



**Twenty First Meeting of the
Informal South Pacific ATS Co-ordinating Group (ISPACG-FIT /21)**
FANS Interoperability Team Meeting
Auckland, New Zealand, 5-6 March 2007

Agenda Item 9:

SATCOM Voice Trial Proposal

(Presented by Boeing)

SUMMARY

SATCOM voice capability will play an increasing role as separation reductions between large numbers of aircraft are used. This paper outlines draft plans and procedures which may be helpful with organising and running a SATCOM voice trial.

1. INTRODUCTION

It is anticipated that SATCOM voice will play an important role in the future when reduced separation is applied amongst several aircraft. Due to the long lead times involved to make changes stakeholders should planning trials now so the issues can be identified and resolved in time to support future airspace enhancements. Stakeholders are encouraged to organize a proof of concept trial to assess the feasibility of using SATCOM voice for non-routine, and routine ATS communications in the South Pacific.

2. DISCUSSION

Participants would use SATCOM voice for all non-normal ATS communications normally conducted via HF radio. Additional guidance material would be provided prior to commencing the trial on what portion of routine communications will be conducted over SATCOM voice. Some aircraft may have SATCOM voice capability only and would use SATCOM voice for passing routine communications normally sent via CPDLC on data link equipped aircraft.

Costs associated with each SATCOM voice call, would be borne by the initiator of the SATCOM call.

The security of ground initiated SATCOM voice calls would be ensured through the use of a unique, confidential PIN numbers assigned to participating FIRs by their service provider.

Support for the use of a SATCOM voice trial in the South Pacific region is based on:

- a) the need to gain operational and technical experience with SATCOM voice;
- b) the need to have an alternative means of voice communications in the event of situations such as poor HF propagation;
- c) the need to validate air crew and radio operator / controller procedures; and
- d) initial trials for ATS use of SATCOM voice in other regions have proved its usefulness in situations such as poor HF propagation.
- e) Reliable SATCOM voice capability will play an important role in mitigating non-normal and unique situations as separation reductions become more mainstream.

The following operational considerations apply with respect to the implementation of SATCOM voice in the South Pacific:

- a) Existing STACOM equipment in FANS 1A equipped aircraft have the capability to support ATC voice communications
- b) New technology SATCOM systems will offer additional voice capability with significantly reduced installation costs.
- c) These new systems do not require equipment cooling and can be operated on backup and standby power (both HF and SATCOM systems are not powered during a standby power condition).
- d) secure, efficient and accurate SATCOM dialing capability is an operational requirement.

The goal of a proof of concept trial is to gather performance data and identify areas where mitigation may be required to address technical, operational, procedural, and or security issues. Dependant on the results of the proof of concept trial, an operational trial with broader participation may be initiated in the future.

In particular the proof of concept trial will gather data relating to:

- connection success rates compared between SATCOM and HF Radio;
- connection times compared to HF Radio for ground and airborne initiated calls;
- validity of ATS and flight crew procedures;
- impact on existing ATS and flight crew procedures
- clarity of voice communications;
- security issues;
- system performance;
- reliability, availability and integrity; and
- costs associated with use of SATCOM voice.

System Overview

ATSUs would define procedures to initiate SATCOM voice calls based on further guidance material that will be developed prior to the trial. Some implementations may use flight plan information to determine the registration of the aircraft using the aircraft's call sign and then cross-references the registration to the correct INMARSAT satellite phone number associated with its registration and PIN number. These trial systems can be as simple as a laptop running a specialized password protected spreadsheet. When the operator enters a call sign and a match is found, and the application could initiate the call.

All SATCOM voice calls initiated by ATSU's will be assigned INMARSAT call priority Q12, ATS Flight Safety, which identifies the call as a priority call to the flight deck.

Aeradio Procedures

Depending on the facility radio operators or controllers will use standard procedures and phraseology, as defined in FS MANOPS. On establishing SATCOM voice contact, radio operators shall ensure positive identification of the aircraft.

If the controller or radio operators are unable to contact the aircraft after two attempts via SATCOM then he/she will revert to HF voice procedures.

Airborne Initiated Calls

For SATCOM voice calls made to an ATSU controller or radio station the radio operator shall:

- ensure the flight identifies itself;
- respond to an aircraft that identifies itself as "SATCOM" by restating "SATCOM" in conjunction with the aircraft call-sign;
- receive and read-back the message, if required; and
- on initial contact allocate the primary and secondary HF frequencies and perform a SELCAL check.

Example: <line rings at ATSU>

ARINC Radio

ARINC Radio, NZ 2555 SATCOM

NZ 2555 SATCOM, ARINC Radio, go ahead

ARINC Radio, NZ 2555, <message> request SELCAL check ABCD

NZ 2555, ARINC Radio <read back message>, primary 8825 secondary 5598, SELCAL ABCD

<ARINC Radio initiates SELCAL check>

ARINC Radio, NZ 2555, roger, SELCAL OK

ARINC Radio out

Ground Initiated Calls

- initiate the dialing sequence;
- confirm the aircraft call sign prior to delivering the clearance or message;
- complete the dialogue; and
- terminate the call after the dialogue is finished.

Example: <line rings in United 929 cockpit>

United 929 SATCOM

United 929 SATCOM, ARINC Radio

ARINC Radio, United 929 go ahead

United 929, ARINC Radio, <message>

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*ARINC Radio, United 929, <read back message>
United 929, ARINC Radio, readback correct, out*

Loss of SATCOM Voice Connection

If the SATCOM voice connection is lost during a communication the radio operator shall:

- attempt to contact the aircraft on HF (SELCAL);
- deliver the clearance or receive the message as appropriate;
- once the transaction is complete initiate a SATCOM Voice call; and
- if connection fails advise the aircraft to revert to HF voice procedures.

Flight Crew Procedures

Pilots will use standard ICAO procedures and phraseology, as defined in Annex 10, Volume II, Chapter 5 and Doc. 8400 in any SATCOM voice communication.

If the pilot is unable to contact the ATSU after two attempts via SATCOM then he/she will revert to HF voice procedures.

3. ACTION BY THE MEETING

3.1 The meeting is invited to use this information to help prepare for and plan a SATCOM voice trial.