



International Civil Aviation Organization

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Agenda Item 4: Aeronautical Mobile Service

DEVELOPMENT OF VHF AIR/GROUND SERVICES

(Presented by Australia)

SUMMARY

Australia has commenced a program to upgrade VHF Air/Ground infrastructure. This paper provides an overview of the upgrade program including strategic decisions on the selection and performance requirements of the new system.

1. INTRODUCTION

1.1 Airservices has successfully completed the replacement of its Air Traffic Management (ATM) infrastructure through the implementation of TAAATS. This has provided an advanced solution to the processing and presentation of surveillance and flight data, and enhanced the utility of the tools available to air traffic control in the provision of ATM services.

1.2 Over the period of implementation of TAAATS, the replenishment of CNS infrastructure, particularly the radio communications facilities, was delayed as a risk mitigation strategy.

1.3 With TAAATS ATM facilities now providing a stable environment it is appropriate and timely to progress the modernisation and replacement of VHF and HF radio communications facilities and their associated infrastructure and control systems.

2. PURPOSE

2.1 This paper reviews the status and plans for the development of VHF aeromobile services used by Airservices Australia to provide air traffic services into Australian airspace.

2.2 Its purpose is to provide some insight into the strategic thinking of Airservices Australia in relation to VHF air/ground, and the specific strategies and actions which are being pursued to give substance to these plans.

3. BACKGROUND

3.1 Communications facilities are recognised as the cornerstone of the provision of air traffic services.

3.2 In Australia, air traffic services comprise the following elements:

- flight information service
- alerting service
- air traffic advisory service
- air traffic control service (area, approach or aerodrome)

3.3 The communication requirements associated with the delivery of each of these services are currently provided through a mix of HF and VHF air/ground networks and facilities.

3.4 The VHF air/ground facilities currently used by Airservices Australia follow design principles established in the 1960s, employ a mix of equipments of varying ages, and utilise control and audio systems based upon relay-switching and fixed wiring. The evolution of service requirements over many years has resulted in some blurring of detailed designs. The radio sites are spread across the Australian continent, providing radio coverage to meet current operational requirements. Bearer systems vary with location, but are a mix of fixed cabling, leased lines, radio bearers and satellite links. Maintenance and support have almost exclusively been provided using in-house labour, with intervention to the component level of equipments.

3.5 The present VHF configurations have demonstrated, to varying extents, the following deficiencies:

- Equipment obsolescence
- Inconsistent and out-dated designs
- Single points of failure
- Inability to exploit the available benefits of new technology
- Complex configurations
- Inflexibility to adapt readily to airspace and resectorisation changes
- Limitations in online reconfiguration
- Vulnerability to radio frequency interference

4. STRATEGIC FRAMEWORK

4.1 The renewal and modernisation of Airservices Australia's communications facilities is being progressed through the implementation of a number of key projects, which together are intended to ensure that service and facilities performance continue to meet safety and customer requirements into the future.

4.2 In particular, the VHF System Upgrade Project is intended to remedy the emerging deficiencies with the current system, addressing obsolescence, improving performance, and exploiting the capabilities of contemporary technology to improve the efficiency and effectiveness of VHF communication service delivery.

4.3 In progressing this initiative, a number of basic assumptions have been made:

- That a channel spacing of 25 kHz will continue to be the operational specification in Australia for the foreseeable future;
- That the current TAAATS operational environment will not change;
- That the VHF voice service, backed by CPDLC and HF will be the primary communication medium for transcontinental traffic; and that a combination of CPDLC and HF voice will be the communication medium for oceanic traffic;

- That, while datalink at VHF will continue to develop in its impact upon aeromobile communications, the requirements for basic voice communications will continue.

5. PLANS FOR VHF AIR/GROUND SERVICES

5.1 As defined in the Air Traffic Services *Requirements for Communications* section of Annex 11 to the ICAO Convention, the VHF AGA communication system shall enable direct, rapid, continuous and static-free two-way communications to take place between the unit providing the service and appropriately equipped aircraft under its control.

5.2 The objectives and strategy of Airservices Australia's VHF System Upgrade Project (VHFSUP) are summarised as follows:

- The development of a new suite of system design standards which use modern technology to optimally satisfy service performance requirements. Attention is being given to equipment reliability, elimination of common mode failure opportunities, reassessment of redundancy needs, etc
- Review radio siting and coverage requirements to more efficiently satisfy operational needs
- Replace all radio and associated interface and control equipments
- Utilise digital bearers and digital voice systems
- Integrate standby power facilities, and improve antenna systems
- Introduce comprehensive remote control and monitoring of all radio and control equipments
- Improve the utility and flexibility of human-machine interfaces
- Establish required logistics, training and support regimes.

5.3 As a precursor to the implementation of the project, the functional requirements of the VHF communications system have been reassessed in the light of contemporary service needs, and documented. These functional requirements form the foundation for equipment procurement and system design.

5.4 Equipment procurement is to be progressed by way of competitive tendering for a complete solution which meets the functional need. The selected contractor will be required to deliver operating systems for installation to a pre-agreed schedule; the contract will include logistics and support services to cover the service life of the equipments.

5.5 The station design, the installation, and the integration with existing systems will be undertaken by skilled Airservices Australia technical and engineering staff.

5.6 Implementation into the field will be a staged process which employs a strong attention to the management of safe and effective transition. The equipment will be subject to stringent site acceptance testing, and be implemented initially at a small group of key sites as an operational pilot. Subsequent stages of implementation will roll out the facilities across Australia in a manner which maximises the efficiency of staff utilisation, coordinates with equipment delivery and bearer replacement, and ensures operational safety.

5.7 The timings anticipated for the project are to establish procurements contracts by the end of 2003, with a commencement of delivery and installation by the end of 2004, and a completion of all sites by the middle of 2006.

6. CONCLUSION

6.1 Airservices Australia has taken a strategic approach to the renewal and up-grading of its extensive network of essential communications facilities.

6.2 As a part of the implementation of this strategy, the complete network of more than three hundred VHF facilities at nearly two hundred individual sites will be replaced and modernised. A major project will be implemented by 2006, and will employ the skills of leading industry suppliers and Airservices Australia's engineering, technical and operational staff.

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