This work identified potential capacity problems with predicted 2015 traffic volumes and explored a series of proposals, setting a solid basis for the further development of a concept of operation and candidate solutions for further validation by means of a real-time simulation.

Airspace organisation scenarios were established by seeking compliance with the following principles:

- ATC sectors shall be defined based on operational needs and be unconstrained by FIR or State boundaries
- The ARN Version 7 ATS routes will form the basis of the FAB route network, while user-preferred trajectories (free routes) will be introduced as far as possible under certain time frames and conditions.

8.2.1 Fast Time Simulation

Simulation (FTS) of the FAB airspace was conducted in 2010 in order to study a number of possible airspace organisation alternatives and identify the most suitable option to be validated by means of a Real Time Simulation (RTS). As a result of the FTS[20] airspace analysis, four different airspace organisations were chosen to be validated by RTS.

8.2.2 Real Time Simulation

A full scale DANUBE FAB RTS was conducted at the EUROCONTROL Experimental Centre (EEC) in Brétigny, France during November – December 2011.

The DANUBE FAB RTS activity took place during a four-week real-time simulation activity comprising 42 active simulation exercises and involving 64 participants (45 ATCOs on measured positions, 7 ATCOs on military positions, 12 ATCO expert observers). The RTS involved a wide range of assessments, notably: recording of executive and planning controller activity (R/T, phone, SYSCO), controller workload ratings, controller feedback questionnaires and individual controller interviews. The simulations were intended for use by the DANUBE FAB stakeholder organisations including ANSPs, military, CAAs and NSAs involved in improving the efficiency and ease of use of the DANUBE FAB Airspace.

Four distinct DANUBE FAB airspace organisations were selected for validation as part of the RTS as follows:

[19] DANUBE FAB Airspace Design – Phase 1, 3.2 Overview of identified areas for improvement

[20] DANUBE FAB Fast Time Simulation Report, version 0.4 (unsigned)

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

- **Organisation 1 (ORG1):** included 19 measured sectors (8 in Bulgarian and 11 in Romanian airspace) assigned to 4 sector groups and ARN Version 7 route network. Airspace extends from FL095 to FL660.

  ORG1 included cross-border airspace managed by 6 sectors. Military operations were handled by 3 military sectors (1 in Bulgarian and 2 in Romanian airspace). Enhanced FUA procedures were supported by real time coordination between military and civil controllers allowing for crossing of active military TRAs by civil flights, as well as for accommodation of military route flights without airspace segregation.

- **Organisation 2 (ORG2):** included 19 measured sectors (8 in Bulgarian and 11 in Romanian airspace) assigned to 4 sector groups and ARN Version 7 route network. Airspace extends from FL095 to FL660.

  Military operations in ORG2 were handled by 3 military sectors (1 in Bulgarian and 2 in Romanian airspace). Enhanced FUA procedures were supported by real time coordination between military and civil controllers allowing for crossing of active military TRAs by civil flights, as well as for accommodation of military route flights without airspace segregation.

- **Organisation 3 (ORG3):** included 19 measured sectors (8 in Bulgarian and 11 in Romanian airspace) assigned to 4 sector groups and ARN Version 7 route network. Airspace extends from FL095 to FL660.

  Military operations in ORG3 were handled by 3 military sectors (1 in Bulgarian and 2 in Romanian airspace). Enhanced FUA procedures were supported by real time coordination between military and civil controllers allowing for crossing of active military TRAs by civil flights, as well as for accommodation of military route flights without airspace segregation.

- **Organisation "Free Route Airspace":** included 7 measured sectors (2 in Bulgarian and 5 in Romanian airspace). Airspace extends from FL095 to FL660. The fixed route network is replaced by direct routes extending across the State borders between the FAB entry and FAB exit points. The FAB airspace entry and exit points coincide with the entry and exit points of the fixed route network.

  Military activities were not simulated. BULATSA and ROMATSA plan for implementation of free route operations in a phased manner, the first phase being implementation of free route airspace during the night hours (for further details see section 4.7). Airspace sectors have been assigned to four sector families – Arad and Bucharest in Romanian airspace, and Sofia and Varna in Bulgarian airspace. These sector families exist currently.

The DANUBE FAB RTS provides supporting evidence (based on predicted 2015 traffic levels) that each of the first three possible organisations envisaged for the future DANUBE FAB airspace is superior to the current airspace organisation. The three airspace organisations examined used different options for adjusting the sectorisation to a more extended route network. Along with the introduction of SYSCO between the ACCs of Bucharest and Sofia, this is claimed to support predicted 2015 traffic levels.

However, the RTS concluded that the first three simulated airspace organisations would require further refinements before implementation:

1. ORG2 and ORG3 focussed on improvements within the Bucharest and Sofia FIRs. ORG2 and ORG3 both have their pros and cons and potential problems are identified in sufficient detail with the optimum solution most likely to be a balanced mix of the two organisations.
2. The simulated cross-border organisation (ORG1) should not be retained for initial FAB implementation. Further options for cross-border sectors should be considered and analysed.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

The above summary is broken down into specific issues and discussed in considerable detail in the DANUBE FAB RTS Report (Annex J). Issues where problems have been encountered are discussed and hints to sources and reasons for problems have been documented. This is summarised in the table in a traffic light notation:

- Green – no major capacity related issues were identified, the sector can cope with the simulated traffic level.
- Yellow – some concerns raised by controllers or some metrics indicate that problems may arise when dealing with the simulated traffic level in that sector.
- Red – major or blocking issues reported or measured during the exercises concluding that the sector is not able to cope with the simulated traffic level.

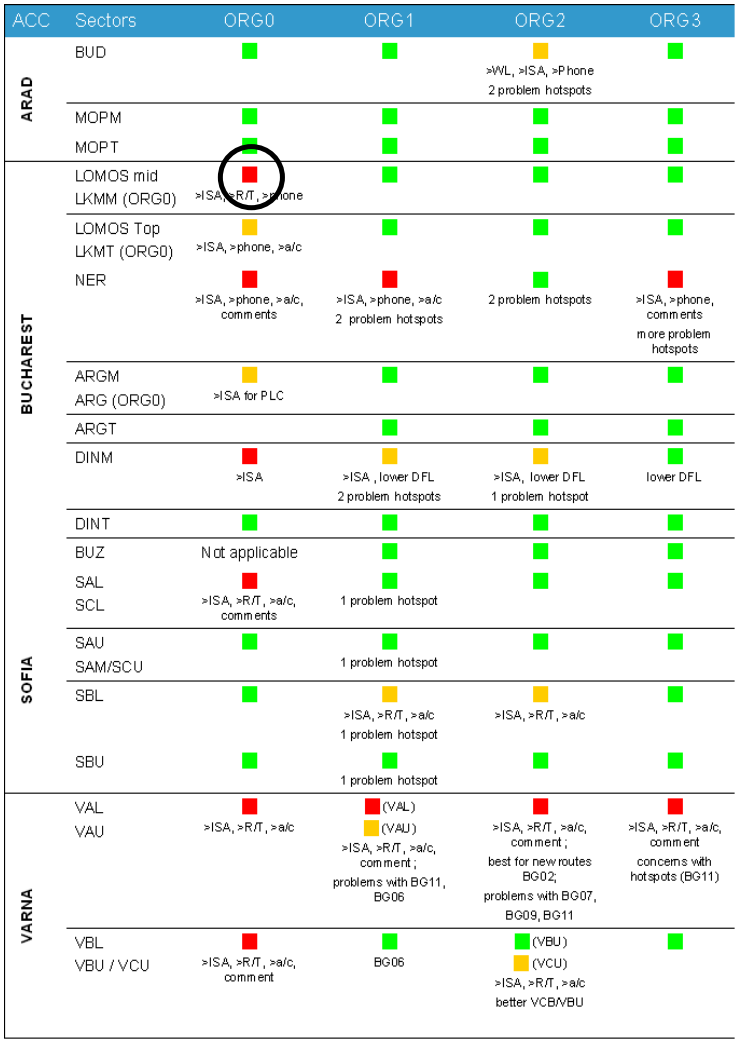


Figure 17: Synthesis of Capacity Related Finding by RTS

A joint operability and safety analysis of the last organisation to illustrate the free-route concept led to 22 recommendations which can be found in chapter 8 of the DANUBE FAB RTS Report (Annex J) as well as in the separate Danube FAB RTS Safety Report (Annex K). In the free route concept the fixed route network is replaced by flight-plannable direct FAB entry-to-exit points. The findings related to the operability of the free route concept indicate that implementation of free route operation in the DANUBE airspace during night/early

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

morning hours is feasible, subject to the implementation, as appropriate, of the recommendations referred to above.

8.3 Changes of Airspace Configuration Resulting from the Harmonisation

Regulation (EU) No. 176/2011 Article 3, Annex Part 2, 6 (b)

Based on the results described above, BULATSA and ROMATSA will consider the RTS validation and safety study findings in support of their efforts:

- to establish the Danube FAB airspace sector design; and
- for a phased implementation of new routes.

The outcome of the Danube FAB RTS will be used to facilitate the development plan of future airspace organisations that will accommodate the new routes in accordance with the agreed route implementation schedule (see section 4).

Furthermore, and in order to optimise its documents and charts, the Republic of Bulgaria is removing the distinction between Upper and Lower ATS routes - "U" prefix within Sofia FIR effective 31st May 2012. This commitment was presented by both Romania and the Republic of Bulgaria at ICAO level in Paris. The removal of the “U” prefix will occur at a future date in Romania.

The DANUBE FAB airspace will continue to be improved after the FAB establishment. Some areas have already been identified as candidates for future improvement including:

- Harmonisation of application of the FUA concept - ICAO D, P, R areas – is expected, once the process of DANUBE FAB airspace management is established (i.e. by the establishment of the High Level Airspace Policy Body, see Sections 4.2.2 and 4.3). Subsequently, further alignment of airspace configurations, concerning the harmonisation of application of the FUA concept - ICAO D, P, R areas will be addressed.
- Harmonisation of DFL between the lower and upper airspace in the FAB (FL245 in the Republic of Bulgaria and FL285 in Romania).
- There are still differences in the upper limit of class G airspace – FL95 within the Republic of Bulgaria and FL105 within Romania.

All airspace configuration changes in DANUBE FAB will be coordinated with the NM.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

9 DANUBE FAB Regional Agreements within the ICAO

The following regional agreements concluded in compliance with the framework established by ICAO Annex 11 to the Convention on International Civil Aviation are of relevance with respect to the establishment and operations of the DANUBE FAB:

- Approval of a Proposal for amendment of the ICAO European Air Navigation Plan (Serial No. EUR/NAT 96/38 - ATS) reference T 17/3.E/6 - KH - 123.ATM from 19 February 1997 in relation with Delineation of FIR boundaries over the High Seas at the Black Sea.
- Inclusion in the ICAO Air Navigation Plan of all airspace projects included in the European Route Network Improvement Plan (ARN V8) in coordination with the NM.

The DANUBE FAB will have no impact on these agreements.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

10 DANUBE FAB Existing Regional Agreements

The following regional agreements are of relevance with respect to the establishment and operations of the DANUBE FAB, though the FAB will have no impact on these agreements:

- EUROCONTROL International Convention relating to Cooperation for the Safety of Air Navigation of 13 December 1960 as amended on 12 February 1981
- Multilateral Agreement relating to route charges of 12 February 1981
- Memorandum of Understanding for ATM Co-Operation in South - Eastern Europe ("ACE MoU"), signed by Republic of Bulgaria, Republic of Moldova, Romania and Turkey, on 21st July 2003 in Strasbourg
- Participation in ICAO RDGE

Further initiatives to enhance coordination and collaboration between DANUBE FAB and neighboring States and FABs are detailed below.

10.1 Cooperation with Neighbouring Countries

According to the DANUBE FAB State Level Agreement, the DANUBE FAB is open to accession to any interested State. The DANUBE FAB has been presented at various bilateral meetings, international forums and conferences. The following initiatives have been undertaken:

- Participation of both DANUBE FAB ANSPs at the CEO of the Balkan ANSPs meeting in Belgrade on 21st February 2012 mutually organised by SMATSA and CANSO.
- **SERBIA/MONTENEGRO:** BULATSA and SMATSA (Serbia and Montenegro Air Traffic Services Agency) held a bilateral meeting on 10 Feb 2012 on which the DANUBE FAB was presented. An Agreement on Operational-Technical Co-operation between BULATSA and SMATSA was also concluded in this meeting.

  Several bilateral meetings were held between ROMATSA and SMATSA (e.g. October 2010, February 2012) and a Cooperation Agreement on Operational and Technical matters was signed between ROMATSA and SMATSA on 26 March 2012.

  An agreement for the shared use of radar sensor data between Bulgarian Air Traffic Services Authority and Serbia and Montenegro Air Traffic Services Agency Ltd, was signed in July 2011.
- **FORMER YUGOSLAV REPUBLIC OF MACEDONIA (FYROM)**: A bilateral meeting was held between the Civil Aviation Authorities of both countries, BULATSA and M-NAV on 8 December 2011 dedicated to presenting the DANUBE FAB initiative. It is expected that FYROM will decide which FAB initiative to join in the future.
  - A Radar Data Exchange Agreement, between the Bulgarian Civil Aviation Administration and the Macedonian Directorate General of Civil Aviation, Air Control Services, was signed on 17 March 1999.
- **Republic of MOLDOVA**: Recently MoldATSA has submitted a written request to ROMATSA and BULATSA to join the DANUBE FAB Project as an observer. The following agreements have been concluded:
  - Sharing of radar data Agreement concluded between ROMATSA and MoldATSA
- **Republic of TURKEY**: Cooperation with Republic of Turkey - A bilateral meeting between BULATSA and DHMI Turkey (the Turkish ANS Provider) was conducted on 5-6 January 2012 in Sofia. The FAB initiative was also presented. For the moment,

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

the Republic of Turkey has expressed no intention to join any FAB initiatives. A Memorandum of Cooperation between DHMI and BULATSA was signed on 16 May 2012.

- Also, it is expected that a Memorandum of Cooperation will be signed between ROMATSA and DHMI on operational and technical matters.

  Delegations representing the Ministries of Transport of the Republic of Turkey and Romania held a Cooperation meeting on 16 – 17 September 2010 where ROMATSA and DHMI discussed possible future cooperation on ATM/ANS issues.
- **HUNGARY**: Several bilateral meetings were held between ROMATSA and HungaroControl CEOs (e.g. January 2010, 17 December 2010, 20 April 2011) and also at working group level for discussing the possible inter-FAB cooperation (16 March 2010). The following agreements have been concluded:
  - A Memorandum of Cooperation between ROMATSA and HungaroControl was signed on 03 March 2011.
  - Contract for the Provision of MANASTUR Radar Data between ROMATSA and HungaroControl - AC/E/B/PS no.008/11.01.2010 was signed in order to improve the continuity, quality and track position accuracy.
  - Contract for the Provision of Puspokladany Radar Data between ROMATSA and HungaroControl - AC/E/B/PS no.008/11.01.2010 as a mirror arrangement of the above.
- **GREECE**: An agreement for the shared use of radar sensor data between Bulgarian Air Traffic Services Authority and Hellenic Civil Aviation Authority, was signed in 2009.

10.2 Cooperation with Other FABs

- The DANUBE FAB regularly participates in international fora to discuss opportunities with other FABs, for example the FFPG.
- Cooperation with other FABs (Blue Med): A high-level meeting was held in February 2012 between ENAV (the Italian ANS Provider) and BULATSA. As part of the BLUE Med FAB and the DANUBE FAB, the parties expressed their future intention to extend their cooperation bearing in mind that both initiatives are also actively presented in the Network Management Board.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

11 DANUBE FAB Consistency with European Union-wide Performance Targets

11.1 Performance Plans

In accordance to the provisions of the Commission Regulation (EU) no. 691/2010 of 29 July 2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) no. 2096/2005 laying down common requirements for the provision of air navigation services, the Romanian Civil Aeronautical Authority and the Bulgarian Directorate General of Civil Aviation Administration, acting as National Supervisory Authorities, developed and submitted individual NPPs.

In the preparation of the NPPs, NSAs and ANSPs had several meetings for establishing the general terms of the work, the content of the documents, correlation of targets and investments at DANUBE FAB level and responsibilities of each entity. Meetings took place in Romania and Bulgaria at different managerial levels. As part of these discussions the States decided to prepare performance plans at national level for the first reference period (2012-2014).

As a part of the collaborative process of elaboration of the Performance Plans, Danube FAB Member States had a common stakeholder consultation with airspace users on 5th of May 2011.

NPPs were submitted to the Commission and PRB on 27th June 2011 for Bulgaria and on 4th July 2011 for Romania. Following assessment by the EC and PRB the EC requested both States to revise the cost-efficiency targets.

Romania and Bulgaria provided revised performance plans and aggregated targets at DANUBE FAB level in January 2012. As of the 29th May 2012, no decision from the European Commission had been made concerning the adoption of the revised performance plans.

After the adoption of the Performance Plans the Bulgarian and Romanian NSAs will monitor the implementation of the performance plans applying the appropriate measures for achieving the targets during the first reference period with full support ensured by BULATSA and ROMATSA.

The Single European Sky's Performance Scheme for RP2 is now developing and the EC intends to finalize the process by mid-2013. The EC proposal is to ensure that the performance scheme is fully developed and implemented, with a gate-to-gate ANS scope, setting performance targets in all four key performance areas of safety, capacity, environment and cost-efficiency.

The State Level Agreement (Annex A) stipulates that the NSA Board may propose the application of performance plans at either national or DANUBE FAB level in accordance with European Union legislation. For the second reference period (2015-2019) and beyond it is envisaged that performance plans will be elaborated at DANUBE FAB level.

On this basis ROMATSA and BULATSA in coordination with the NSAs are proposing for RP2 and beyond to contribute in an effective and efficient way for providing benefits to the industry and to ensure the SES performance.

11.2 Key Performance Areas

A key driver during the development of DANUBE FAB has been the Key Performance Areas (KPAs) of Safety, Environment, Capacity and Cost-efficiency. Several of the studies during the development phase have therefore been produced in direct response to these KPAs including the ConOps, Environmental Impact Assessment Study and Safety case.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

Furthermore, the Real Time Simulation (RTS) looked specifically at the potential for the ConOps to deliver against each of these KPAs. This is illustrated in the diagram below.

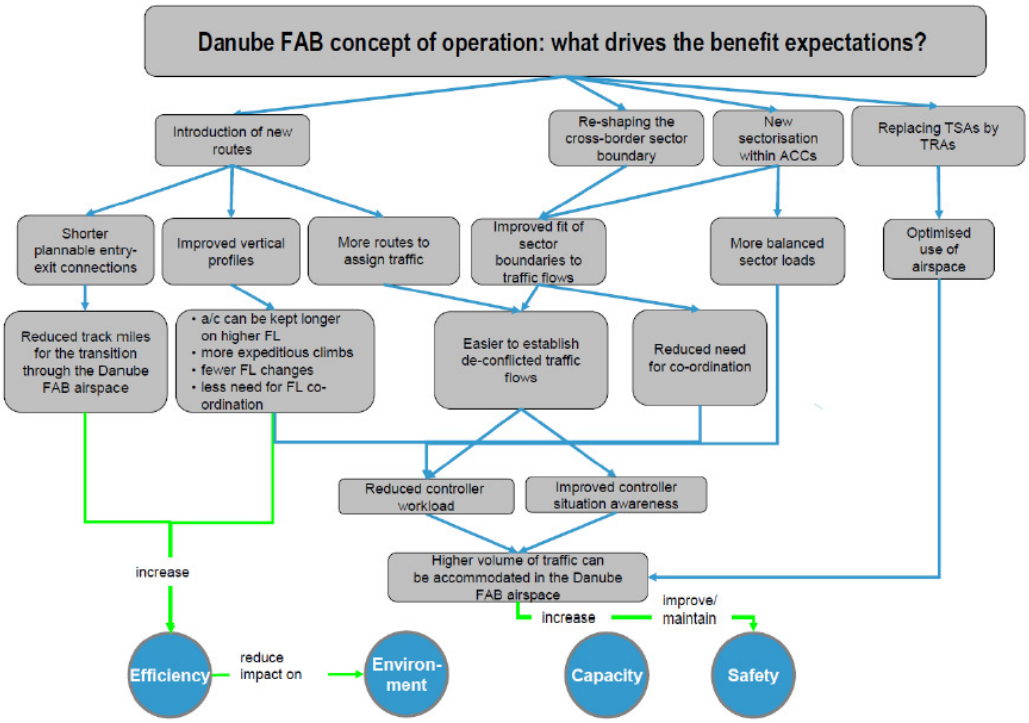


Figure 18: Impact of DANUBE FAB ConOps on KPAs

11.3 Safety

Safety has been adequately considered at all phases of the development of the DANUBE FAB and addressed in the Agreements signed between the States, ANSPs and NSAs.

Comprehensive activities for the development of safety assurance for the establishment of the DANUBE FAB have been carried out and this is reflected in the DANUBE FAB Safety Case (Annex E) as described in section 3. The scope of the DANUBE FAB safety assurance documentation goes beyond the criteria derived from the requirements of the Commission Regulation (EU) No 176/2011.

The “SMS Roadmap for the Harmonisation and Enhancement of BULATSA and ROMATSA Safety Management Systems Within DANUBE FAB” (Annex F) lays down a complete plan of activities and schedule of milestones for aligning and harmonising the Safety Management Systems of the DANUBE FAB ANSPs.

The DANUBE FAB Safety Policy (Annex G) has also been released.

In regards to the airspace changes and subsequent simulation and validation exercise, the RTS provides evidence of expected positive impact on ATCO workload and situation awareness thus enabling a potential for the current safety level to be maintained with increased capacity. A dedicated safety study was part of the Danube FAB RTS. The safety report was compiled principally on the basis of observations and debriefs and is a separate report to ensure independence.

A set of objective safety metrics was collected by means of an Automatic Safety Monitoring Tool (ASMT). This was used to corroborate the findings and conclusions from the analysis of the controllers’ and observers’ feedback, as well as to assess the achieved safety of aircraft separation during RTS.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

The recommendations from the RTS safety report will be used to fine tune the airspace design, sector design and ATC procedures during the on-going implementation of DANUBE FAB routes in order to ensure that current levels of safety are maintained or improved.

11.4 Environmental Impact

In terms of horizontal flight efficiency, the proposed route network is in line with the Network Manager plans and is expected to deliver substantial benefits to airspace users. The introduction of the new ATS routes enables airspace users to flight-plan shorter flights. This is expected to result in reduced track miles for the transition of aircraft through the Danube FAB airspace.

As detailed in the CBA (Annex H), by 2015 each flight is expected to save more than 0.5 minutes of flying time, increasing to beyond a minute per flight in 2020 following the introduction of free routes.

The gain in flight efficiency in terms of reduced track miles is directly linked to an equivalent gain in reduced environmental impact as a result of reduced fuel burn and hence CO_2 emission.

A dedicated Environmental Impact Assessment Study (Annex O) was performed by Eurocontrol experts to analyse assess any changes in environmental impacts arising from Danube FAB airspace and route network proposals. The study was carried out using the System for traffic Assignment and Analysis at a Macroscopic level (SAAM) fast-time simulation (FTS) tool and conducted in accordance with the requirements and principles of the European Union's Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) Directives.

The study determined annual fuel and emissions savings as shown in the table below:

	2015	2020	2030
Fuel savings (tonnes)	22000	45000	80000
CO2 savings (tonnes)	70000	143000	255000
NOx savings (kg)	280000	550000	950000

Table 14: DANUBE FAB environmental impact

Danube FAB can be considered to contribute to the global need to conserve increasingly scare oil stocks by reducing aviation fuel use by around 80K tonnes per annum by 2050. This is an economic benefit, which will also benefit society.

Furthermore, as the European emissions trading scheme matures, CO_2 emissions can reasonably be expected to have an increasing financial value. If a market value of €8.3 per tonne is used[21] and assuming 80% allocation of free permits[22] the CO_2 benefit from DANUBE FAB in 2030 can be expected to reach over €1.5 million per annum.

A workshop was also held on 5th October 2011 in Sofia, with the objectives:

- To foster the understanding and awareness on ENV as a transversal topic related to all DANUBE FAB project groups (as well as all stakeholders and interested parties invited/presented).
- To jointly define and validate the assumptions and "cases" to be assessed by SAAM FTS, consistent with other work packages.

[21] Carbon price at 02/02/12

[22] Free permits will be allocated for approximately 82% of the total CO_2 emitted by airlines per year in the 2004-2006 baseline period years, in 2012, and 80% of that amount for the years 2013-2020

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

- To review potential legal risks or differences concerning ENV in both DANUBE FAB partners.

The workshop was attended by representatives from DANUBE FAB ANSPs, CAAs, EUROCONTROL, TAROM, Bulgaria Air, and Sofia Airport.

It included an opportunity for each stakeholder to present environmental initiatives with a view to fostering greater collaboration within those initiatives. The initiatives presented included a successful CDA (continuous descent approach) trial in 2009 in the Bucharest TMA with Airbus A318 and A320 aircraft. The conclusions of this had led to improvements in procedures, ATC practices and piloting techniques for Bucharest arrivals.

Work will shortly begin to harmonise the Environmental Management Systems of both DANUBE FAB ANSPs. The harmonised systems are expected to be compliant with ISO 14001. The work will be undertaken with the support of an external consultancy and is expected to be launched before summer 2012. The study is expected to:

- Elaborate harmonised QMS and EMS documentation between BULATSA and ROMATSA, including:
  - Proposal for the FAB Quality and Environment Policy to be submitted for approval from the SQSE WG Coordinators;
  - Formulated FAB Quality and Environment Targets taking into account the EC requirements; and
- Ensure harmonised FAB QMS/EMS records, including: audit plan, management review preparatory report, transition plans and environmental aspect assessment.

11.5 Capacity

Airspace users within DANUBE FAB experience practically no delays. This will continue to be the case for the foreseeable future, due to the commitments laid down in NPPs of both States for the first reference period (RP1) and the improvements in the route network described in section 5 for RP2.

For RP1 NPPs were produced individually by each State but in addition a DANUBE FAB aggregated target for delay was provided as per the table below.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

DANUBEFAB aggregated capacity targets RP1*								
	FAB	State	ANSP	ACC	ACC code	2012	2013	2014
The capacity reference values provided in January 2011 by the EUROCONTROL capacity planning process, based on the EU-wide capacity target of 0.5 min/flight in 2014			BULATSA	Sofia	LBSRCTA	0.11	0.14	0.12
			ROMATSA	Bucuresti	LRBBCTA	0	0	0
			BULATSA	Sofia	LBSRCTA	0.07	0.09	0.08
			ROMATSA	Bucuresti	LRBBCTA			
The capacity target values as per Bulgarian and Romanian NPPs from June 2011 and the DANUBE FAB aggregated values accordingly			BULATSA	Sofia	LBSRCTA	0.11	0.14	0.12
			ROMATSA	Bucuresti	LRBBCTA	0	0	0
			BULATSA	Sofia	LBSRCTA	0.07	0.09	0.08
			ROMATSA	Bucuresti	LRBBCTA			
The improved capacity target values as per revised Bulgarian and Romanian NPPs from Jan 2012 and the DANUBE FAB aggregated values accordingly			BULATSA	Sofia	LBSRCTA	0.11	0.13	0.11
			ROMATSA	Bucuresti	LRBBCTA	0	0	0
			BULATSA	Sofia	LBSRCTA	0.07	0.08	0.07
			ROMATSA	Bucuresti	LRBBCTA			

*The DANUBEFAB aggregated capacity target values are calculated using the formula decribed by PRB in "Assessment of National / FAB Performance Plans with Performance Targets for the period 2012-2014" and the Sofia ACC/DANUBE FAB traffic ratio taken from Capacity reference values provided in January 2011 by EUROCONTROL.

Table 15: FAB level targets for capacity

The new Danube FAB airspace organisation will be able to accommodate a higher volume of aircraft. This is driven by the availability of more routes plus an improved fit of sector boundaries to traffic flows making it easier for sector teams to de-conflict the traffic. The evidence in support of this is provided by the Real Time Simulation (RTS) which compared different airspace organisations to identify the areas of the current airspace limiting the accommodation of future 2015 traffic levels. The RTS also looked into the replacement of the current Temporary Segregated Areas (TSA) with Temporary Reserved Areas (TRA) to make more airspace available for civil use. The availability of system-supported coordination (SYSCO) also contributes to a reduction in workload, particularly for the planning controller.

11.6 Cost Efficiency

The cost efficiency targets defined at EU-wide level (Decision 121/2011/EU) have been achieved by the two states, as shown in the table below. After the initial assessment made in September 2011 by the PRB, Romania and Bulgaria have improved their national performance plans and have contributed to the reduction of the gap between current performance and the achievement of the cost efficiency targets at EU-level. The figures presented hereunder have been aggregated at FAB level. Further aspects of DANUBE FAB cost efficiency are detailed in section 6.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

DANUBE FAB aggregated cost-efficiency targets RP1*									
	Revised Performance Targets BG+RO (Jan 2012)	2009A	2010A	2011	2012	2013	2014	Average per annum 2009-2014**	Average per annum 2011-2014**
	BG Determined costs in real terms (in BGN at 2009 prices)	152,872,468.01	140,801,322.34	144,817,427.56	142,824,250.97	146,121,183.02	143,184,049.03	-1.3%	-0.4%
	BG Determined costs in real terms (in EUR at 2009 prices)	78,183,638.32	72,009,350.05	74,066,317.97	73,054,014.46	74,710,574.55	73,208,841.79		
	BG Total en-route Service Units	1,798,292.00	1,839,757.00	1,918,500.00	1,966,102.00	2,043,942.27	2,117,994.92	3.3%	3.4%
	BG Real en-route determined unit rate in BGN (at 2009 prices)	85.01	76.53	75.48	72.64	71.49	67.60	-4.5%	-3.6%
	BG Real en-route determined unit rate in EUR (at 2009 prices)	43.48	39.14	38.61	37.16	36.55	34.57		
	RO Determined costs in real terms (in RON at 2009 prices)	563,745,064.81	563,312,562.29	555,112,100.21	546,997,499.48	555,327,696.34	564,349,440.12	0.0%	0.6%
	RO Determined costs in real terms (in EUR at 2009 prices)	133,177,668.20	133,075,494.93	131,138,239.09	129,221,266.91	131,189,170.96	133,320,444.25		
	RO Total en-route Service Units	3,133,000.00	3,414,000.00	3,537,000.00	3,612,000.00	3,802,000.00	4,008,000.00	5.0%	4.3%
	RO Real en-route determined unit rate in RON (at 2009 prices)	179.94	165.00	156.94	151.44	146.06	140.81	-4.8%	-3.6%
	RO Real en-route determined unit rate in EUR (at 2009 prices)	42.51	38.98	37.08	35.78	34.51	33.26		
	DANUBE FAB Determined costs in real terms (EUR at 2009 prices)	211,361,306.52	205,084,844.98	205,204,557.06	202,275,281.38	205,899,745.50	206,529,286.03	-0.5%	0.2%
	DANUBE FAB Total en-route Service Units	4,931,292.00	5,253,757.00	5,455,500.00	5,578,102.00	5,845,942.27	6,125,994.92	4.4%	3.9%
	DANUBE FAB Real en-route determined unit rate agregated in EUR (at 2009 prices)	42.86	39.04	37.61	36.26	35.22	33.71	-4.7%	-3.6%
	Average EU-wide determined unit rate for en-route ANS (in EUR 2009)			59.97	57.88	55.87	53.92	-3.2%	-3.5%

*The DANUBE FAB aggregated cost-efficiency target values are calculated using the formula decribed by PRB in "Assessment of National / FAB Performance Plans with Performance Targets for the period 2012-2014"

**In EUR terms

Figure 19: FAB level targets for cost-efficiency

11.7 Common Charging

Provisions for a single unit rate are covered Chapter VIII of the State Level Agreement (Annex A). A study is due to be completed by the end of 2012 to evaluate the possibility of having a common charging regime. Pending the results of this study a decision will be made on whether or not to have a single unit rate.

The principles for charging ANS within DANUBE FAB have been defined in Article 26, Chapter of the State Level Agreement. Article 26.4 of the said Agreement states that the DANUBE FAB charging policy shall be established on the basis of Harmonised Charging Rules adopted by the DANUBE FAB Governing Council. These are to be elaborated by the end of 2012 and shall apply to en-route charging zones.

A preliminary assessment of two possible charging options – to establish either one or two charging zones in the DANUBE FAB airspace identified general pros and cons for each option. Further analysis of the options has been performed.

The FIN WG considers that, for the time being, the introduction of a single unit rate would be a premature decision. Although it would be theoretically possible, it would encounter a number of technical difficulties while bringing little or no benefits to the initiative. The establishment of a common charging zone and the introduction of a single unit rate should follow the natural development process of the FAB rather than being imposed through an early administrative decision.

The establishment of a single charging zone should be aligned with the evolution of the service provision within the DANUBE FAB airspace. It would currently be difficult to justify a single cost base and a single en-route unit rate provided that no cross-border operations are in place. In case there is a decision on cross-border service provision, based on operational requirements, the FIN WG would propose a solution so as to facilitate these processes.

The parties have identified and assessed the effects of the differences in the following areas related to charging: cost allocation methodologies, level of costs, structure, volume and financing of exempted flights, national legislations, national practices for the establishment and the approval of the cost bases.

A step towards the implementation of a single unit rate was the amendment of the VAT law in Bulgaria in 2011, applicable from 01.01.2012. From 2012 BULATSA is entitled to charge VAT on all its services (the applicable rate is either 20% or 0%, subject to the requirements

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

of the VAT Act in Bulgaria as well as EU VAT Directive). This is a step towards harmonisation of the fiscal framework of the two providers.

Another problem to be taken into account for the establishment of a single en-route charging zone is the economic regulation of the cost evolution. There are different cost drivers in the two countries, as well as their impact in the total costs of the ANSPs. These differences might be overcome gradually with the preparation of the national and FAB performance plans in the near future.

During the first reference period (2012-2014) as defined by the Reg. (EC) 1191/2010, two charging zones will be maintained. The difference in the determined unit rates is not significant but there are important effects in the actual unit rates due to the adjustments from previous years and the evolution of the exchange rate.

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

12 References

[1] The Deputy Minister of Transport and Communications of the Republic of Bulgaria and the Secretary of State at the Ministry of Transport, Construction and Tourism of Romania, in the presence of EUROCONTROL's Director General signed a joint statement expressing the political endorsement to the Initiative by the two States for "creating the prerequisites for the establishment of a functional airspace block" was signed on 25th February 2005 in Sofia.

[2] The Minister of Transport of the Republic of Bulgaria and the Minister of Transport, Construction and Tourism of Romania signed a statement on "a common vision for co-operation in the context of preparation for applying Single European Sky acquis, including establishment of Functional Airspace Blocks" on 21st September 2006

[3] Memorandum of Understanding between the Ministry of Transport and Infrastructure of Romania and the Ministry of Transport, Information Technology and Communications of the Republic of Bulgaria on cooperation in air navigation services provision matters and for the establishment of a functional airspace block, comprising the national airspace of Romania, the national airspace of the Republic of Bulgaria and the airspace included in the scope of the international legal obligations of Romania and the Republic of Bulgaria (signed in Sofia, 26th February 2010). In library at www.danubefab.eu.

[4] MoU between the DANUBE FAB National Supervisory Authorities - Memorandum of Understanding on cooperation in air traffic management & air navigation services matters and on preparation for establishment and implementation of functional airspace block – DANUBE FAB. (signed on 19th October 2010). In library at www.danubefab.eu.

[5] Memorandum of Understanding between BULATSA and ROMATSA (signed in Bucharest, on 10th August 2010). In library at www.danubefab.eu.

[6] European ATS Route Network Version-7 (ARN v.7) (EUROCONTROL)

[7] European ATM Master Plan, Edition 1 - 30 March 2009, www.atmmasterplan.eu/.

[8] EUROCONTROL Specification for ATCO Common Core Content Initial Training, Edition 1.0, 21.10.2008 – Released Issue, Ref: EUROCONTROL-SPEC-0113

[9] EUROCONTROL Guidelines for the Competence Assessment of Air Traffic Safety Personnel (ATSEP) Edition 1.0, 04.04.2006, Released Issue, EATM Info-centre Reference: 060403-01

[10] State Gazette, Issue 25/27.03.2012 of ordinance No. 110/20.03.2012 of the president of the Republic of Bulgaria

[11] FAB Strategic Business Plan

[12] The European Network Operations Plan 2012-2014, EUROCONTROL, Latest Edition at time of writing, 28th March 2012

[13] ICAO Document 4444 – Procedures for Air Navigation Services (PANS) - Air Traffic Management ()

[14] ICAO Document 7030 – Regional and Supplementary Procedures – European (EUR) Region

[15] ICAO Document 8168 — PANS–OPS — (Procedures for) Aircraft Operations. Volume I — Flight Procedures (+ Amendments 1-4). Volume II — Construction of Visual and Instrument Flight Procedures (+ Amendments 1-4).

[16] EUROCONTROL Common Format Letter of Agreement between Air Traffic Services Units, , Edition : 4.0, 15/03/2012, Released Issue, Ref: ASM.ET1.ST015 DEL01/02

[17] Regulation (EC) No 549/2004 of the European Parliament and of the Council. The framework for the creation of the single European sky, (the framework Regulation). 10th March 2004 (Note: amended by Regulation (EC) 1070/2009)

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

[18] Regulation (EC) No 550/2004 of the European Parliament and of the Council. Provision of air navigation services in the single European sky (the service provision Regulation). 10th March 2004 (Note: amended by Regulation (EC) 1070/2009)

[19] Regulation (EC) No 551/2004 of the European Parliament and of the Council. Organisation and use of the airspace in the single European sky (the airspace Regulation). 10th March 2004 (Note: amended by Regulation (EC) 1070/2009)

[20] Commission Regulation (EU) No 176/2011. Information to be provided before the establishment and modification of a functional airspace block. 24th February 2011

[21] Regulation (EC) No 1070/2009 of the European Parliament and of the Council amending Regulations (EC) No 549/2004, (EC) No 550/2004, (EC) No 551/2004 and (EC) No 552/2004 in order to improve the performance and sustainability of the European aviation system, 21st October 2009

[22] Commission Regulation (EC) No 730/2006. Airspace classification and access of flights operated under visual flight rules above flight level 195, 11th May 2006

[23] Commission Regulation (EC) No 2150/2005. Common rules for the Flexible Use of Airspace (FUA), 23rd December 2005

[24] Commission Regulation (EC) No 1032/2006. 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 (SYSCO – OLDI), 6th July 2006

[25] Commission Regulation (EU) No 677/2011. Detailed rules for the implementation of air traffic management (ATM) network functions and amending Regulation (EU) No 691/2010. 7th July 2011

[26] Commission Regulation (EU) 255/2010. Common rules of air traffic flow management - Art 1, Art 4, Annex: List of the ICAO provisions of air traffic flow management (ICAO 4444), 25th March 2010.

[27] Commission Regulation (EC) No 1033/2006. Requirements on procedures for flight plans in the pre-flight phase for the single European sky, 4th July 2006

[28] Commission Regulation (EU) 929/2010 amending Commission Regulation (EC) 1033/2006. Requirements on procedures for flight plans in the pre-flight phase for the single European sky, 18th October 2010

[29] European Safety and Regulatory Requirements (ESARRs) and ESARR Advisory Material (EAM), EUROCONTROL, http://www.eurocontrol.int/articles/src-publications. ESARR 1 - Safety Oversight in ATM, ESARR 2 - Reporting and Assessment of Safety Occurrences in ATM, ESARR 3 - Use of Safety Management Systems by ATM Service Providers, ESARR 4 - Risk Assessment and Mitigation in ATM, ESARR 5 - ATM Services' Personnel, ESARR 6 - Software in ATM Functional Systems)

[30] Common DANUBE FAB Selection Requirements, version 1.0, 30th March 2012

[31] DANUBE FAB Information to Single Sky Committee Meeting 43, Edition.1.0, 06.09.2011

[32] Minutes of Meeting from Airspace Design and Operations Development Expert Group (ADODEG), 19th Meeting,

[33] European Network Operations Plan 2012-2014 (EUROCONTROL)

[34] Working Document WP3.1 - Financial Analysis, Stage 2, 09 July 2008

[35] EUROCONTROL Handbook for Airspace Management, Edition 3.0, 15/06/2010, Ref: EUROCONTROL-GUID-140

[36] MILITARY EXERCISE over the Black Sea, Activation of LBD 312, LBD 313 and LBD 314. Summary of agreements reached between EUROCONTROL DNM OPL and NOS, Bulgaria and Romania on 27th October 2011.

[37] EUROCONTROL Guidelines on Generic Military Requirements to be Considered when Establishing or Modifying a Functional Airsapce Block, Version 2.0, 15th April 2011

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

13 Glossary

Acronym	Term
ABI	Advance Boundary Information Message (OLDI)
ACC	Area Control Centre
ACE	ATM Co-Operation in South-Eastern Europe
ACT	Activate Message (OLDI)
ADODEG	Airspace Design and Operations Development Expert Group
ADS-B	Automatic Dependent Surveillance - Broadcast
AFTN	Aeronautical Fixed Telecommunication Network
AMC	Airspace Management Cell
AMP	Aeronautical Meteorological Personnel
AMSL	Above Mean Sea Level
ANS	Air Navigation Service
ANSP	Air Navigation Service Provider
AoI	Area of Interest
ARINC	Aeronautical Radio, INCorporated
ARN	ATS Route Network
ASM	Automatic Safety Monitoring Tool
ATC	Air Traffic Control
ATFCM	Air Traffic Flow and Capacity Management
ATM	Air Traffic Management
ATS	Air Traffic Services
ATSEP	Air Traffic Safety Electronics Personnel
ATSU	Air Traffic Service Unit
AUP	Airspace Use Plan
BG DG CAA	Bulgaria Director General – Civil Aviation Authority
BULATSA	Bulgarian Air Traffic Services Authority
CAA	Civil Aviation Authority
CANSO	Civil Air Navigation Services Organisation
CBA	Cost / Benefit Analysis
CDA	Continuous Descent Approach
CDM	Collaborative Decision Making
CDR	Conditional Route
CNATCC	Common National Air Traffic Control Centre
CO_2	Carbon Dioxide
COF	Change of Frequency Message
CPDLC	Controller – Pilot Data Link Communications
CTR	Control Zone
DME	Distance Measuring Equipment
EASA	European Aviation Safety Agency
EATMN	European Air Traffic Management Network
EC	European Commission
ECAA	European Common Airspace Area
EEC	EUROCONTROL Experimental Centre (Paris, France)
EMOSIA	European Model for Strategic ATM Investment Analysis
ESSIP	European Single Sky ImPlementation
EU	European Union
EUROCONTROL	The European Organisation for the Safety of Air Navigation

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

FAB	Functional Airspace Block
FFPG	FAB Focal Points Group
FIR	Flight Information Region
FMP	Flow Management Position
FP	Flight Plan
FR	Free Route
FTS	Fast Time Simulation
FUA	Flexible Use of Airspace
HOP	Hand-Over Proposal Message (OLDI)
IACA	International Air Carrier Association
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
INF	Information Message (OLDI)
IRR	Internal Rate of Return
KPA	Key Performance Area
KPI	Key Performance Indicator
LAM	Logical Acknowledgement Message (OLDI)
LARA	Local And sub-Regional Airspace
LoA	Letter of Agreement
LOF	Log-On Forwarding Message (OLDI)
LLSIGWX	Low Level Significant Weather
MAC	Message for Abrogation of Co-ordination Message (OLDI)
MAS	Manual Assumption of Communications Message (OLDI)
MET	Meteorological (services)
MoldATSA	Moldova Air Traffic Services Authority
MoT	Ministry of Transport / Minister of Transport
MoU	Memorandum of Understanding
MWO	Meteorological Watch Office
NAN	Next Authority Notified Message (OLDI)
NDOP	Network Directors of Operations
NETOPS	Network Operations Team
NM	Nautical Mile
NM	Network Manager
NMB	Network Management Board
NOP	Network Operations Plan
NPV	Net Present Value
NSA	National Supervisory Authority
NSACC	National Supervisory Authorities Coordination Committee
OI	Operational Improvements
OLDI	(EUROCONTROL Standard for) On-Line Data Interchange
OSC	Operational Standing Committee
PAC	Preliminary Activation Message (OLDI)
PANS	Procedures for Air Navigation Services
PI	Performance Indicator
PMO	Project Management Office
P-RNAV	Precision Area Navigation
RAMS	Reorganised ATC Mathematical (Model) Simulator (EEC)
RCA	Reduced Coordination Airspace
RCAA	Romanian Civil Aviation Authority

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

REV	Revision Message (OLDI)
RNDSG	Route Network Development Sub-Group
RNP	Required Navigation Performance
ROF	Request on Frequency Message (OLDI)
ROMATSA	Romanian Air Traffic Services Administration
RTS	Real Time Simulation
SA	State Level Agreement
SAAM	System for Assignment and Analysis at a Macroscopic level
SAPSC	Strategies And Planning Standing Committee
SCF	Social Consultation Forum
SDM	Supplementary Data Message (OLDI)
SES	Single European Sky
SESAR	Single European Sky - ATM Research
SITA	Société Internationale de Télécommunications Aéronautiques
SLA	Service Level Agreement
SM	Safety Management
SMATSA	Serbia and Montenegro Air Traffic Services Agency
SMS	Safety Management Systems
SQSEC	Safety, Quality, Security and Environmental Standing Committee
STATFOR	Air Traffic STATistics and FORecast Specialist Service (EUROCONTROL)
SYSCO	System Supported Coordination
TIM	Transfer Initiation Message (OLDI)
TMA	Terminal Manoeuvring Area
TRA	Temporary Reserved Airspace
UUP	Updated Airspace Use Plan
WAM	Wide Area Multilateration
WG	Working Group
WMO	World Meteorological Organization
XIN	Airspace Crossing Intention Notification Message (OLDI);
XRQ	Airspace Crossing Clearance Request Message (OLDI)

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX A: State Level Agreement

Agreement on the Establishment of the DANUBE Functional Airspace Block between Romania and the Republic of Bulgaria

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX B: NSA Agreement

National Supervisory Authorities Cooperation Agreement
Within DANUBE FAB
between
the Romanian Civil Aeronautical Authority (RCAA) and the Directorate General Civil Aviation, Ministry of Transport and Infrastructure of Romania (MTI/DGCA)
and
the Directorate General "Civil Aviation Administration" of the Republic of Bulgaria

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX C: ANSP Agreement

FINAL DRAFT
DANUBE FUNCTIONAL AIRSPACE BLOCK
ANSP COOPERATION AGREEMENT
BETWEEN
BULGARIAN AIR TRAFFIC SERVICES AUTHORITY
AND THE
ROMANIAN AIR TRAFFIC SERVICES ADMINISTRATION

VERSION: 1.0
16 MAY 2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX D: Concept of Operations

DANUBE FAB
CONCEPT OF OPERATIONS

Version 1.0
Date: 24/06/2011

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX E: Safety Case

DANUBE FAB SAFETY CASE

Version: 1.0
Version Date: 25/04/2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX F: SMS Roadmap

SMS ROADMAP for the harmonisation
and enhancement of
BULATSA and ROMATSA
Safety Management Systems
within DANUBE FAB

Version: 1.0
Version Date: 9/03/2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX G: Safety Policy

DANUBE FAB Safety Policy

Edition 1.0 – May 2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX H: CBA

Cost Benefit Analysis - Final Report

Version: 5.2
Date: May, 9th 2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX I: Business Case

Business Case Final Report

Version: 4.0
Date: May, 4th 2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX J: RTS Report

Danube FAB
Real-Time Simulation
Final Report

Edition: 0.9
Date: 06.04.2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX K: RTS Safety Report

DANUBE FAB
Real Time Simulation
Safety Study

Edition: 1.0
Date: 28/03/2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX L: Technical Architecture

DANUBE FAB
Refined Target Architecture
2016

Version 1.0
Date: 19.04.2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX M: DME Agreement

Agreement on the shared use of
Radio Navigation Aids for Area Navigation
between
Bulgarian Air Traffic Services Authority
and
Romanian Air Traffic Services Administration

Edition: 1.0
Date: 20.03.2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX N: Communications Infrastructure Study

DANUBE FAB
STUDY FOR IMPROVEMENT
OF COMMUNICATIONS INFRASTRUCTURE
BETWEEN ROMATSA AND BULATSA

Edition: 1.0
Date: 16.09.2011

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX O: Environmental Impact Assessment Study

DANUBE FAB
Implementation Phase
Environmental Impact Assessment Study

Edition: Final version
Date: March 29th 2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX P: Airspace Plan Phase 1

DANUBE FAB
Airspace Design - Phase 1
ASSESSMENT AND
GENERAL ASSUMPTIONS

Edition: 1.0
Date: 08.12.2009

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX Q: Airspace Plan Phase 2

DANUBE FAB
Airspace Design - Phase 2
Proposed options for ATS route network structure

Edition: 1.0
Date: 01.03.2010

This document is available at:
http://documents.danubefab.eu/node/3

Catalogue of ATS route network proposals

Edition: 1.4
Date: 14.04.2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX R: Airspace Plan Phase 3

DANUBE FAB
Airspace Design - Phase 3
Development of Sector Families and Sectors -
Operational approach

Edition: 1.0
Date: 27.07.2010

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)

ANNEX S: Operational Procedures Harmonisation Plan

DANUBE FAB
Operational Procedures Harmonisation Plan

Edition: 1.0
Date: 16.05.2012

This document is available at:
http://documents.danubefab.eu/node/3

Co-financed by the European Union
Trans-European Transport Network (TEN-T)