



WORKING PAPER

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Agenda Item 4: Optimum capacity and efficiency – through global collaborative ATM

4.2: Dynamic management of special use airspace

AIRSPACE MANAGEMENT AND CIVIL/MILITARY COORDINATION

(Presented by the Presidency of the European Union on behalf of the European Union and its Member States¹; by the other Member States of the European Civil Aviation Conference²; and by the Member States of EUROCONTROL)

SUMMARY

Following a tasking of the 37th Assembly, ICAO launched a global campaign on civil/military coordination to which EUROPE contributes. This WP reflects on the ASM Improvement initiatives within the framework of civil/military coordination within Europe.

Action: The Conference is invited to agree to the recommendation in paragraph 6.

1. INTRODUCTION

1.1 The 37th Session of the ICAO Assembly tasked ICAO to undertake several initiatives in the field of civil/military cooperation with the aim of airspace optimization. ICAO prepared the *Civil/Military Cooperation in Air Traffic Management* (Cir 330), launched its global civil/military cooperation campaign in 2011 and has prepared a proposal for AN-Conf/12 on ICAO's future activities in the field of civil/military cooperation. The objective of this paper is to present the current airspace practices being used in Europe supporting and enhancing civil/military coordination. The ultimate aim is the full automated integration of the 4D civil/military³ trajectory management in the SESAR operational environment.

2. EUROPEAN CIVIL/MILITARY COORDINATION BACKGROUND

2.1 Civil/military coordination is generally seen as one of the main cornerstones in aviation. The fact that airspace is considered to be one continuum in which all civil and military airspace users need to fulfil their mission, requires optimum coordination. In Europe this coordination takes place at the strategic level in terms of airspace design and airspace planning, the pre-tactical level and the tactical

¹ Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom. All these 27 States are also Members of ECAC.

² Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Croatia, Georgia, Iceland, Moldova, Monaco, Montenegro, Norway, San Marino, Serbia, Switzerland, The former Yugoslav Republic of Macedonia, Turkey and Ukraine.

³ Future civil and military 4D trajectories are defined respectively as "business and mission" trajectories.

level both in a local national, a regional (functional airspace blocks (FAB) and Pan-European (EUROCONTROL) context.

2.2 The Single European Sky (SES) aviation concept aims at achieving an integrated ATM civil/military air navigation system of systems for Europe, also known as the European ATM network. EUROCONTROL acts as the designated European ATM network manager. Whilst establishing the ATM network, Member States stipulated very clearly, that one must take into account the national interests regarding civil and especially military aviation, as the latter is concerned with the national security and defence which are State functions both falling under national sovereignty.

2.3 National sovereignty is interpreted as an exclusive power of a State which it must be able to exercise at all times. States derive their rights – and obligations – from their sovereignty. In the exercise of their sovereign powers, they conclude treaties (e.g. NATO) and become a member of international aviation organisations such as ICAO and EUROCONTROL. States do not lose sovereignty by a transfer of sovereign powers to international organisations, or the pooling of their resources or creation. Sovereignty enables States to move air transport forward rather than preventing them from doing so, provided they retain control, in law or in fact or both, of the said national functions, including but not limited to air traffic management⁴.

2.4 In this respect, the Member States of the European Union (EU) whilst recognizing that the European Community has no legal competence on military operations, signed a common Member State declaration in support of the SES legislative package, thereby declaring that they will:

- a) cooperate with each other;
- b) ensure that the interests of Member States' military users of airspace will, where relevant, be represented in the whole development, decision-making process and implementation of the single European sky, including the Single Sky Committee;
- c) ensure, where appropriate, that military personnel are involved in the work undertaken by recognized organizations⁵;
- d) take into account, in relation to matters of air traffic management, the fundamental importance of EUROCONTROL;
- e) enhance civil military cooperation and, if and to the extent deemed necessary by all Member States concerned,
 - 1) facilitate cooperation between their armed forces in all matters of air traffic management, so as to make it possible to address relevant needs in the implementation of the regulatory framework for the single European sky;
 - 2) taking into account the objective of establishing the regulatory framework for the single European sky by 31 December 2004, create the arrangements necessary to support such military cooperation in order to guarantee a balanced consideration of economic as well as security and defence requirements.

⁴EUROCONTROL Publication on Sovereignty in Aviation Ref:09/02/06-03, Edition 1

⁵ set up under Article 3 of Regulation (EC) No 550/2004 (service provision Regulation)

3. EUROPEAN AIRSPACE MANAGEMENT INITIATIVES

3.1 The main aim of the on-going European airspace management initiatives is to bring tangible benefits in terms of flight efficiency through a more dynamic airspace management/air traffic flow management (ASM/ATFM) process, that now also involve air traffic control (ATC) as appropriate. Based on the EC Regulation No 2150/2005, which represents the EU regulatory reference for the application of the flexible use of airspace concept, the initiatives have three primary objectives: exploiting the utilization of airspace structures and the availability of conditional routes (CDRs⁶) as appropriate in accordance with the network requirements; the consistent application of FUA across the network; and safe, efficient and accurate information/data flows between civil and military components.

3.2 Several achievements have already been made in Europe in support of these initiatives. The main achievements to date include:

3.2.1 ***The introduction of a more dynamic ASM/ATFCM process:*** Previously the airspace planning and allocation information was frozen in the afternoon on the day before operations and all changes after that had to be done tactically. The aim of a more dynamic airspace management/air traffic flow and capacity management (ASM/ATFCM) process was therefore to move the planning phase closer to the time of operations in order to exploit opportunities from airspace changes during the day of operations. The process has over the last couple of years been improved, with States introducing an intermediate step towards a so called rolling process, which will give the opportunity for them to continuously promulgate the latest planning of airspace usage in order to provide more or less real-time information to the users of the airspace status.

3.2.2 ***Improved notification process.*** To be able to fully take advantage of opportunities, it is important that there is an efficient notification to the users when changes occur. In Europe, improvements have been introduced to allow a prompt notification to the users of updated information of airspace planning and allocation. Updated airspace use plans are posted on dedicated websites, and made available via B2B service for those flight plan providers that import the updates automatically into their systems. In addition, the network manager has upgraded its possibilities to automatically inform the users of any change in airspace planning, allocation and actual usage that may offer a better rerouting for a particular flight.

3.2.3 ***Improved CDR route network.*** The further improvement of the European CDR route network in order to offer more opportunities to the users for a better flight efficiency was considered a very important enabler for improved flight efficiency. The conscious effort of the European States over the last five years (2007–2011) to improve the efficiency of the network has resulted in an increase of the number of CDR segments from 1998 to a total of 2918 CDRs (46% growth) and their actual use, in particular those CDR segments for which the closure is predictable, therefore more attractive for flight planning.

3.2.4 ***Better supporting tools.*** In order to provide for an efficient process in an area where there are 30 000 civil flights per day and a high number of military training areas, there is a strong requirement for supporting tools. In Europe the main developments include:

1. A central Pan-European network manager support system with a special ASM interface (CIAM) which allows the automatic exchange of data between the airspace management cells in the States and the network manager, and enables to expand and consolidate the national plans into a Pan-European plan.

⁶A conditional route (CDR) is a non-permanent air traffic services (ATS) route or portion thereof which can be planned and used under specified conditions (Ref.: European Commission Regulation No. 2150/2005)

2. Local systems, such as the local and subregional ASM support system (LARA)⁷, which support the full ASM process including civil-military coordination at State or functional airspace block level and enable automated exchange of data with the network manager.
3. Network operations plan portal and B2B service; are enablers to support a more efficient notification to the all users.

4. **PERFORMANCE**

4.1 The single European sky regulations require a performance driven approach, and an optimal utilisation of civil and military airspace structures is an area that contribute significantly to improved performance in terms of enhanced flight efficiency.

4.2 The achievements explained in paragraph 3 above provide a concrete contribution to improve flight efficiency and reduce environmental impact. The improvements to the CDR network combined with better processes for their utilization has brought tangible benefits in terms of fuel savings and reduced CO2 emission. This positive trend together with the interest shown by airspace users are evidence of the importance of efficient civil/military coordination processes.

5. **FURTHER STEPS**

5.1 Although the introduction of the enhancements referred to above provided tangible benefits, there are still a number of improvements required in order to secure the full benefits of a dynamic ASM/ATFM process. Following the outline of the intentions expressed in SESAR business/mission trajectory management and in ASBU Modules B0-10, B1-10 and B1-35, the European stakeholders are presently working on further improvements to the airspace management process.

5.2 The main aim of this new initiative is to further enhance ASM/ATFCM/ATC processes through more performance driven operations based on the management of airspace configurations. It aims at providing processes that support the use of more dynamic and flexible elements, and it describes a seamless, CDM-based process with an advanced real time management of airspace configurations as well as a continuous sharing of information among all ATM partners enabled by advanced technology.

5.3 The basic building blocks of this new initiative are the following:

1. An extensive use of airspace configurations, aimed at responding to and balancing performance driven strategic objectives (capacity, flexibility, flight efficiency, environmental) at all levels, network, sub-regional and local, while taking due account of military mission effectiveness.
2. A CDM process at State and/or FAB level where improvements to the airspace organisation and management are agreed. The CDM process will be based on the cooperation between airspace users, the local ASM, ATFM and ATC functions, the network manager as appropriate and, where available, subregional functions (FABs). This civil/military process will enable a move from present day coordination towards integrated civil/military 4D business/mission trajectory management of operations.
3. A continuous, seamless and reiterative planning, allocation and operational deployment of optimum airspace configurations, based on airspace requests for mission trajectory operations at any time period (pre-tactical and tactical phases). The promulgation by States of real-time

⁷ This powerful ASM tool is however not yet implemented by all Member States.

airspace status data is expected to further improve the ability of airspace users to benefit from changes to airspace structures in real-time.

4. The use of 4D trajectories, where the shared business/mission trajectory (SB/MT) is used during the planning phase and the reference business/mission trajectory (RB/MT) is agreed prior to departure and includes both surface and airborne phases of flight.
5. Extensive use of modular areas and the introduction of mechanisms allowing the definition and use of flexible, ad hoc structures within a given airspace configuration, and improved management of segments of CDRs. Management of civil/military trajectories, including GA/BA, uses DMAs (dynamic mobile areas) to tailor volume and time on airspace reservation in accordance with actual need.
6. More flexibility in the definition and operation of sector configurations taking into account not only trajectory demand but also airspace availability as result of the CDM process; indeed airspace allocation and sector configuration should offer enough flexibility in order to identify the best combination to satisfy civil and military requests, exploit resources available and minimize the need of ATFM measures, while keeping to a simple and straight-forward coordination process.
7. More extensive cross border operations, supported by FAB implementations, resulting in shared use of reserved/segregated areas, taking into account reasonable sharing of environmental nuisance.
8. Major system support improving standardisation and enabling functions at network/sub-regional and local level, in order to further enhance civil military coordination.

5.4 All these building blocks will be supported by a comprehensive performance reporting metrics, aligned with the performance scheme regulation. Such metrics would enable network manager and ANSPs to measure how progressive and successful they are being.

5.5 The next five years will see more free route environments implemented across Europe, and evolution of airspace configurations should take into account such scenario, focussing on the implementation of an efficient CDM processes. Such processes are required to reinforce operations planning as well as support the exploitation of available resources to satisfy performance requirements in a free routes environment.

5.6 The activities detailed in paragraph 5 above are the result of intense discussions between the European States, and it is proposed that they be used as background material for the development of global guidelines on FUA, following the intentions expressed in SESAR and in the ASBU Modules B0-10, B1-10 and B1-35.

6. ACTION BY THE CONFERENCE

6.1 The Conference is invited to:

- a) note the European airspace management improvement initiatives; and
- b) recommend that ICAO develop guidelines on flexible use of airspace, airspace design and interoperability requirements to facilitate the integrated use of the airspace within the framework of civil/military coordination.

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