

**Guidance on the use of ICAO
Aeronautical Mobile (Route)
Service VHF band (118 MHz – 137
MHz) by the Military**

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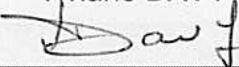
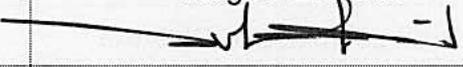
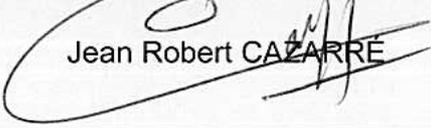
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Abstract			
<p>The purpose of this document is to respond to an open action identified in the sequence of the EUROCONTROL study on Frequency Usage Analysis for Europe (FUAE). This action was recorded in the conclusions of the Stakeholders workshop held on the 10th October 2008, at the EUROCONTROL Headquarters, which purpose was to present and discuss the results of FUAE Phase I.</p> <p>FUAE Deliverable 5 (Project Conclusions and Way Forward), communicated in due time to the European Commission, stated that EUROCONTROL should undertake the “<i>development of guidelines to prescribe which military assignments could be justified in the VHF civil band. Several States are in favour of the harmonisation across States of military assignments in the VHF band and would thus support the development of such guidelines.</i>”</p>			
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Contact Person(s)		Tel	Unit
Viviane DAVY Thomas OSTER		+32 2 729 30 68 +32 2 729 50 35	DCMAC/ATM DCMAC/CNS

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AUTHORITY	NAME AND SIGNATURE	DATE
DCMAC Expert	Viviane DAVY 	04/05/2010
Head of DCMAC/CNS	Jorge PEREIRA 	04/05/2010
Head of Division DCMAC	Michael STEINFURTH 	04/05/2010
Director CMAC & SESI	Jean Robert CAZARRE 	07/05/2010

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EXECUTIVE SUMMARY

To face the increasing congestion in the VHF spectrum band (117.975 – 137 MHz) and the higher demand for new frequency assignments, Europe is reviewing the need to further expand 8.33 kHz channel spacing operations below FL195 in the ICAO EUR Region.

The next steps on the phased implementation of 8.33 kHz below FL195 will entail the amendment of European Commission (EC) Regulation 1265/2007 on air-ground voice channel spacing (AGVCS).

In the sequence of a request from European Commission (EC), EUROCONTROL has been conducting activities on the audit and definition of measures for a more efficient use of VHF frequency resources in Europe. The conclusions of Phase I of the Frequency Usage Analysis in Europe (FUAE) project included a specific action to justify and harmonise across States the use of military assignments in the VHF COM band.

The present document describes the specific military missions and Air Traffic Services (ATS) related tasks that justify the assignment of VHF COM frequencies to military organisations. Some best practices that should be adopted to minimize the VHF congestion are also described in the document.

In general, the use of VHF COM frequencies by military organisations can be justified by the need for military ATC units to provide ATS services to civil airspace users for a) en-route operations, terminal areas (TMA) and military aerodromes open to civil traffic; b) information services (alerting, IFR crossing, etc.); c) test and calibration flights; d) search and rescue (SAR), distress and emergency flights; e) special events (air shows, etc.) and f) military training flights using civil aircraft.

Organisations operating VHF frequencies and frequency managers shall take the necessary measures to ensure the most efficient utilization of VHF frequency assignments. The FUAE study recalled a number of best practises including: initial and periodic/regular review of assignments, use of temporary assignments, Designated Operational Coverage (DOC) tailoring, shared assignments and assignments for special events. This document recommends military organisations to take due account of identified best practices.

1. INTRODUCTION

- 1.1. The aeronautical VHF band (118-137 MHz)¹ is the main radio communications band for line-of-sight air-ground voice communications used at all ATC Centres and Airports, for en-route, approach and landing phases of flight. The increasing demand and congestion of VHF frequencies in European high-density traffic areas have motivated the introduction of 8.33 kHz channel spacing. The mandatory carriage of 8.33 kHz radio equipment above FL195 has been enforced in more than 20 ICAO EUR Region States.
- 1.2. In spite of present decreasing air traffic levels, associated with the financial downturn, the demand for new VHF assignments continues and is expected to increase once traffic levels rise again. Therefore, Europe is reviewing the need for 8.33 kHz expansion below FL195, as well as other measures to alleviate VHF congestion.
- 1.3. Implementation of 8.33 kHz channel spacing above FL195² was considered as a first step which would need to be evaluated for possible expansion in due time, on the basis of proper operational, safety and economic impact assessment.
- 1.4. For these reasons, before considering the possible 8.33 kHz expansion below FL195, the European Commission (EC) requested EUROCONTROL to estimate the potential for complementary measures to improve the effective utilisation of the band. The expected result from the requested studies was to gain further information on how the current utilization of the band could be assessed and the potential gains which might be expected from improved practices.
- 1.5. The EUROCONTROL Frequency Usage Analysis for Europe (FUAE) study was conducted in 7 States of the European core area where the VHF frequency congestion is more critical.
- 1.6. The FUAE conclusions were presented at a Stakeholder workshop held on the 10th October 2008. Several areas for improvement were highlighted including particular discrepancies between the different States in relation with the military usage of VHF frequency resources.
- 1.7. FUAE Deliverable 5 (Project Conclusions and Way Forward), communicated in due time to the European Commission, stated that EUROCONTROL should undertake the *“development of guidelines to prescribe which military assignments could be justified in the VHF civil band. Several States are in favour of the harmonisation across States of military assignments in the VHF band and would thus support the development of such guidelines.”*

¹ VHF COM band for Aeronautical Mobile (Route) Service (air-ground and air-air communications, VHF voice and data) coordinated by ICAO as described in ICAO Doc. 9718

² Single European Sky Regulation (EC) Nr 1265/2007 of 26 October 2007 covers Air-Ground Voice Channel Spacing

2. OBJECTIVE AND SCOPE

- 2.1. The purpose of this document is to share best practices and provide guidance on the military usage of frequency assignments in the ICAO VHF COM band (117.975 MHz - 137 MHz). It also describes the operational justifications for the assignment of ICAO VHF COM frequencies to military organisations.
- 2.2. The present guideline document does not question the States' prerogative for the management, assignment and operational utilization of VHF COM frequencies. It simply fulfils an open action identified in the conclusions of a EUROCONTROL study (FUAE) promoting the harmonisation of best practises and operational justification for the use of ICAO VHF COM band resources.
- 2.3. Due to the nature of the present document (response to an action arising from FUAE study) it was decided to consider it as a non-ERAF (EUROCONTROL Regulatory and Advisory Framework) document³. The specific format and consultation options (Civil-Military CNS Focus Group) derive from this non-ERAF nature. The document will be associated to FUAE study Phase I conclusions without prejudice of perusal by military organisations.

3. OPERATIONAL JUSTIFICATIONS FOR MILITARY VHF FREQUENCY ASSIGNMENTS IN THE ICAO VHF COM BAND

- 3.1. Military organisations, in particular Air Traffic Control (ATC) units, provide Air Traffic Services using aeronautical spectrum bands (those not under ICAO coordination), that have been designated to sustain military operations (e.g. harmonised military bands UHF (225 MHz – 400 MHz) and VHF Aeronautical Mobile (Off-Route) Service (138 MHz – 144 MHz) for Operational Air Traffic – OAT).
- 3.2. Nevertheless, there are particular military missions, tasks and services that require the availability of additional VHF assignments in the ICAO VHF COM namely when military organisations provide Air Traffic Services⁴ to civil airspace users.
- 3.3. In many States, military ANSPs provide ATC support and services to a wide range of airspace users, civil or military, even when operating as General Air Traffic (GAT). The type of service, airspace volume and phase of a flight may vary depending on local arrangements in each State (e.g. in some cases military ATS are in charge of supporting all traffic in the lower airspace).
- 3.4. A number of other tasks carried on or facilitated by the military might require also the availability (permanent or temporary) of VHF COM frequencies. These cases are described later in the document.
- 3.5. The cases where ATS provision or other missions or tasks do justify the assignment to or the use by the military of VHF COM frequencies include:

³ In line with Guidelines for Eurocontrol Specifications and Eurocontrol Guidelines paragraph 4.2.3.

⁴ In compliance with ICAO Annex 11 or equivalent as determined by the national regulations

3.5.1. Air-ground voice communications ATC support for **En-Route Operations**

- Depending on the ATC organisation in each State, civil and military ATC Units can be separated, co-located or integrated.
- In the States where ATC Units are not fully integrated, military ATC can have the responsibility for the provision of ATS services to any airspace user, either civil or military, in a designated part of the national airspace. For example, there are multiple cases in Europe where the military are in charge of controlling all the traffic in the lower airspace of a particular State.
- This situation includes also civil IFR/GAT crossing through military sectors within the areas of responsibility of the military ATC centres.
- The en-route military ATC centres providing air-ground communications services to civil traffic conducting General Air Traffic (GAT) operations need to hold VHF COM frequencies as required to sustain levels of civil traffic.

3.5.2. Air Traffic Services in terminal airspace - **TMA Operations**

- Military ATS units (Approach Control and Aerodrome Control, including Ground) may be designated by States to provide ATS within airspace structures (ATZ, CTR and TMA) associated with a military aerodrome.
- Most military aerodromes have to provide ATC support to any airspace user crossing its area of responsibility. VHF communications is the means to provide such ATC support when handling civil traffic crossing terminal airspace.

3.5.3. Air Traffic Services in military aerodromes - **Airport Operations**

- The joint civil-military use of designated military aerodromes is a practice already in place in many ECAC States⁵.
- In the case of a military aerodrome open to civil traffic, its military ATS units should be authorised by the competent State authority to provide ATS to civil aviation operating as GAT. In this case, ATC communications require the availability of VHF infrastructure and associated frequency resources.

3.5.4. **Information services**

- The safe and efficient conduct of flights requires the availability of information services. For example, in specific circumstances it is possible to allow the crossing of a restricted area where military activity is performed. Any airspace user not involved in this activity has the obligation to contact and to request a clearance to the appropriate responsible ATC unit.
- The responsible ATC unit can be military but flights to be supported can be civil airspace users flying GAT, hence the only interoperable means to support the required ATC information exchanges are VHF radio frequencies.

⁵ EUROCONTROL Guidelines Supporting the Civil Use of Military Aerodromes (CUMA), 11 November 2009

- Flight Information Services (FIS) will have to be equally available to civil and military traffic.

3.5.5. **Special Events**

- There is no precise definition for special aeronautical events. Examples include:
 - air shows;
 - dedicated military exercises organised in non permanent airspace structures;
 - training involving less-capable flying units (e.g. military aircraft from Eastern countries unable to tune military bands).
- Military ATC units supporting such events should use spectrum resources compatible with the equipment of involved airframes. This implies the use of VHF COM frequencies.

3.5.6. **Search and Rescue, Emergency and Distress flights**

- Search and Rescue (SAR) is a national responsibility with associated activities very often performed by the military. Nevertheless, SAR activities can also involve civil aircraft. The same applies to emergency, distress, medical and hospital flights.
- Air-ground voice communications are vital for these missions. Therefore, ICAO VHF COM frequencies are essential for this type of flights.

3.5.7. **Calibration flights**

- Calibration flights are conducted to check the performance of ground-based and airborne ATC systems including surveillance, navigation, and approach and landing aids (e.g. PSR, SSR; Mode S, ILS, TACAN, VOR, NDB, etc.) for civil and military use.
- Calibration flights can be conducted by civil aircraft operators which will need to be supported using VHF COM frequencies that are in some cases assigned to the military entities that organise such activities.

3.5.8. **Test flights / Functional check flights**

- Test flights are conducted to test and verify the functionalities of new or existing aircraft systems. Functional check flights are conducted to verify aircraft performance after servicing, a major overhaul or mid-life upgrade.
- These flights are very specific with different actors (pilots, controllers, engineers, etc.) monitoring certain flight segments or parameters. Each participant may need to be supported by a dedicated frequency to distinguish clearly ATC safety-related communications exchanged with the ATC unit, from technical exchanges.
- Test and functional check flights can be conducted by/for military and civil

aircraft. In many States the military organise all or some of these activities and have VHF COM frequencies assigned for the required support.

3.5.9. Training flights

- In some States the training of military pilots is conducted by civil aircraft operators using aircraft not equipped with military communications enablers. Military ATC units providing a service to this traffic will need dedicated ICAO VHF COM assignments.

4. BEST PRACTISES

4.1. The FUAЕ study concluded that there are a number of measures that should be implemented for a more efficient usage of VHF spectrum. The key aspect is to ensure that maximum gains can be accrued by applying such efficiency measures to both civil and military users of VHF COM frequencies.

4.2. It is well understood that the norms and rules guiding frequency management are defined at national level. However, the best practises described in this chapter have resulted from FUAЕ Phase I and are shared in this document for possible consideration by users and managers. The following basic best practices should be observed when military organisations plan, manage or use VHF COM frequencies:

4.2.1. Regular review of assignments

- The data bases used in frequency management are essential to facilitate the provision of new assignments and thus need to be kept permanently up-to-date.
- The Phase I of FUAЕ study focused on the need to constantly ascertain the actual use of assignments. The study demonstrated the need to avoid old assignments being maintained even when there is no operational justification anymore, and to inform the national frequency manager.
- There are assignments of permanent or temporary nature depending on the duration of the mission or task justifying the need. The regular review is concerned mainly with permanent assignments.
- Initial Review
- Some European-wide initial reviews started during the FUAЕ study but further steps are needed, at pan-European and local scale, to further report on the actual usage of older assignments, cancel those that are no longer required and update the national data bases.
- Periodic Review
- Thereafter, the States should have a mechanism in place to periodically review the data base. The frequency managers should perform this review on an annual basis, as a minimum.

4.2.2. **Temporary Assignments**

- Assignments should be made on a temporary basis when the justifying mission or task has a short duration. At the end of this period the assignment should be terminated and the frequency released.
- Some States have decided to define a fixed life-time for each assignment, with frequencies automatically released at the end of their lifetime if no justification is provided in time.
- The frequency manager should monitor the status of temporary frequencies and take corrective actions when necessary. This task will be made easier if periodical reviews are conducted.

4.2.3. **Designated Operational Coverage (DOC) Tailoring**

- Some existing military VHF COM assignments were allocated, on a permanent basis, a long time ago when the VHF congestion was not so severe. At that time, coverage/DOC considerations were not as critical as today.
- The initial DOC can be defined for a precise mission or task or to cover the area of responsibility of an ATS unit. The associated coverage parameters may need to change after the initial definition. Any modification on the coverage requirement should be immediately communicated to the frequency manager so that the data base can be updated.
- DOC associated with VHF frequency assignments shall be adapted to the real operational need. An inadequate DOC can be the origin of harmful interferences and prevent re- assignments.

4.2.4. **Shared Assignments**

- The employment of shared assignments can be applied when civil and military ATC units are integrated or, at least, co-located.
- This method enables a more dynamic management and use of a pre-defined set of frequencies. In this case, there is no anticipated allocation of frequencies by sector. Frequencies can be pooled and used when and where required.
- This dynamic method of frequency allocation requires an appropriate tool/process to prevent conflicts. This tool/process might not be immediately available but should be considered in future improvements when dynamic sector/airspace structures are used to cope with traffic demand.

4.2.5. **Assignments for Special Events**

- As explained in the previous chapter, military ATS units that support special events might need additional VHF assignments during a determined period.
- As in the case of temporary assignments, frequencies supporting special

events should be taken from available sets of reserve frequencies, free from adjacent interference, and allocated on request for the period of duration of the event and automatically released at the end. The DOC should be adapted to the event.

5. CONCLUSIONS

- 5.1 Most aeronautical frequency assignment requirements can be satisfied through what is known as the 'ad-hoc' process, whereby new frequencies can be planned, coordinated and assigned successfully by a State without the need for frequency changes in other States. However, due to the congestion within the VHF communications band, it is often the case that a new frequency cannot be found by the State.
- 5.2 In such cases, the requirement should be submitted into the 'block planning' process. Block Planning is an ICAO EUR Frequency Management Group (FMG) process, facilitated by EUROCONTROL, in which unresolved State requirements are addressed at a pan-European level. It is sometimes possible to satisfy a requirement if one or more existing frequency assignments are 'shifted' to a different frequency. The block planning process is performed every six months.
- 5.3 The ICAO VHF COM band is highly congested band due to increasing frequency demand. Already today not all requests can be accommodated in the ICAO Block Planning process.
- 5.4 A shortcoming of the current situation is that ICAO EUR frequency management procedures rely on the good will of the participating States. However, EUROCONTROL does support the effective application of these procedures by delivering tools and training to States.
- 5.5 In fact, there was a request from the EC for EUROCONTROL to conduct activities on the audit and definition of measures for a more efficient use of VHF frequency resources in Europe. The experience, information and tools gained from the Frequency Usage Analysis in Europe (FUAE) project (Phase I) can be an important baseline for future improvements in this domain.
- 5.6 The military have duly contributed to the first phase of FUAE studies to ensure that the scarce VHF resources are also used in a more efficient and judicious way when allocated to military organisations. In the frame of FUAE, as it is the case for civil users, the military users of VHF COM frequencies were expected to equally justify the spectrum resources allocated to them on the basis of recognised operational requirements.
- 5.7 In parallel, the best practices and opportunities for improvement leading to VHF spectrum efficiency gains as identified in FUAE Phase I should also be observed by military organisations.
- 5.8 It would be a good practice to enlarge this kind of audits to EU scale and deliver additional recommendations.

ANNEX A: GLOSSARY

AGVCS	Air-Ground Voice Channel Spacing
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
ATS	Air Traffic Services
ATZ	Aerodrome Traffic Zone
CNS	Communications, Navigation and Surveillance
COM	Communications
CTR	Control Zone
DME	Distance Measuring Equipment
DOC	Designated Operational Coverage
EC	European Commission
ECAC	European Civil Aviation Conference
ERAF	EUROCONTROL Regulatory and Advisory Framework
FIS	Flight Information Services
FMG	Frequency Management Group (ICAO)
FUAE	Frequency Usage Analysis in Europe
GAT	General Air Traffic
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
NDB	Non-Directional Beacon
OAT	Operational Air Traffic
PSR	Primary Surveillance Radar
SSR	Secondary Surveillance Radar
TACAN	(UHF) Tactical Air Navigation Aid
TMA	Terminal Manoeuvring Area
UHF	Ultra High Frequency
VHF	Very High Frequency
VOR	VHF Omni-directional Radio Range