

FUNCIONAL BLOCKS IN FUTURE SINGLE EUROPEAN SKY

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Summary: The paper is focused on the new structure and dividing of the European airspace and its possible future benefits. This ambitious project can change and improve travelling time in air passenger transport, of course in case of realization. At maximum load in the long run can serve multiple lines, which corresponds with the expected increase of demand for air transport. Future positive effects would be reflected in air fares and shortening waiting times at airports. Whole target is to create functional and effective system enabling cost savings. Secondly, this system will be useful for the benefit of further increasing operational safety of air transport and systematic reduction of emissions from air traffic.

Key words: Single European Sky, Air Transport, Functional Block, FAB EC, European union

INTRODUCTION

Particularly in high developed European countries the numbers of schedule air services continuously increase. Rising numbers of transported passenger may cause more delays in next years and secondly prolonging waiting times at airports. Especially overloaded airports, from now (HUB), cause irregularities in regular traffic.

This situation has been recognized by the European Commission at the end of the 90s. The increase has a clear trend, despite of the fact that after the global economic crisis in 2008 as well as the terrorist attacks after 2008 was air transport period slightly falling and so regular air passenger transport was relatively reduced.

Sustainable, most efficient and more environmentally friendly air transport is the European union target.

As a possible solution, the whole of Europe's airspace and some other adjacent areas, and the whole of this space, should be re-divided into several so-called functional air blocks which will be consisted of member states. The individual blocks will be structured to match transport flows as much as possible and not just according borders.

1. PROJECT SINGLE EUROPEAN SKY

The Single European Sky, from now (SES), is an important Pan-European air traffic management project for field of air traffic management, from now (ATM), with the possibility of expanding into some North African countries, namely Egypt, Tunisia and Morocco.

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The SES project has a pan-European character and is open to neighbouring countries. Negotiations on the possibility of associating the airspace of some states in North Africa, namely Egypt, Tunisia and Morocco, are currently underway. The SES initiative dates back to the year 1999 with target to improve the performance of ATM and air navigation services and to re-integrate the European airspace. The SES initiative was launched as a reaction to the fact that air navigation has led of numerous delays, which peaked in Europe in the late 90s. Practically, the Single European Sky initiative should result in shorter flight times due to shorter routes and less delays and consequently reduced aircraft and flight costs. The expected benefits of SES are ambitious but not unrealistic.

Main targets:

- Completing the integration of airspace between 2035 and 2050
- Triple increase of capacity compared to the start of the project in 2004
- Reduce ATM costs by half
- Another increase in operational safety
- Reduction of passenger transport emissions by 10%

Tab.1 – Main fields of ATM and ANS:

ATM-Air Traffic Management	ANS-Air Navigation Services
Flight and Operational Services	Attendant Services on Field of Navigation
Direction of Air Space and Air Blocks	Communication Services
Air flow management	Flight Information Services
Surveillance of Air Transport	Meteorological Services

Source: Authors

1.1 SES Legislation and Operational Development

In 2004, the European Parliament and the Council of the European Union adopted the first of four basic regulations, so-called SES I. This legislation established in the legal basis for the future.

1. Regulation (EC) No 549/2004 laying down the framework for the creation of the
2. Regulation (EC) No 550/2004 on the provision of ANS
3. Regulation (EC) No 551/2004 on the organization and use of airspace in the SES
4. Regulation (EC) No 552/2004 on the interoperability of the European ATM network

In 2009, Member states submitted a request for a more effective regulatory framework for aviation in the EU. The legislation has been amended and a second package of legal regulations called SES II has been created. It focuses on performance in key areas of the ATM system such as safety, capacity, the environment and cost-effectiveness.

- Regulation (EC) No 1070/2009

This comprehensive regulatory framework has significantly encouraged the restructuring of European airspace and the provision of air navigation services by providing a separation of regulatory functions from service provision, greater flexibility in civil and military use of airspace, interoperability of equipment, harmonized upper airspace classification, air navigation services and the common requirements for the licensing of air

traffic controllers. Furthermore, "key components" have been identified, forming the single European sky structure:

- In 2013, a proposal for extending SES II + legislation was introduced
- At present, negotiations continue, for the time being, without further legislation

1.1.1 Organization EUROCONTROL

Based on the performance monitoring system, was appointed a control body, the European Organization for aviation safety.

Continuous control objectives:

- Arrangement of air traffic flow and coordination of radio frequencies used in general air traffic
- Optimizing the flight paths network and economies of scale through service integration) or even merging service providers across national borders, thereby reducing the cost of air navigation services.
- For each functional airspace block member states shall jointly designate one or more air traffic service providers.

1.1.2 SESAR

It stands for (SES + ATM + research) and represents the SES technology block. The aim is to develop and implement the next generation of the European air traffic management system by 2020.

- SESAR was established by Eurocontrol in 2007
- Represents all research and development in the field of ATM
- It is a unique partnership between the public and private sectors
- Associates members from ATM, service providers, airlines and manufacturers
- Estimated costs for the SESAR development phase (2008-2024) amount to € 3.7 billion
- At the operational stage (installation of new large-scale systems in the years 2015-2035), the cost is estimated at over EUR 30 billion to finance the aviation sector (90%) and the EU (10%)

1.1.3 Results

- The average delay caused by the air traffic flow arrangement dropped from 5.4 min For 1.8 min. For the period 1999-2014
- The ideal horizontal flight path length was reduced from 5.03% to 4.7% over the period 1999-2014
- Also, the cost of one flight was cut by 15% over the period 1999-2014

Numbers and results are to a large extent still affected by the economic recession. Air transport capacity still did not reach the pre-crisis 2008 volume, but trend is obvious for the year 2017.

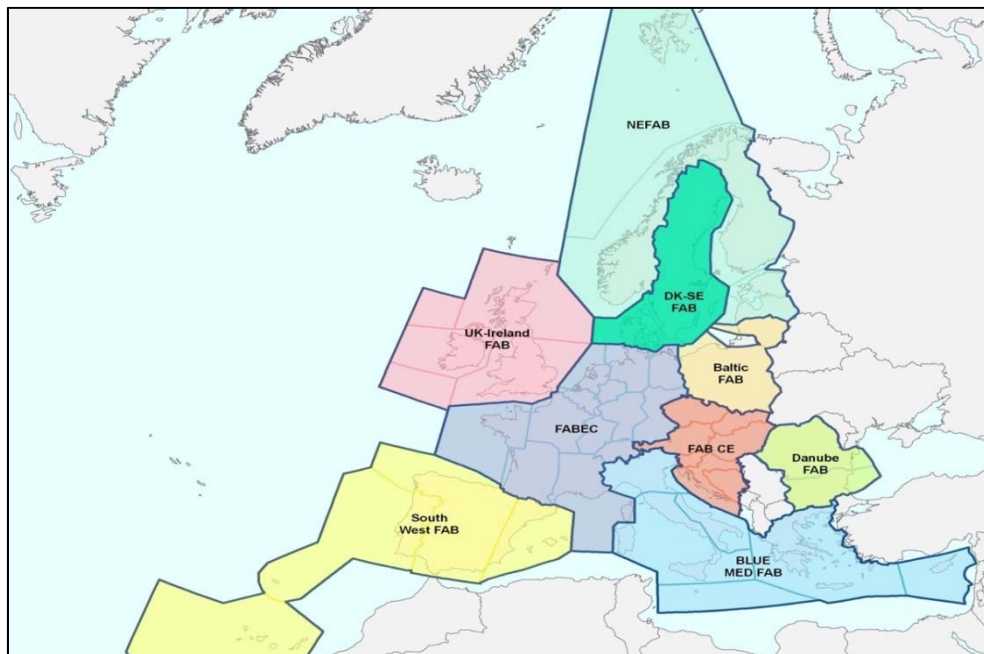
1.2 SES Funcional Blocks

The situation is such that each member state has its own air traffic service provider, and even in the future it is expected that these providers will continue to operate. The ATM will

follow another system that will be designed to deliver the desired results in the long run and be meaningful.

In the future division into functional blocks, the FABEC block, representing Germany, France and the Benelux countries, is considered the central area.

There are many critical views that this block should be divided into at least two blocks. FABEC is the EU's busiest airspace. Obviously, only the proper functioning of this block will allow the efficient functioning of other blocks that are set more realistically. Block FABEC will more or less affect, than other blocks.



Source: <http://www.eurocontrol.int>

Fig. 1 – SES dividing into blocks and their borders

Tab.2 - Dividing into Functional Blocks according to Air Traffic Flows

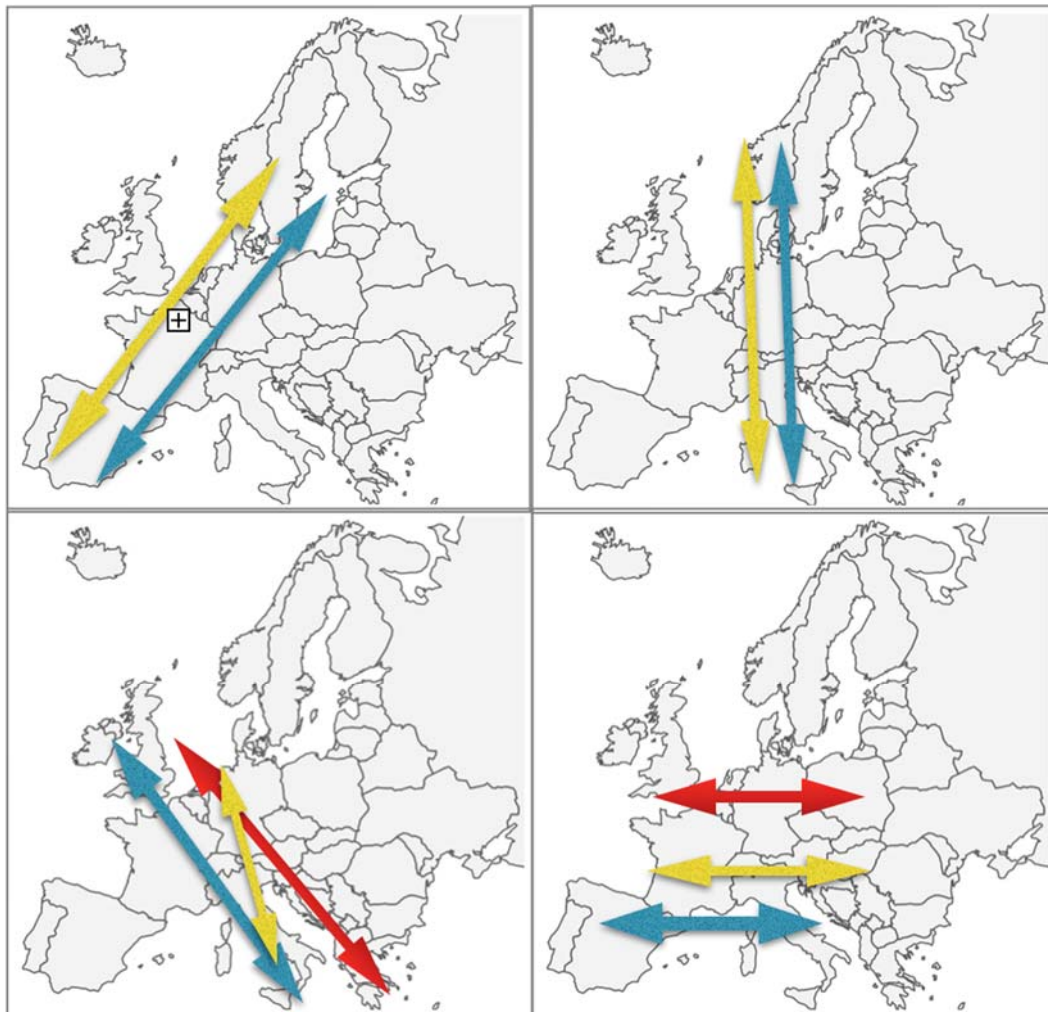
FUNCIONAL BLOCKS	STATES
FABEC	Germany, France + Corsica, Belgium, Netherlands, Luxembourg
UK-IRELAND FAB	Great Britain, Northern Ireland
FAB CE	Czech Republic, Slovakia, Poland, Hungary, Austria, Slovenia, Croatia, Bosnia and Hercegovina
BALTIC FAB	Poland a Lithuania
SOUTH WEST FAB	Spain, Portugal, Canary Isl., Baleares Isl., Madeira
BLUE MED FAB	Italy + Sardinia, Greece
OPTION FOR EXTENSION	Egypt a Tunisia
DANUBE FAB	Bulgaria a Romania
DK-SE FAB	Sweden, Denmark
NEFAB	Norway, Finland, Latvia, Estonia
OPTION FOR EXTENSION	Iceand, Greenland

Source: Authors

- Note that up to now 9 functional blocks have been approved and covering 31 countries

1.2.1 Main Traffic Streams in Europe

According to the main LD traffic streams is obvious that future divisions into functional blocks can be effective. A quick transition between blocks will allow shorter flight time, accelerate flight communication and thus save money for one year while maximizing the potential of the new SES.



Source: Authors

Fig. 2 – Main transport flows in air transport

2. BLOCK FAB CE

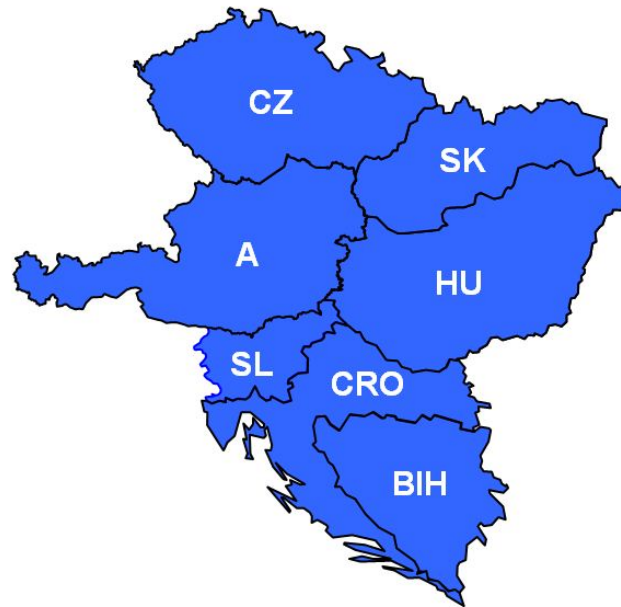
It is the Central European functional airspace block under the FAB CE abbreviation and is a project and association of seven states. These are the Czech Republic, Slovakia, Austria, Hungary, Slovenia, Croatia and Bosnia and Herzegovina and their air navigation service providers.

- Namely: Air Traffic Control of the Czech Republic, LPS SR, Austrocontrol, Hungarocontrol, Slovenia Kontrol, Crocontrol and BHANSA

- Supervisory bodies, such as civil aviation authorities, military aviation components of states and other associated institutions of institutions

A certain amount of support for this project is provided by EUROCONTROL and the project is financially supported by the EU through the so called structural funds for transport.

The FAB CE project is one of the pioneering activities of the Czech Academy of Sciences in the international field, which is strategically important for the future SES.



Source: Authors

Fig. 3 – Block FAB CE

2.1 Development and Operation

The individual function blocks have certain differences in the sense of realization of the association in the function block. It depends on the number of member states and its size of their territory, also on historical habits, the sea borders and many other factors. In many cases negotiations can be very varied, because they always at least slightly prefer their own position at the expense of other countries.

First, a Central European Air Traffic Services (CEATS) agreement was concluded in 1997 to provide centrally the air traffic services of participating central European countries. This grouping did not have much chance of success because it was conceived as a significant limitation of ATM providers in individual countries, but one large center would be created. Originally, the project was intended to mean that the base center would be in Vienna and the surrounding states did not agree.

After 2000, a new layout and new SES capabilities began to emerge, with the retention of all ATM members.

The Czech Republic is now a member of the FAB CE bloc, where there is growing cooperation between the associated states. In this connection, he starts to talk about a direct partnership with the BLU MED neighbour block. If it continues to build on existing blocks of cooperation with other blocks, it is a good way to set a single European sky and this project can be fully realized once.

CONCLUSION

Project SES is a very ambitious plan but one of the most advanced continental ATM systems which could be created globally. It can be finished together with so called Trans-European Networks (TEN-T) and air transport in one of the pillars.

Implementation will require not only huge financial investments but also the involvement and cooperation of all EU Member States. The system will not function fully unless all nine function blocks will co-operate. Other issues then trigger the effective operation of an unofficially central FABEC block that brings together Germany, France and the Benelux countries and whose maximum efficiency will have its limits.

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