



Agenda Item 2: Analysis of Version 1 of the SAM ATS route network

FLEXIBLE USE OF AIRSPACE

(Presented by the Secretariat)

Summary	
This working paper presents an analysis of the elements to be taken into account for the optimisation of the flexible use of airspace.	
References: <ul style="list-style-type: none">• 35th ICAO Assembly• Global Air Navigation Plan (ICAO Doc 9750)• Circular 330• GREPECAS	
ICAO Strategic Objectives:	<i>A – Safety</i> <i>C. Environmental protection and sustainable development of air transport</i>

1 Introduction

1.1 The flexible use of airspace is an airspace management concept described by the International Civil Aviation Organization (ICAO) that addresses the optimisation, balance and equity in the use of airspace by the different civil and military users, facilitated by strategic coordination and dynamic interaction. It is based on the Resolutions of the 35th ICAO Assembly, initiative GPI-1 of the Global Air Navigation Plan (ICAO Doc 9750), and GREPECAS.

1.2 The flexible use of airspace must also cover the airspace over high seas within the jurisdiction of the FIR concerned, without detriment to the rights and duties acquired by member States by virtue of the Convention on International Civil Aviation (Chicago Convention) of 7 December 1944 and its Annexes.

1.3 Likewise, there are activities that require that a certain volume of airspace be reserved for their exclusive or special use (SUA) during certain periods of time, given the characteristics of their flight profile, the importance or risks involved in the operations to be conducted in such airspace, and the need to keep them effectively and safely separated from other types of aeronautical activities.

2 Discussion

2.1 The flexible use of airspace (FUA) is an airspace management concept based on the principle of accommodating airspace users inasmuch as possible, taking into account effective communications and the cooperation and coordination required to ensure security, safety, efficiency and environmental sustainability.

2.2 The concept includes airspace management functions—strategic, pre-tactical and tactical—, which are independent from each other but closely related, and that must be performed in a coordinated manner in order to ensure an efficient use of airspace.

2.3 When different aeronautical activities with different needs share the same airspace, their coordination should be aimed at the safe conduction of flights and the optimum use of available airspace.

2.4 The systematic application of this concept must be taken into account for the optimisation of the route network, especially when defining scenarios where non-permanent or conditional routes will be implemented.

2.5 Furthermore, some SAR activities, military exercises or actions may require joint coordination and cooperation with more than one State at a given moment, in which case the establishment of civil/military coordination and cooperation committees in each State is of greater relevance.

Information management

2.6 Good information management is critical for the successful application of the FUA concept. Consequently, the timely distribution and accuracy of the information to be transmitted to civil and military controllers regarding airspace status and specific air traffic situations having a direct impact on the safety, efficacy and efficiency of operations become of critical importance.

2.7 Furthermore, timely access to updated information on airspace status is vital for all parties that wish to use available airspace structures, so that they may prepare or modify their flight plans.

Civil/military coordination and cooperation

2.8 The effective and harmonised application of the flexible use of airspace concept in an airspace volume requires precise and dynamic civil/military coordination standards that take into account the needs of all users and the nature of their various activities, trying to avoid permanent reservation of airspace and optimising its flexible use.

2.9 To this end, the efficacy of civil/military coordination must be based on standards and procedures for the efficient use of airspace by all users, which must be reflected in letters of operational agreement between military authorities and air traffic services (ATS), and on some basic ruling principles.

2.10 The establishment of a civil/military coordination and cooperation committee is absolutely necessary for managing the application of the flexible use of airspace concept, taking into account all users and ruling principles that are consistent with the flexible use of airspace concept.

Basic ruling principles for civil/military coordination and cooperation

2.11 The flexible use of airspace concept should take into account the following ruling principles:

- a) coordination and cooperation between civil and military authorities will be organised at a strategic, pre-tactical and tactical management level through the establishment of letters of operational agreement and/or special procedures concerning a given activity, aimed at enhancing safety and airspace capacity and improving the efficacy and flexibility of air operations;
- b) consistency between airspace management, air traffic flow management, and air traffic services functions shall be achieved and maintained to ensure efficient planning, distribution and use by all users at the three airspace management levels (strategic, pre-tactical and tactical);
- c) reservation of airspace for exclusive or specific use by certain user categories shall be temporary, to be applied only during limited periods of time based on actual use, and will end when the activity that gave origin to it has ceased. The procedures established in ICAO documents and annexes shall be followed, as well as those prescribed in letters of operational agreement and/or special procedures;
- d) air traffic services units and users shall make the best possible use of available airspace, and
- e) coordination and collaborative decision-making among ATS, ATFM and flexible use of airspace management units must be consistent and ongoing during the strategic, pre-tactical and tactical phases of airspace management.

Letters of operational agreement

2.12 The agreements and procedures aimed at a flexible use of airspace may be established in letters of operational agreement, which shall specify, *inter alia*, the following:

- a) horizontal and vertical boundaries of the airspace concerned;
- b) the classification of the airspace available for use by civil air traffic;
- c) the units or authorities responsible for airspace transfer;

- d) the conditions for airspace transfer to the ATC unit concerned;
- e) the conditions for airspace transfer from the ATC unit concerned;
- f) airspace availability periods;
- g) any limitations to the use of the airspace concerned; and
- h) any other relevant procedures or information.

Strategic airspace management

2.13 To ensure a strategic management of airspace, civil and military units providing air traffic services should perform at least the following functions:

- a) ensure the application of the flexible use of airspace concept at the strategic, pre-tactical and tactical level;
- b) review user needs regularly;
- c) analyse and validate the activities that require airspace reservation or restrictions;
- d) define temporary airspace structures and procedures that offer multiple reservation and route options;
- e) establish criteria and procedures for the creation and use of adjustable lateral and vertical airspace boundaries to accommodate flight path variations and short-term flight changes;
- f) assess domestic airspace structures and the route network in order to plan flexible airspace structures and procedures;
- g) determine the specific conditions under which the responsibility for separation between civil and military flights will fall upon civil and military air traffic services units or military control units;

- h) establish and offer users airspace structures in close cooperation and coordination with neighbouring member States when the corresponding airspace structures have a major impact on transborder traffic or on flight information region boundaries, with a view to ensuring optimum use of airspace by all users;
- i) establish consultation mechanisms between individuals or bodies and all parties and organisations involved, in order to properly meet user needs;
- j) develop, assess and periodically review operational procedures, coordination and results in relation to flexible use of airspace;
- k) establish mechanisms to store data on airspace requests, assignment and actual use for subsequent analysis and planning of activities.
- l) ensure that areas destined for training and recreation, ATC sectors, route networks, arrival and departure procedures are implemented and published in the appropriate time and manner, in coordination with the requirements of all airspace users and taking into account ICAO strategic objectives.

Pre-tactical airspace management

2.14 Civil and military units should ensure the introduction of the appropriate support systems, preferably automated, to enable those responsible for airspace assignment operations to provide timely information about airspace availability to all affected users, special airspace management units, if any, air traffic service providers, and all parties and entities concerned.

2.15 The appropriate military control units and air traffic services units must exchange information about any changes in airspace activation plans in a timely and efficient manner, and make sure that all affected users are informed about effective airspace status.

Tactical airspace management

2.16 Safety requires the establishment of coordination and cooperation procedures between civil and military air traffic services units to enable direct communication of relevant information in real time to resolve concrete traffic situations between civil and military controllers providing services in the same or in adjacent airspace volumes. It is important to make the information available to civil and military controllers and military control units, especially when so required for safety reasons, through a fast exchange of flight data, including the position and flight intentions of aircraft.

Safety assessment

2.17 It is important that, within the safety management process and before introducing any changes to the implementation of the flexible use of airspace, a safety assessment be conducted that includes hazard identification and risk analysis and mitigation in accordance with SMS procedures.

Lessons learnt

2.18 Following the operational phase, it is deemed advisable to make an assessment of issues encountered. Inspection findings, audits, and the SMS analysis can provide important information that must be used for continuous airspace optimisation. Accordingly, the reports of joint action concerning

the flexible use of airspace, as well as the analysis by a specialised, multidisciplinary group, acquire major significance in the analysis of lessons learnt aimed at improving the procedures and regulations that seek to optimise safety and the flexible use of airspace.

3. **Suggested action**

3.1 The Meeting is invited to:

- a) Analyse the information contained in this working paper.
- b) Incorporate in the SAM ATS Route Optimisation Action Plan those actions that are deemed relevant for optimising the flexible use of airspace.
- c) Recommend States that have not done so yet, to implement a civil/military coordination and cooperation unit for the optimisation and flexible use of airspace.
- d) Identify possible users of segregated and non-segregated airspace volumes with whom letters of operational agreement will need to be established in order to optimise the use of such airspace volumes.

* * * * *