Regulatory Challenges in the introduction of the GSM services onboard aircraft

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BACKGROUND / INTRODUCTION

The development and popularity of mobile communications along with an expansion of internet and wireless technologies has transformed the way people communicate. Mobile telephony has become an integral part of daily life, users expect to be connected to their networks at every moment of the day. Businesses also rely heavily on the use of mobile communications. It is therefore inevitable that the aviation industry would explore and develop technology to enable the use of mobile phones on board aircraft.

In the past, several attempts have been made to introduce in-flight telephone services for passengers in North America, Europe, and on long-haul international routes through the use of in-seat telephones. Though technically successful, none of the previous ventures have been a commercial success, mainly because of the high cost of calls and the complexity of the onboard equipment.

A suitable response to industry’s expectations was continually impeded by several problems relating mainly to the technology itself and to the regulatory aspects of the use of mobile phones onboard airborne aircraft particularly as the use of mobile telephones on board aircraft remained prohibited by most aircraft operators who have issued in-cabin procedures stipulating that such devices may not be used during the flight, i.e. when the aircraft leaves the runway until the flight arrives at the destination runway. Several countries\textsuperscript{1}, including the United States, have also expressly banned the use of the mobile phones on board aircraft.\textsuperscript{2} These prohibitions have arisen as a result of concerns about

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\textsuperscript{1} The European Union rules integrate the rules of the European Joint Aviation Authorities that recommend in JAR OPS to prohibit the use of personal electronic devices onboard European air carriers’ aircraft. The JAROPS are implemented on various levels in the EU countries, for instance in Germany it was reflected in the

\textsuperscript{2} The US law provides that: \textbf{§ 22.925 Prohibition on airborne operation of cellular telephones.} “Cellular telephones installed in or carried aboard airplanes, balloons or any other type of aircraft must not be operated while such aircraft are airborne (not touching the ground). When any aircraft leaves the ground, all cellular telephones on board that aircraft must be turned off. The following notice must be posted on or near each cellular telephone installed in any aircraft: ‘‘The use of cellular telephones while this aircraft is airborne is prohibited by FCC rules, and the violation of this rule could result in suspension of service and/or a fine. The use of cellular telephones while this aircraft is on the ground is subject to FAA regulations.’’”. Amendment of Sections of Part 22 of the Commission’s Rules in the Matter of Airborne Use of Cellular Telephones and the Use of Cell Enhancers in the Domestic Public Cellular Radio Service, See 47 C.F.R. § 22.925.
possible risk of interference which could be caused by mobile phones with aircraft avionics and terrestrial networks.

DEVELOPMENTS OF TECHNOLOGY AND STATE OF THE ART

Technology has now been developed which allows mobile telephones to operate on board aircraft without causing any harmful interference to aircraft avionics or to terrestrial mobile systems\(^3\). This technology commonly referred to as Mobile Communications on-Board Aircraft (MCA) not only facilitates passenger communications, but also enhances aircraft safety by preventing any mobile telephones or PDAs from interfering with aircraft avionics. Further, it also prevents interference with terrestrial mobile phone systems. The airborne picocell operates as a “conventional” cell but it includes, in addition to the equipment necessary to facilitate the satellite link, a supplemental piece of equipment used to control transmissions by onboard handsets.

The mobile handsets operate by connecting with a control device in the aircraft using a GSM frequency\(^4\). The control device transmits the signal from the aircraft, via satellite, on a different frequency\(^5\). Hence, using mobile handsets onboard an aircraft requires spectrum which would be used exclusively between the mobile handset and the picocell. No spectrum is required outside the aircraft in flight.

These recently launched services onboard such airlines as Air France and TAP\(^6\) will allow airborne passengers access to voice mobile telephony, short messaging, and the internet over their personal mobile handsets supported by a system installed on-board aircraft relying on the satellite links for backhaul.

Like most innovative technological developments there wasn’t a corresponding or suitable regulatory framework leaving market players such as OnAir\(^7\) to take a proactive approach in the process of formulating new regulatory rules applicable to this technology. The in-house regulatory team of OnAir had to formulate a strategy in order to allow the rollout of the service around the globe.

THE REGULATORY CHALLENGE

Given the international nature of both aviation and telecommunications a challenge faced early on was establishing a priority for the most appropriate region in which OnAir would pro-actively work towards the development of a suitable regulatory framework. The European region was chosen not only because OnAir is a European based company but also Europe as a geo-political union represents the most integrated and

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\(^3\) If should be noted that SITA together with Airbus created a joint venture Onair to develop such a system. Other systems are developed by companies such as AeroMobile, along with other types of communication. AirCell (Wifi); Row44 (Wifi) Panasonic exConnect.

\(^4\) OnAir GSM system operates in bands 1710-1785 MHz for uplink and 1805-1880 MHz for downlink.

\(^5\) Satellite link is 1626.5 -1660.5 for downlink and 1525.0-1559.0 for uplink.

\(^6\) In December 2008 OnAir launched a trial service onboard BMI, its deployment with RyanAir is due shortly.

\(^7\) See note 3 supra
comprehensive regulatory regime simultaneously applicable to the widest number of multiple states

OnAir had to locate a forum uniting the European regulators called to examine existing regulations from the legal and technical points of view. In addition traditional telecommunications regulations have had to be applied to the aviation sector and a satisfactory solution had to be found by formulating a common European approach.

As mentioned earlier, in order to be fully operational, the service requires usage of different frequency bands for different parts of the system. For instance, on-board the aircraft 1800 MHz frequencies are used for connectivity purposes whilst the relay between satellite and aircraft operate in the internationally co-coordinated L – band. Whilst the regulation of the system covering the aircraft- satellite part hasn’t raised major problems, the regulation of the inside cabin usage of frequencies required a concerted approach which involved technical studies and the establishment of a regulatory framework which could provide guidelines for addressing regulatory needs in other countries.

The Conférence Européenne des Postes et des Télécommunications (CEPT) served as the primary forum or starting point for a pan European regulatory effort aimed at establishing up a harmonised regulatory approach to the MCA service. Naturally, OnAir as a major industry player and main contributor to the studies undertaken within the CEPT, decided to propose possible principles of the potential framework.

OnAir suggested to the CEPT to consider that the fact that since the licensing of a station installed in an aircraft is the business of the country of registration,\(^8\) so also is the assignment for use by it of the associated frequencies.\(^9\)

Further to the suggested approach two streams of work were followed within the CEPT. The Spectrum Engineering Working Group (SE7) of the European Communications Committee (ECC) examined interference effects between on-board Mobile communications on aircraft systems and terrestrial cellular networks. The result of this work is presented in ECC Report 93\(^10\) which was adopted in September 2006. That ECC 93 Report served as the technical justification for the formal ECC Decision on the harmonized use of airborne GSM systems in the frequency bands 1710-1785 and 1805-1880 MHz (ECC/DEC/(06)07)\(^11\). This decision was elaborated by the Regulatory Affairs Working Group that incorporated an annex to the Decision defining the radio

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\(^8\) This strategy was developed based on the principle of Chicago Convention that won’t be discussed in this study.

\(^9\) This suggestion is reflected in the considering of the CEPT Decision [that] accordingly responsibility for the authorisation of the GSM spectrum utilised on board an aircraft as part of such a System is that of the country of registration of the aircraft, in accordance with that country’s licensing regime.

\(^10\) Electronic Communications Committee, ECC Report 93 “COMPATIBILITY BETWEEN GSM EQUIPMENT ON BOARD AIRCRAFT AND TERRESTRIAL NETWORKS, September 2006”

\(^11\) Electronic Communications Committee, “ECC Decision of 1 December 2006 on the harmonised use of airborne GSM systems in the frequency bands 1710-1785 and 1805-1880 MHz” DRAFT ECC/DEC/(06)07, December 2006
regulatory limits of the on-board MCA system based on the results set forth in ECC Report 93.

Based on ECC Report 93, the ECC prepared a formal Decision on the harmonized use of MCA systems in the frequency bands 1710–1785 and 1805–1880 MHz ECC/DEC/(06)07. This decision was adopted in December 2006 and provides the basis for the use of GSM equipment onboard aircraft and which has now been implemented by most national European radio regulation authorities.

The non-binding ECC decision aims at producing a multilateral “framework” agreement intended to provide for the harmonized treatment of GSM services on-board aircraft across CEPT member states and in particular to establish a practical system for the authorization (including authorization of access to necessary spectrum) of MCA systems installed on-board aircraft registered in CEPT member states. The ECC Decision contemplates that administrations will allow the free circulation and use of such systems over their territory on the basis of the system operator having been authorized to use the required spectrum (or exempted from the need to be so authorized) by the country of registration of the aircraft alone. To allow the system to function according to this principle, the Decision subjects the use of MCA systems to the condition precedent of avoiding harmful interference to aircraft avionics or terrestrial telecommunications networks which in practice satisfies the requirement of respect of the regulation of the overflown countries.

Whilst the airworthiness certification\(^ {13}\) and the communication link between MCA systems and the satellites used for back haul remain outside the scope of the Decision, the compatibility report studies the conditions of non-interference with ground networks. The Decision notes that it is possible to ensure that no harmful interference is caused to systems operating outside the aircraft if the power levels and frequency bands are suitably controlled and on-board mobile handsets are prevented from attempting to register with mobile networks on the ground and can register only inside the aircraft. The MCA system therefore is confined to the space of the aircraft, which guarantees the absence of harmful interference and facilitates the efficient use of spectrum. It is contemplated that the Decision will be subject to certain operational conditions, including a minimum operating height of 3,000 meters (10,000 feet).

Despite its practical importance for the harmonisation of regulations in the telecommunications sector CEPT doesn’t have a legal personality in international law and enforcement powers to implement its decisions on the national level which may significantly impact the application of the decision on the national level. In order to enforce the results of the ECC on the national level, OnAir had to continue the started work in a forum that disposes of greater enforcement powers.

The most appropriate institution in the European context is of course the European Commission responsible for setting the regulatory policy for telecoms and media sector.

\(^{12}\) See note 20 supra

\(^{13}\) The airworthiness certification falls in the remit of the European Aviation Safety Agency, and it is Airbus who drives the procedure for the certification of OnAir system.
The EU Commission has at its disposal a number of instruments allowing it to address various issues in order to achieve a more integrated telecommunications market.

Generally the authorisation rules for electronic communications services in the EU allow Member States to determine when it is necessary to make the use of a spectrum subject to the grant of a right of use. The Member States retain the power to limit the number of rights of use usually because of the risk of harmful interference or the scarcity of the spectral resource. This implies that the procedure of the grant of individual rights to use the spectrum may vary from one member state to another and may have high costs for the new entrants on the market. However, in the absence of harmful interference and pursuant to the article 5 of the Authorisation directive, the Member states should submit the authorisation of the electronic communications services to the general authorisation.

It should be noted that the decision to subject the use of spectrum to the general authorisation or to the individual grant of rights falls in the remit of the Member States’ competence, however, the Commission has at its disposal a certain number of means allowing it to promote a co-ordinate authorisation procedures so that the providers of the pan European services could have a simplified market access.

In the case of the mobile communications services on board aircraft, the Commission could use its powers under the article 19 of the Framework directive which allows it to make recommendations to the Member States in order to achieve objectives set out in the

15 Recital 8 of the Authorisation Directive states Those aims can be best achieved by general authorisation of all electronic communications networks and services without requiring any explicit decision or administrative act by the national regulatory authority and by limiting any procedural requirements to notification only. Where Member States require notification by providers of electronic communication networks or services when they start their activities, they may also require proof of such notification having been made by means of any legally recognized postal or electronic acknowledgement of receipt of the notification. Such acknowledgement should in any case not consist of or require an administrative act by the national regulatory authority to which the notification must be made.
16 Article 5 of the Authorisation directive states:

1. Member States shall, where possible, in particular where the risk of harmful interference is negligible, not make the use of radio frequencies subject to the grant of individual rights of use but shall include the conditions for usage of such radio frequencies in the general authorisation.

17 Article 19 of the Framework directive states:

1. Where the Commission, acting in accordance with the procedure referred to in Article 22(2), issues recommendations to Member States on the harmonized application of the provisions in this Directive and the Specific Directives in order to further the achievement of the objectives set out in Article 8, Member States shall ensure that national regulatory authorities take the utmost account of those recommendations in carrying out their tasks. Where a national regulatory authority chooses not to follow a recommendation, it shall inform the Commission giving the reasoning for its position.

2. Where the Commission finds that divergence at national level in regulations aimed at implementing Article 10(4) creates a barrier to the single market, the Commission may, acting in accordance with the procedure referred to in Article 22(3), take the appropriate technical implementing measures.
article 8 of the same directive among which the promotion of innovation and the encouragement efficient use of radio frequencies and numbering resources.

Hence it was essential for OnAir to persuade the Commission to use its powers to adopt a document that could indicate a coordinated approach to the Member States when authorising the MCA. The preferable approach would of course consist in getting general authorisation regime applicable to the service, however, it would be impossible to set up such a framework without Member States’ conviction that the system doesn’t cause harmful interference. Therefore it was vital to obtain a legally binding document that would evidence the absence of such harmful interference.

Radio Spectrum Decision allows the Commission to ensure coordination between Member States and to harmonise conditions for the efficient use of radio spectrum. Pursuant to such decisions the Commission has the power to adopt measures in order to achieve harmonisation if it considers that such measures are necessary. In fulfilling this task the Commission is assisted by the Radio Spectrum Committee which is charged with addressing the development of technical implementing measures aimed at harmonising conditions for the availability and efficient use of radio spectrum. This may be achieved by issuing a mandate to the CEPT if the technical implementation measures fall in the remit of the CEPT. Thus through the procedure of the mandate issuance the technical work of the CEPT showing that the on board system doesn’t cause harmful interference to the terrestrial networks may be rendered legally binding upon the Member States. In practice, the issuance of such mandate with consequent adoption of the CEPT output by the Commission meant that EU member States could no longer justify refusing to authorise OnAir system on the basis of their concerns about interference issues and therefore the road was paved the acceptance of application of the article 5 of the Authorisation Directive to the MCA.

The Commission took onboard the MCA question and formalised its position by issuing a mandate to CEPT aiming at linking the CEPT work (compatibility studies of MCA systems resulting in a draft Decision ECC DEC(06)FF) in the mid of 2006 and after a careful examination of the CEPT results the RSCOM had drafted a decision, subsequently adopted by the Commission on April 7, 2008. The Decision (the “RSC Decision”) required Member States to make the 1800 MHz frequency band available for MCA systems on a non-protected, non-interference basis according to specified technical conditions. This Decision is based on the earlier ECC Decision and also refers to the CEPT Report 016 and the harmonised standard developed by the European Telecommunications Standards Institute (ETSI). The RSC Decision is binding and gives the European Member States six months to implement it following its adoption.

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18 (2.) The national regulatory authorities shall promote competition in the provision of electronic communications networks, electronic communications services and associated facilities and services by inter alia... (d) encouraging efficient use and ensuring the effective management of radio frequencies and numbering resources.


On the other hand, the procedure initiated under the article 19 of the Framework Directive led to the adoption of Recommendation\(^{21}\) achieving a coordinated approach of national authorisation conditions and procedures relating to use of the radio spectrum for mobile communication services on board aircraft. It recommends to the Member states to impose the least onerous authorisation system on the providers of MCA services and to consider making provision of MCA services in aircraft registered in their jurisdiction subject to general authorisation, subject to the respect of the technical conditions set out in Commission Decision on harmonised use of spectrum (the RSC decision discussed above). Based on the principle of the CEPT decision, the recommendation considers in its recital 17 that “for the purposes of this Recommendation, the aircraft cabin space is considered to be under the jurisdiction and control of the country of registration of the aircraft.”

Therefore the State of registry will issue a relevant authorisation for the services operated on board aircraft registered in its country. Recital 10 stipulates: *Responsibility for authorization of MCA services should lie with the country of registration of the aircraft, in accordance with that country’s authorisation system.*

Moreover, an authorization issued in a Member State should be automatically recognized by other Member States of the European Union and no additional conditions should be imposed on the provision of service onboard aircraft overflying the territory of a Member State.

The Commission has also opened a door for the MCA services provided on board non EU registered aircraft. Subject to the respect of the technical parameters, such MCA services in aircraft registered outside the Community are exempted from an authorisation in the Community.

**CONCLUSION**

With the adoption of the EU instruments the MCA services were inscribed in harmonized framework that should be applicable throughout the Union. However, it has not meant the end of the regulatory work in Europe. On national level steps had to be taken in order to harmonize the current legislation with the new rules of the EU.

Generally the Member States have a strict implementation approach: they have modified the national frequency plan in order to allow the free use of 1800 MHz band frequencies above 3000 meters by the installation providing the mobile communications. Only few countries opted for a grant of a licence for use of spectrum. For instance the UK Ofcom has subjected the use of spectrum to issuance of an aircraft radio licence granted to the airline operator registered in the UK. The position of Ofcom was dictated by its worry to have a better control of the possible interference.

Furthermore, the Member States had to implement the Recommendation of the EU on the national level by applying the general authorization regime to the providers of the

MCA services. Generally the EU countries decided to apply the general authorization regime to the service providers onboard the national registered aircraft whilst the provision of services on foreign registered aircraft regardless whether they are community registered or not, should be free provided such services are in compliance with the conditions agreed in the decision and registered in accordance with the relevant ITU rules.

Hence, the providers of the MCA services became subject to the general conditions attached to the general authorization as per the Annex of the Authorization directive.

The recommendation has not specified in which category the MCA services may fall and has not define which conditions should be applicable or not leaving the choice to the member states. Consequently OnAir regulatory team had to negotiate with the regulatory authorities least onerous conditions that may be applicable to OnAir in case it provides its services onboard aircraft registered in a Member State of the European Union.

This work is still ongoing and the results will be achieved during the year 2009. The example of European Union regulation of the MCA services is fundamental for the development of the worldwide framework for this innovative service.

OnAir was formed in 2005 to develop and operate in-flight passenger communications services. It is owned by SITA, the airline-owned provider of IT solutions and communications services to the air transport industry, and Airbus, one of the world’s leading aircraft manufacturers. OnAir is headquartered in Geneva, Switzerland, and has operations in Seattle, London and Montreal.

OnAir is committed to developing a full range of affordable in-flight communication services tailored to passengers’ differing habits and preferences on different types of flights.

With OnAir, passengers are able to use their own portable electronic devices, including laptop computers, mobile phones, smart-phones and Personal Digital Assistants (PDAs), as well as the airline’s in-seat equipment, to communicate in-flight, just as they do on the ground.