EUROCONTROL

AERONAUTICAL TELECOMMUNICATION NETWORK PANEL

WORKING GROUP 3 (APPLICATIONS AND UPPER LAYERS)

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Eurocontrol Trials End System (TES) - Status Update

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SUMMARY

This paper presents the current status of the Eurocontrol Trials End System (TES), an implementation of the CNS/ATM-1 Package ATN upper layers, ADS, CM and CPDLC applications.

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1. INTRODUCTION

This paper presents the current status of the Eurocontrol Trials End System (TES), an implementation of the CNS/ATM-1 Package ATN upper layers and ADS, CM and CPDLC applications.

This is a delta update to previous papers describing the overall concept, implementation approach and validation results obtained from the TES project.

1.1. References

ATNP/WG3/WP4-13   Approach to Validation of CNS/ATM-1 Package SARPs

ATNP/WG3/WP9-23   Results from Eurocontrol Application SARPs Validation

ATNP/WG3/WP9-24 (IP) Implementation of Eurocontrol CNS/ATM-1 Trials End System (TES)

ATNP/WG3/WP9-25 (IP) Eurocontrol ATN Project Overview and Status

2. BACKGROUND

The Eurocontrol Trials End System (TES) project has been involved in a number of activities in support of the validation of the draft ICAO Air-Ground SARPs and supporting ATN Upper Layers. A major activity was the production of prototype software realisations of the SARPs. The TES Prototyping contract has produced implementations of the functionality specified in ADS, CM, CPDLC and Upper Layer SARPs.

Key achievements include:

- Prototype Implementation. The CNS/ATM-1 SARPs have been validated for completeness and consistency by ensuring that they can be implemented.

- API specification. As part of the specification work for the TES Prototyping Contract, a number of strategic end system application programming interfaces (APIs) have been specified. This process helped to reveal a number of inconsistencies in the early draft SARPs by considering information flows at a number of conceptual interfaces.

- Interoperability Testing. The highest level of confidence in draft SARPs is obtained by performing interoperability tests between independent implementations of the applications specified in the SARPs. This provides confidence that the SARPs are written unambiguously. Scenarios were developed to support validation by means of inter-operating independent implementations of the Air-Ground SARPs.

Fundamental to the implementation approach is the definition of a set of programming interfaces enabling a modular approach to be taken. There is no requirement for such interfaces to be standardised as SARPs, but it could be beneficial to share the interface definitions with other States and Organisations, to encourage the development of portable applications and therefore potentially decrease costs by maximising the market relevance of products developed to work within the global ATN environment.

The TES software implements an OSI telecommunication stack based on an environment from MARBEN Produit called C-OSIAM. The architecture of TES is closely related to the C-OSIAM approach for building a telecommunication stack.

The TES software is implemented over the OSI transport service, which is provided either by the OTS 9000 product from Hewlett Packard, or by the Internet SARPs-compliant TAR/TTS system which has been developed within Eurocontrol.

3. CURRENT STATUS

The TES prototype software currently implements version 3.0 of the air-ground applications SARPs and version 4.0 of the Upper Layer Communication Service SARPs. These were the initial baseline SARPs which were placed under configuration control after the Munich meeting of ATNP/WG3 in June 1996.

The initial phase of the TES software development successfully completed the final stage of acceptance testing on 5th June 1997.

TES is now available for free issue for experimental purposes to Eurocontrol Member Administrations. A four-day training course has been developed to allow users to exploit the TES software. The software is currently being delivered to NATS (UK), DFS (D) and SICTA (I).

4. NEXT STEPS

Future highlights include:

- Build 2

  A major upgrade of the TES software is now under way to align with the SARPs versions approved at the ATNP Working Group of the Whole meeting in March 1997. This will keep the software current, validate any SARPs changes since June 1996, and facilitate interoperability with other implementations. Delivery is planned for mid-September 1997.

- Integration with airborne system on BAC 1-11

  TES is being used, together with Trials ATN Router (TAR) and Trials Transport Service (TTS) components, to provide a complete CNS/ATM-1 implementation which will undergo flight trials as part of the FITAMS (Flight Trials of ATN / Mode S Subnetwork) project. This will provide the first ever demonstration of ICAO SARPs compliant end-to-end (7 layer) datalink via multiple mobile subnetworks with live experimental aircraft. The ADS and CPDLC applications are important components of the FITAM trials, as are both satellite and Mode S subnetworks. Flight trials are planned to commence in mid October 1997.

- Interoperability testing

  IOP testing with other independent implementations of ATN applications and upper layers is an important goal of the TES project. This not only increases confidence in the SARPs themselves but ensures that global interworking is indeed feasible. The earlier IOP testing of the CM application between TES and a US implementation will shortly be extended to include the ADS application. Interoperability of CPDLC will be performed when TES Build 2 is complete.

- Possible ATN demonstrator

  An ATN demonstrator, including realistic end-user interfaces, may be produced by the Eurocontrol Institute in Luxembourg, using TES software for the ATN upper layers and applications.

- Integration into ATC centres / simulators

  Investigations are under way into the integration of the TES pre-operational software with other experimental ATC systems and air and ground simulators. Candidates for these activities are the Upper Air Centre in Maastricht and the simulators at the Eurocontrol Experimental Centre in Brétigny-sur-Orge, near Paris. A feasibility study has also been performed into integration with the "Rapid Prototyping Facility" for controller workstations within Eurocontrol HQ.

- Trials and Experiments by Member States.

TES is being delivered to a number of Eurocontrol Member States for use in their own ATN trials and experiments.

5. CONCLUSIONS

The Eurocontrol TES software played a major role in CNS/ATM-1 package SARPs validation and continues to be important for ATN pre-operational trials and exploitation. It is available for free distribution to Eurocontrol Member States.

This paper has provided the Working Group with a brief update of the status of the TES implementation. Members are invited to contact the Eurocontrol ATN Project for further details and / or a demonstration.