International Civil Aviation Organization

NINTH MEETING OF THE COMMUNICATIONS/NAVIGATION/SURVEILLANCE AND METEOROLOGY SUB-GROUP OF APANPIRG (CNS/MET SG/9)

Bangkok, Thailand, 11–15 July 2005

Agenda Item 3: Aeronautical Fixed Service

SOUTH PACIFIC AERONAUTICAL FIXED SERVICE NETWORK IMPLEMENTATION

(Presented by USA)

SUMMARY

Implementation of the South Pacific Aeronautical Fixed Service (AFS) Network for data and voice communications between Australia, Fiji, New Zealand, Papua New Guinea and the United States of America is complete and the network is operational.

1. Introduction

1.1. Airservices Australia, Airports Fiji Limited, Airways Corporation New Zealand, the Civil Aviation Authority of Papua New Guinea, and the United States Federal Aviation Administration have mutual requirements to exchange air traffic data and voice communications with each other. Previously, a combination of point-to-point circuits and international direct dial service was used to satisfy air traffic voice and data requirements between States. After discussions and deliberations between the participating States, it was decided that the establishment of a more state-of-the-art network which supports multiple services, voice compression, multiple protocols, re-routing, network security, was remotely manageable, and more easily expandable was desired. In addition to the benefits listed above, implementation of the meshed network would also allow States to potentially disconnect point-to-point circuits that would no longer be needed.

2. Establishing the Network

2.1 In 2002, the United States (US) Federal Aviation Administration (FAA) and Airports Fiji Limited (AFL) upgraded the Aeronautical Fixed Services (AFS) communications between them. The FAA and AFL replaced their unsupportable multiplexing equipment with N.E.T. Promina 800 and N.E.T. Promina 100 equipment, respectively. The FAA and AFL also established a 64 kilobytes per second (Kbps) trunk circuit between the Oakland Air Route Traffic Control Center (ARTCC) and Nadi Area Control Center (ACC).

2.2 Similarly in 2003, the USA FAA and Airways Corporation of New Zealand Limited established bilateral AFS communications using N.E.T. Promina equipment. The FAA upgraded their N.E.T. Promina 800 equipment at the Oakland ARTCC to accommodate voice and data services to New Zealand. Airways Corporation of New Zealand implemented Promina 100 equipment at the Auckland ACC. A 64 Kbps trunk circuit was also established between Oakland ARTCC and Auckland ACC.

2.3 Subsequently in early 2004, Airservices Australia also agreed to procure compatible N.E.T. Promina equipment to realize the multiple benefits of creating a fully integrated South Pacific AFS network. Following the integration of Airservices Australia into the network, the Civil Aviation Authority of Papua New Guinea was able to interface to the network via existing legacy service to Australia. Figure 1 shows the South Pacific AFS Network Configuration. A complete listing of service requirements implemented over the network is listed in Appendix A.

3. Benefits of the Data/Voice Multi-service Access Platform

3.1 The replacement platform was selected to implement AFS communications as a result of providing several significant benefits, including:

- Multi-service access platform
- Voice compression
- Multi-protocol routing
- Re-routing capabilities
- Easily expandable platform
- Remotely manageable and configurable
- High network reliability
- Network security

3.1.1 Multi-service platform

3.1.1.1. The replacement platform allows for the integration of voice and data services on a single platform. This platform supports voice, video, data, fax, modem, local area network (LAN), and image traffic.

3.1.2 Voice Compression

3.1.2.1. Voice services can be compressed to use 16, 9.6, 8, or 4.8 Kbps of bandwidth. The replacement platform provides constant bandwidth and toll quality for voice services, in addition to supporting a number of voice compression industry standards, including Conjugate Structure Algebraic Code Excited Linear Prediction, CS-ACELP (G.729).

3.1.3 Multi-protocol routing

3.1.3.1. The replacement platform supports multiple protocols routing simultaneously. These protocols include: Asynchronous Transfer Mode (ATM), frame-relay, Internet Protocol (IP), Integrated Services Digital Network (ISDN), and voice.

3.1.4 Re-routing capabilities

3.1.4.1. Another benefit of the network is the ability to provide alternate routing of both AFS voice and data in the event of a trunk failure. Alternate routing is controlled using priority and preemption criteria developed by the participating states.

3.1.5 **Easily expandable platform**

3.1.5.1. The replacement platform is expandable with multi-feature card slots. As a result, expansion to meet new requirements may not involve buying a new platform or using more space.

3.1.6 **Remotely manageable and configurable**

3.1.6.1. This feature helps reduce service costs. Management is 'standards-based' using Simple Network Management Protocol (SNMP) and HP OpenView.

3.1.7 **High network reliability**

3.1.7.1. The replacement equipment has the ability to determine network topology. With this information, data can be rerouted to optimize the end-to-end circuit path. The network has the ability to reroute traffic automatically in a few seconds in the event of a failure.

3.1.8 **Network security**

3.1.8.1. Security on the network is enabled by virtue of partitioning of user access to restrict change privileges to nodes of influence only.

4. Conclusion

4.1 In the Asia/Pacific Region, a common multi-service access platform is being used to support the exchange of air traffic data and voice communications between Australia, Fiji, New Zealand, Papua New Guinea and the United States of America.

4.2 The meeting is invited to review the technical solution implemented by Airservices Australia, Airports Fiji Limited, Airways Corporation New Zealand, Civil Aviation Authority of Papua New Guinea, and the US FAA to satisfy AFS communications requirements.

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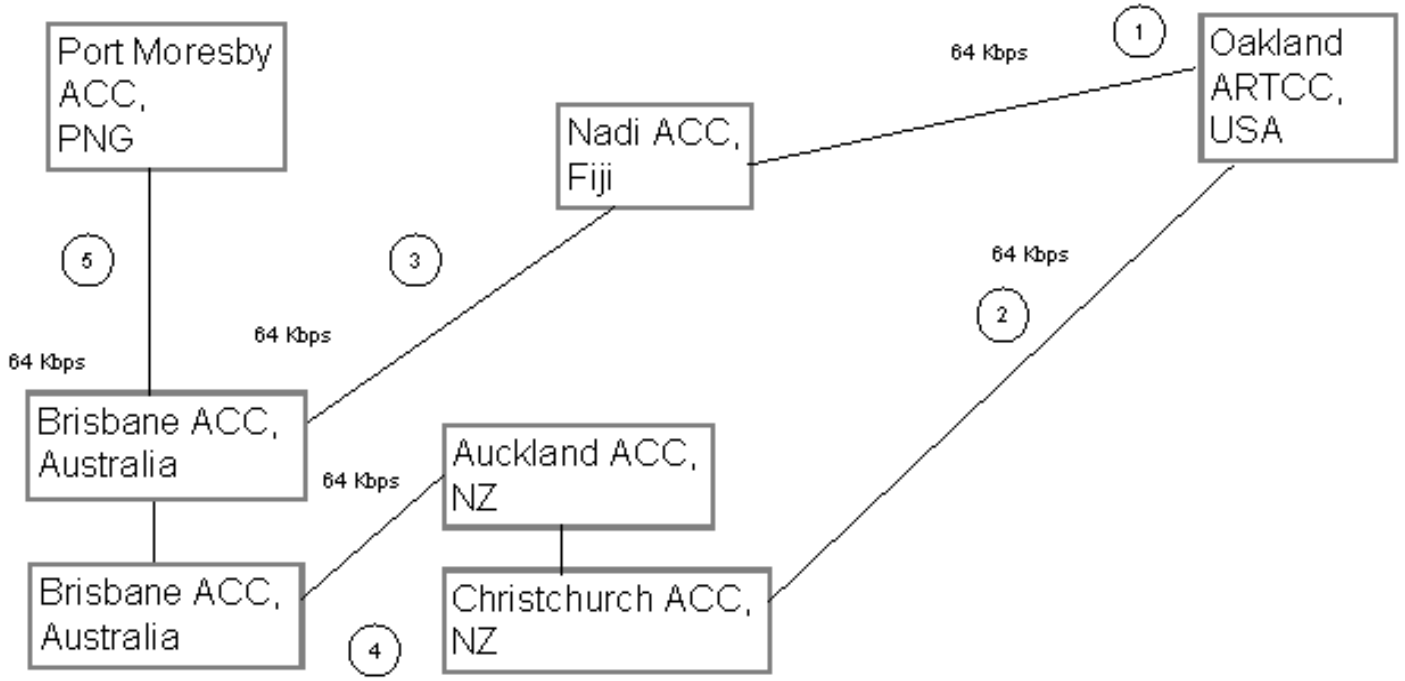
Figure 1: South Pacific AFS Network Configuration



Appendix A
Services on South Pacific AFS Network

	1 *Fiji / USA* *64KBPS Circuit*			*2* *New Zealand / USA* *64KBPS Circuit*			*3* *Australia / Fiji* *64KBPS Circuit*
Bandwidth KBPS	Service		Bandwidth KBPS	Service		Bandwidth KBPS	Service
8	Management Overhead		8	Management Overhead		8	Management Overhead
3	Framing Overhead		3	Framing Overhead		3	Framing Overhead
2.4	X.25 AFTN Data		2.4	X.25 AFTN Data		4.8	X.25 AFTN Data
8	Fiji/USA ATC Comp. Voice		8	NZ/USA ATC Comp. Voice		8	AUS/Fiji ATC Comp. Voice
4.8	Fiji/USA MET Data		8	AUS/USA ATC Comp. Voice		8	AUS/Fiji ATC Comp. Voice
8	Fiji/USA MET Comp. Voice		8	PNG/USA ATC Comp. Voice		8	AUS/Fiji ATC Comp. Voice
						8	Fiji/NZ ATC Comp. Voice
	4 *Australia / New Zealand* *64KBPS Circuit*			*5* *Australia / Papua New Guinea* *64KBPS Circuit*			
Bandwidth KBPS	Service		Bandwidth KBPS	Service			
8	Management Overhead		8	Management Overhead			
3	Framing Overhead		16	X.25 AFTN Data			
2.4	X.25 AFTN Data		8	AUS/PNG ATC Comp. Voice			

	1 *Fiji / USA* *64KBPS Circuit*			*2* *New Zealand / USA* *64KBPS Circuit*			*3* *Australia / Fiji* *64KBPS Circuit*
8	AUS/NZ ATC Comp. Voice		8	AUS/PNG ATC Comp. Voice			
8	AUS/NZ ATC Comp. Voice		8	AUS/PNG ATC Comp. Voice			
8	AUS/USA ATC Comp. Voice		8	PNG/USA ATC Comp. Voice			
8	PNG/USA ATC Comp. Voice						
8	Fiji/NZ ATC Comp. Voice						