AVIATION SPECTRUM GROUP

REPORT OF SEVENTH MEETING

The seventh meeting of the Aviation Spectrum Group was held at the Ministry of Economic Development, Wellington on 24 April 2007. The meeting opened at 1000.

PRESENT

Alan Jamieson (Chairman) AVA
Roger Kippenberger Airways New Zealand
Bruce Emirali NZ Defence Force
Kieran Shanahan NZ Defence Force
Dave Robinson Radio Spectrum Management
Cristian Gomez Radio Spectrum Management
Hugh Railton HR Consulting
Zahid Munawar CAA
Toby Farmer CAA

APOLOGIES:

Mark Shepherd, Air New Zealand
Dave Kershaw, Ministry of Economic Development
Michael Stewart, Airways New Zealand

REPORT OF SIXTH MEETING AND MATTERS ARISING

The Report of the Sixth Meeting was accepted.

FMBC interference and ILS receivers

Toby Farmer explained that the ILS receiver standards specified in Civil Aviation Rules did not meet the ICAO 1998 standards, so that aircraft with earlier receivers were more susceptible to interference from FMBC in the upper part of the 88-108MHz band. Zahid Munawar pointed out that the Rules did not preclude operators fitting ICAO receivers.

Dave Robinson said that one customer wanted to transmit from the Auckland Skytower at 47dBW on 106.2MHz, and wondered whether a “no-fly zone” of about 2km radius could be established around the Skytower to mitigate any potential interference. Dave also suggested that CAA could undertake a survey of installed ILS receivers to find out the extent of the potential problem. Zahid noted that unless there was a reported case of interference, the grounds for such a survey (which would be an expensive exercise) could not be justified.
It was agreed that further off-line discussions between CAA, MED and Airways on this issue and the potential for interference is required.

**Link 16**

Close cooperation between NZDF, RSM and CAA had successfully resolved Link 16 licensing issues.

**REPORTS ON MEETINGS OF INTEREST TO ASG**

**ICAO WG F, Montreal, December 2006**

Alan Jamieson reported that the meeting had reviewed WRC Agenda Items 1.5 and 1.6. There had also been presentations and discussion on the issue of mobile phones on-board aircraft. AeroMobile had adopted the approach of obtaining licenses for each country to be flown over, whereas OnAir was working on the basis of a single licence from the aircraft’s State of Registry.

**APT Preparatory Group, January 2007**

Alan said that the APG covered all Agenda Items, but picked up the ICAO positions on relevant items, thanks largely to the contribution of the ICAO representative. (ICAO is not a member of the APT, but its contributions as information documents are welcomed.)

**APT Wireless Forum, January 2007**

Alan reported that half of the one-day AWF meeting was devoted to the issue of mobile phones on aircraft, and the AWF would work with ICAO on the various issues.

**ICAO Regional Preparatory Group, January 2007**

Toby reported on the RPG. The draft of ICAO’s revised position for WRC-07 was presented; it had some changes in detail, for example, in regard to the use of the VOR band for the AM(R)S. AeroMobile had given a presentation on its pico-cell system for mobile phones on aircraft, which was followed by a lengthy and wide-ranging discussion.

**Conference Preparatory Meeting, February 2007**

Alan noted that with regard to Agenda Item 1.3 there was some controversy at the CPM regarding the proposed 200MHz allocation for EESS and SRS; European states wanted the allocation increased to 300MHz, but others considered this was outside the scope of the Agenda Item. Discussion of AIs 1.5 and 1.6 was straightforward.

**52nd Radio Sector, March 2007**

The Radio Sector particularly noted the importance of the ASG in developing an aviation position.
The next Radio Sector meeting will be held on 6 June.

**UP-DATE ON PROPOSED USE OF CELL-PHONES ON-BOARD AIRCRAFT**

**International Up-Date**

Hugh Railton presented a paper (Attachment A) outlining the AeroMobile approach to ICAO considerations. AeroMobile addressed 4 key considerations: airworthiness approval, radio regulatory, human factors and overall control. AeroMobile was keen to work with ICAO to resolve these issues.

Reporting on AeroMobile activities, Hugh said that Qantas would soon have the service operational on selected domestic routes in Australia. Qantas had airworthiness approvals from CASA, as well as the appropriate spectrum approvals and telco agreements. Vodafone was withholding from this area of the market, possibly to explore a different approach using direct air-ground connections, rather than the satellite link adopted by both AeroMobile and OnAir. AeroMobile had licence agreements in 30 countries, and could restrict the service to SMS messaging if appropriate.

Zahid noted that airworthiness approvals from one state are normally automatically accepted by others; NZ would not find this appropriate for a pico-cell approval. It was agreed that the CAA would work with CASA to ensure that the Qantas approval was not automatically accepted in NZ, and with the UAE CAA in respect of any Emirates approvals.

**ACTION: CAA**

Alan noted that IATA had issued a paper, but that it was generally neutral (and slightly out of date as the FCC had put the issue aside, so that there is no movement in the USA).

The long-awaited RTCA report was disappointing in that it drew no positive conclusions on interference to avionics from mobile phones because of the enormous variety of mobile phone types. Instead, it gave detailed testing methods for states or operators to use as they wished. Zahid noted that all avionic systems were tested to RTCA DO-160D for susceptibility to interference.

Alan said that EUROCAE were undertaking some testing and that the ECC had issued a Decision in December 2006 to allow mobile phones to be used on board aircraft above 3000m AGL; however, aviation regulatory approval was still needed. ICAO had issued a letter to European states inviting them to withhold certification of pico-cell systems until all the issues are resolved.

As noted above, the AWF had written to ICAO (Attachment B) to set up a joint study to resolve the issues. ICAO’s formal response would follow the Air Navigation Committee’s May meeting.
Further Action by ASG Working Group

The Working Group would review the information presented and continue to study the subject.

REVIEW OF NEW ZEALAND POSITION ON AVIATION ISSUES

Agenda Items

The meeting considered the CPM final text, with emphasis on the methods of achieving the AI outcomes.

**AI 1.3 Up-grade of RLS and extended allocation for the EESS and SRS**

ASG supports the upgrade, with protection for the ARNS.

<table>
<thead>
<tr>
<th>Method</th>
<th>ASG Position</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method A1</td>
<td>Support</td>
<td></td>
</tr>
<tr>
<td>Method B1</td>
<td>Support</td>
<td>Extension of allocation for EESS and SRS preferred in the band 9 300 – 9 500 MHz based on compatibility studies.</td>
</tr>
<tr>
<td>Method B2</td>
<td>Not supported</td>
<td></td>
</tr>
</tbody>
</table>

Europe suggests that 600MHz is required for EESS and SRS and proposes an extension to the allocation of 300MHz, rather than 200MHz.

ASG prefers the allocation extension to be 200MHz.

**AI 1.4 IMT 2000**

ASG notes that the only aeronautical spectrum affected by the CPM report is the 2 700-2 900 MHz band, and endorses the disadvantages given for the use of this band.

**AI 1.5 Aeronautical Telemetry and Telecommand**

<table>
<thead>
<tr>
<th>Method</th>
<th>ASG Position</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method A</td>
<td>Neutral.</td>
<td>Although not required in NZ, there are some concerns regarding existing fixed point-point services.</td>
</tr>
<tr>
<td>Method B</td>
<td>No change required</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------</td>
<td></td>
</tr>
<tr>
<td>Method B</td>
<td>No change required</td>
<td></td>
</tr>
<tr>
<td>Method C1</td>
<td>Oppose</td>
<td></td>
</tr>
<tr>
<td>Method C2</td>
<td>Support</td>
<td></td>
</tr>
<tr>
<td>Method C3a</td>
<td>Conditional support</td>
<td></td>
</tr>
<tr>
<td>Method C3b</td>
<td>Not supported</td>
<td></td>
</tr>
</tbody>
</table>

**Method B**

No change required

**Method C1**

Oppose
To ensure MLS core band remains protected.

**Method C2**

Support
Including all variants

**Method C3a**

Conditional support
ONLY if the requirement cannot be met elsewhere (some satellite and WLAN activity)

**Method C3b**

Not supported
RR 9.21 would not be workable: coordination difficult if not impossible with an unlicensed service

### AI 1.6 Additional Allocations for AM(R)S

<table>
<thead>
<tr>
<th>Method 1a</th>
<th>Support 112-117.975 MHz; strongly preferred to Method 1b (116-117.975 MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 2b</td>
<td>Support 960-1 164 MHz; strongly preferred to Method 2a (960-1 024 MHz)</td>
</tr>
<tr>
<td>Method 3a</td>
<td>Neutral Recognizing that there are compatibility difficulties with existing services in using these bands for AM(R)S</td>
</tr>
<tr>
<td>Method 3b</td>
<td>Neutral Recognizing difficulties using these bands for AM(R)S, however, this method does provide improved safeguards for existing services</td>
</tr>
<tr>
<td>Method 4</td>
<td>Support 5 091-5 150 MHz, AM(R)S</td>
</tr>
<tr>
<td>Method 5</td>
<td>Support 5 091-5 150 MHz AMS for aeronautical security, providing the AM(R)S takes precedence</td>
</tr>
</tbody>
</table>

**Method for Issue D**

No change required to RRs
Recognition of use of VSAT networks for aeronautical safety-related services. Sympathetic to ICAO position for a WRC recommendation and could provide verbal support provided that there is support from developing countries.
AI 1.13 Review of Allocations between 4 MHz and 10 MHz
No change required.

AI 1.16

<table>
<thead>
<tr>
<th>Method</th>
<th>Support</th>
<th>Prefer to Method A</th>
</tr>
</thead>
</table>

AI 1.17 Compatibility between FSS and other services around 1.4 GHz

| Method 1 | Support | Also support the suppression of RR 5.339A and Resolution 745 as mentioned in the CPM Report. |

ASG endorses the draft CPM report.

AI 1.20 Protection of Earth Exploration Satellite Service

| Method C | Support | The concept of Method C is the only acceptable approach noting the difficulties posed by introducing even non-mandatory limits on services in adjacent bands. |

AI 1.21 Compatibility between Radio Astronomy Service and Active Satellite Services

Support any method that maintains the integrity of RNSS operations in that band

Concern is that consideration of RAS needs should not take precedence over RNSS operations nor introduce any undue constraints on the RNSS.

AI 7.1 Regulatory Framework
No change required

AI 7.2 New Agenda Items for Future Conferences

The current ICAO position has 4 items for inclusion; the revised version changes the emphasis of one. The ASG supports the first 2 and the revised item, deletes one and proposes a new item.

| a) Support | Deletion of country footnotes as listed by ICAO |
Support

Review of studies of 1.5-1.6 GHz band for AMS(R)S spectrum requirements in relation to Resolution 222 similar to ICAO position.

New item

Add new item on spectrum requirements for UAVs, as per draft CEPT proposals.

It was agreed that Alan and Toby would prepare appropriate text on the new agenda items for consideration by the next Radio Sector meeting.

It was also agreed that Alan and Toby would revise the draft ASG position document in line with decisions taken and update the ICAO and IATA positions where appropriate. It would be circulated to members for approval, after which it would be referred to CPG 1 (and other CPGs if appropriate) and to the next Radio Sector Meeting.

**ACTION: ALAN, TOBY**

**OTHER BUSINESS**

The next meeting will be held during the period between the APG and AWF meetings (i.e. late July/early August 2007). The date, time and venue will be advised as soon as possible.

Toby thanked the Ministry of Economic Development for its hospitality in hosting the meeting.

The meeting closed at 1330.
AeroMobile Approach to ICAO Considerations  
April 2007

The most comprehensive discussion and review of the potential use of mobile phone services aboard aircraft by ICAO to date was undertaken by ICAO’s Aeronautical Communications Panel (ACP) Working Group F (WG F) and is therefore best placed to represent the ICAO global position on the installation and use of systems enabling mobile phone usage onboard commercial airliners. According to the minutes of the 16th meeting of WG F in December 2006, “The Secretariat explained that their initial opinion was that within the boundaries of the ICAO Convention it was not possible for ICAO to place conditions on the use of such equipment and therefore they felt it was not possible for ICAO to do any more from a global perspective.”

However, ICAO suggests to States that the following needs to be considered when addressing this issue:

1. Airworthiness approval – Certification by an appropriate body of the onboard pico cell equipment
2. Radio regulatory – National mobile phone frequency requirements, pico cell operating altitude restrictions and security requirements
3. Human factors – Conditions put in place by airline concerning behaviour and mobile phone operating conditions
4. Overall control – Ability for pico cell on aircraft to be restricted or shut down by captain or designated person.

AeroMobile, Airbus and OnAir had all submitted papers and made presentations to the WG F meeting. AeroMobile agrees with these outcomes, especially the need to meet both the independently established aviation and radio/telecoms regulatory requirements.

These key considerations are being addressed by AeroMobile as follows:

1. **Airworthiness Approval – Certification by an appropriate body of the onboard pico cell equipment.** ICAO recognizes that the rigorous requirements of national aviation administrations are applicable to systems like AeroMobile. The airworthiness certification process is designed to ensure that any system installed on an aircraft does not affect the safety of the vessel and includes procedures for ensuring that systems of any kind do not interfere with the correct performance of other systems. Additionally, the process involves the development of applicable operational procedures and human factors aspects. As part of the airworthiness certification efforts, a range of tests designed to replicate extreme AeroMobile system operating conditions have been successfully concluded. These tests, based largely on guidance from RTCA DO-294B and DO-160E/EUROCAE14-E, and as required by certification bodies, have included the actual simultaneous activation and use on an aircraft of over 250 GSM mobile devices as well as high power electromagnetic compatibility testing with transmission power of up to 20’000 (twenty thousand) times the nominal power output of a single mobile device using the AeroMobile system.
At Qantas, installation, certification and the initial operational flights of the first aircraft has been completed according to international aviation standards as administered by Australia’s Civil Aviation Safety Authority (CASA). Qantas has assumed airworthiness responsibility according to Australian regulations. As reported by the Australian Broadcasting Corporation, “The Civil Aviation Safety Authority (CASA) says it has complete confidence in the safety of a trial to allow passengers on planes to use their mobile phones.”

The Emirates installation is currently undergoing airworthiness certification process by the UK CAA under the authority of the European Aviation Safety Agency (EASA). The EASA certification approval will be endorsed by the UAE General Civil Aviation Authority (GCAA) when complete. The EASA process is responding to an extensive list of “critical review items” which address all aspects of installing and operating the AeroMobile system, including all aspects of potential interference effects to aircraft systems. However, the process is taking longer to complete than originally anticipated due the need for the provision of extensive test result data and analysis, and additional requests that have arisen during the process.

2. Radio regulatory – National mobile phone frequency requirements, pico cell operating altitude restrictions and security requirements.

AeroMobile recognizes that radio/telecommunications regulatory requirements, distinct from aeronautical and aviation regulations and standards, must be complied with for operation of the AeroMobile system.

AeroMobile seeks to comply with all relevant international and national telecommunications and radiocommunications regulations including frequency requirements and at all times is operated in such a way that provides no harmful interference of any kind to terrestrial networks. The AeroMobile system is automatically disabled when flying over countries where authorization is not yet available. To date, AeroMobile has received explicit authorization for operation over 30 countries. Through the work in the CEPT and independent testing on conventionally configured aircraft, AeroMobile has initially found that the system will not provide any harmful interference to terrestrial networks when operated at altitudes above 5000m above ground level. The system is configured to remain inactive at heights below the configured limits to ensure no harmful interference is produced. This feature cannot be overridden by flight crew or cabin crew. In all cases, AeroMobile works closely with the telecommunications and radio regulatory bodies of each country in order to ensure compliance with national regulations and standards.

AeroMobile has conducted on-the-ground full functional testing of the live system in cooperation with all Australian operators of equipment on the relevant bands, plus over 20 operational flights to date and has recorded no incidences of harmful interference to other networks.

AeroMobile is actively contributing to the development international regulatory frameworks and standards including within the CEPT, ETSI and APT.
Within the CEPT, ECC Report 093 "Compatibility of GSM on board aircraft" and ECC Decision (06)07 "ECC Decision of 1 December 2006 on the harmonised use of airborne GSM systems in the frequency bands 1710-1785 and 1805-1880 MHz" have been published, thus providing the framework for the operational characteristics of GSM systems on passenger airliners and a regional regulatory framework to facilitate the deployment of these systems.

Within ETSI, the Joint Task Group GSM OBA (GSM Onboard Aircraft) has been assigned the responsibility to develop 2 documents:

- A Harmonised Standard;
- A Technical Specification in 2 parts.

The draft Harmonised Standard (EN 302 480) "Electromagnetic compatibility and Radio Spectrum Matters (ERM); Harmonized EN for the GSM onboard aircraft system covering essential requirements of Article 3.2 of the R&TTE Directive" identifies the essential requirements of the GSM OBA system to demonstrate conformity to Article 3.2 of the R&TTE Directive and to the technical Annex of the ECC Decision ECC/DEC(06)07.

The draft Technical Specification (TS 102576) "Electromagnetic compatibility and Radio Spectrum Matter (ERM); Digital Cellular Telecommunications System (Phase2+); Radio access network equipment specification: GSM onboard aircraft; Technical and operational requirements of the GSM onboard aircraft System" provides the additional requirements, limits and methods of measurement related to the particular characteristics of the GSM onboard aircraft system and the operational requirement. The first part of the TS provides the additional requirements, associated limits and the methods of measurement, which are not available in any other ETSI standards in order to demonstrate that the GSM onboard aircraft system conforms to Article 3.2 of the R&TTE directive. The second part of the TS provides an agreed methodology in order to demonstrate conformance to e.i.r.p. limits defined outside the aircraft and testing procedures to determine the value of key parameters.

3. Human factors – Conditions put in place by airline concerning behaviour and mobile phone operating conditions

The most visible and non-deterministic concern regarding the introduction of new technology to the passenger cabin is related to human factors and passenger behaviour. AeroMobile has been working closely with launch customers to develop cabin operational procedures for use of the system. Cabin crews have been sensitized to the human factors concerns and have been briefed on responses to likely FAQ's as well as how to handle certain exceptional situations. Passengers are advised to respect the comfort of fellow travellers, and are given specific recommendations on a seat-back card, on the in-cabin video briefing and during the PA announcement. Early results from the Qantas trial have so far not identified any areas of significant concern, however additional operational experience will be required before drawing any conclusions.

One area of concern expressed by ICAO is the potential that mobile devices may be left active after the aircraft has descended below the minimum operating height. AeroMobile's Cabin Crew System Operation Manual provides relevant guidance to cabin
crews and the system Control Panel enables the monitoring of the mobile devices' status. Compliance with cabin crew instructions can be monitored and enforced in ways that are impossible today.

This is a visible area for global harmonisation and ICAO has recommended the increased involvement of IATA to address cabin related matters. AeroMobile has coordinated closely with ICAO to extend the agenda of the IATA Cabin Safety Task Force meeting to be held May 7 and 8 in Dubai to develop industry Recommended Practices for the operation of pico cell systems like AeroMobile. AeroMobile has been the principal driver behind this development on behalf of the industry and has contributed documents based on those developed for and with launch customers and encouraged the participation of our airline customers at the meeting itself.

4. **Overall control – Ability for pico cell on aircraft to be restricted or shut down by captain or designated person.**

   A key feature of the AeroMobile system is the extensive control provided to cabin crew and flight crew. The system Control Panel, operated by the cabin crew at their full discretion, may be used to activate or de-active or restrict the functionality of the AeroMobile system as follows:

   - Disable incoming calls
   - Disable voice calls of any type
   - Denial of service to non-crew devices
   - Total denial of service to all devices
   - Access of specific services to specific devices (e.g. cabin crew, VIP phones).

   Using the Control Panel the crew may select the appropriate mode of operation for a particular phase of flight or particular sector. This may include disabling voice services between the dinner and breakfast meal services on overnight flights if required.

   Additionally, the flight crew may disable the system at any time via a system power 'kill switch' located on the flight deck.
Date: 6 March 2007

Dr. Taïeb Chérif  
Secretary General  
International Civil Aviation Organization  
999 University Street  
Montréal, Quebec  
H3C 5H7  
Canada

Dear Mr. Chérif,

As you may be aware, the Asia-Pacific Telecommunity (APT) was approached by SITA in December 2004 regarding the use of mobile phones and wireless data devices by passengers on-board aircraft during flight. The APT tasked the Asia-Pacific Telecommunity Wireless Forum (AWF) for action. The AWF develops, inter alia, Recommendations, Reports and Opinions on radio regulatory matters, and work has been proceeding on an AWF “Opinion on the Framework for the use of Mobile Phones on board Aircraft”.

The most recent meeting of the AWF was held in Bangkok in January last immediately after the fourth APT Preparatory Group meeting (APG2007-4) for the forthcoming World Radiocommunication Conference of the International Telecommunication Union. At that AWF meeting consideration continued on the draft Opinion and the discussions at the meeting benefited from the presence of ICAO officials, particularly Mr. Robert Witzen from ICAO Headquarters, Montreal, who were also present for the APG2007-4 meeting.

In the AWF discussions, the following conclusions were reached:

1. The issue of the use of mobile phones on-board aircraft has become a global issue requiring a globally harmonized approach.

2. While developments in Europe such as the recent decision by the Electronic Communications Committee (ECC) of the European Conference of Postal and Telecommunications Administrations (CEPT) need to be taken into account by the AWF, conditions concerning the use of mobile phones in Asia-Pacific are different than those in Europe and will need to be reflected in the Draft AWF Opinion.
3. The issues can be grouped into three areas of interest as follows:
   a. Issues primarily of concern to radio regulators.
   b. Issues primarily of concern to civil aviation authorities and aviation regulators.
   c. Issues primarily of interest to airlines and IATA.

4. There is benefit to be gained by the active participation, coordination and cooperation of ICAO and aviation experts in the further work of the AWF on this topic and that a suitable method to encourage this on a joint basis needs to be found.

It was also noted that the AWF has an important role to play in completing its studies on this topic with the joint participation of both radio regulatory and aviation experts.

It is in this context that I am writing to you to suggest that the AWF develop with ICAO a cooperative approach to studying the use of mobile phones on-board aircraft. We understand that our two organizations would have complimentary regulatory roles to play in terms of civil aviation considerations on the one hand and radio regulatory considerations on the other.

If you agree with this approach, I would further suggest that we task our experts to develop a plan for the way forward, recognising that these studies are a necessary precursor to the preparation of any regulatory provisions. We also understand from the viewpoint of the proponents of these systems, such as SITA/OnAir and Aeromobile, that the studies need to be conducted in a timely manner.

I look forward to your early response as I consider that our potential cooperation on this matter would be an example for others in the radio regulatory field to follow on matters of mutual interest to civil aviation and radio regulatory communities.

Yours sincerely,

Amarendra Narayan
Executive Director
Asia Pacific Telecommunity

cc: Dr. Young-Kyun Kim
Chairman, AWF
Mr. Bjorn Ramfjord
President, Air Navigation Commission

Mr. L. B. Shah
Regional Director ICAO, Asia and Pacific (APAC) Office