

AERONAUTICAL TELECOMMUNICATIONS NETWORK PANEL

Working Group 1 Meeting	7 - 10 March 1997
Working Group 2 Meeting	4 - 6 March 1997
Working Group 3 Meeting	4 - 6 March 1997
Working Group of the Whole Meeting	11 -14 March 1997

Phuket, Thailand

A Summary of the ADS Europe Final Trials Report

Presented by: _____

Summary

This Information Paper summarises the ADS Europe Final Trials Report. Delegates are invited to note its content and project's contribution to the ATN SARPs Validation.

1. Introduction

The ADS Europe Project was undertaken by the (specifically formed) ADS Europe Consortium in response to the European Commission's (EC) Call for Proposals for studies and experiments on the use of telematic technologies in support of CNS in air transport. This was funded under the EC's APAS Programme.

The ADS Europe Consortium Partners were the UK National Air Traffic Services Ltd (NATS), Sofréavia and the French Air Navigation Directorate (DNA), and the National Aerospace Laboratory of the Netherlands (NLR). The sub-contractors used by the Consortium Partners were: Sextant, Racal, France Telecom, British Telecom, Air France, Lufthansa, British Airways and KLM.

2. Project Objectives

The consortium undertook the task stated as the primary objective of the EC's Call for Proposals for '*Exploratory Action on ADS for ATM*', which was to "Obtain pre-operational demonstration results for dissemination within the air transport community".

The contract was awarded in December 1994 and the Final Report was published in December 1996.

This Information Paper summarises the results and conclusions of the ADS Europe Final Trials Report. The report is available as a supplement to this Information Paper.

3. Project Results and Conclusions

3.1 General

The principal objectives of the ADS EUROPE project were fully met. The most important results were the considered to be the implementation of the first air-ground ADS/AMSS/ATN system with multiple aircraft and ATC systems, and the contribution to standards validation.

Two main types of results were achieved from the project, namely, the measurements obtained from the recorded trials data and the experience of developing and implementing the ADS EUROPE Trials System.

3.2 Trials Results.

The trials produced information on the communications system and the ADS functionality.

The final communication system showed message delivery success rates of 98%, already better than earlier NATS trials using the Inmarsat Data-2 satellite protocols alone (96%). It is anticipated that further system development will improve the ADS EUROPE Trials results.

The one-way (aircraft to ground) message delivery times were dependent upon the satellite channel used, itself dependent on message length. The average 600bps R-channel transfer was measured at 6 secs, 12 secs for the 600bps T-channel and 10 secs for the 10.5kbps T-channel (with a precision of approximately 1 second).

The round-trip message delivery times¹, also dependent upon the satellite channel used, was found to have additional dependencies such as implementation within the ADSE (ADS airborne equipment). The results showed that, in general: periodic ADS contract round trip times are longer than demand contracts; T-channel round trip times were longer than R-channel (both 600bps channels); an aircraft fitted with 10.5kbps T-channel provided round trip times of about half those of the 600bps channels.

¹ Round trip time is defined as the time from an ADS contract request being sent from the Ground System to the time the acknowledgement to that request is received back at the Ground System.

The ADS functionality in the trials showed no discrepancy between the position data recorded on the aircraft and that received and recorded on the ground. Comparison between ADS position data and Inertial Reference System data and SSR data showed good correlation. Finally, the trial determined that over the satcom subnetwork a reporting interval of 10 secs was possible for short periods, but that for sustained reporting the shortest reporting interval was 15 secs.

3.3 Trials Experience.

The trials enable ATN parameters, such as the TP4 timers, to be optimised. The current set of trials TP4 timers, optimised for a five minute ADS reporting rate, have been extracted from the report and reproduced below. Further work in this area is planned.

Also the trials showed that, once global satellite coverage was available, there were no data losses due to loss of satellite coverage. The trials recorded satellite switching on the same GES took approximately 30 secs, or approximately 90 secs when the GES was also changed. No data was lost during satellite switching. The different antenna fit on the different aircraft was found to have no affect on antenna coverage.

TP4 Timer	Current agreed value
T1, Re-transmission timer	100 seconds
N, Maximum transmission number	3
W, Window timer	7 minutes (420 seconds)
IL, Inactivity timer	16 minutes
L, Frozen reference timer	Specific value not required ²
AL, Acknowledgement timer	Specific value not required ²

3.4 Trials Recommendations.

When integrating the trials systems, traceability tools were found to aid problem solving. The trials experience led to a Report recommendation that they be implemented to enable both top level and detailed analysis.

The integration exercise also led to a recommendation that a reference system with generic interoperability test procedures be provided. This will enable new systems to be integrated without impact upon the operational system.

The trials found that the ATN protocol overheads did not affect the system performance, but recommended that timer values be assessed to optimise the cost of maintaining a route to an aircraft whilst ensuring that a transport connection is available.

A recommendation was made that an addressing plan is developed to manage the ATN network architecture.

4. Further Information.

The ADS EUROPE Final Trials Report, limited copies of which are available, provides more detail on the points referenced above and should be consulted for further information. The ADS EUROPE Trials infrastructure will be maintained until December 1997, under funding from EUROCONTROL, to support further work.

² Alcatel stack specific

