Aeronautical Telecommunication Network Panel

Joint Working Group

Alexandria, 17-18 October 1996

ATN SARPs Defect Reporting and Configuration Management After ATNP/2

Draft ATNP/2 WP

Prepared and Presented by

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International Coordinating Council of Aerospace Industries Associations (ICCAIA)

Summary

Attached to this paper is a draft ATNP/2 Working Paper which proposes that an advanced method of configuration management be instituted by ICAO to support the long-term validation efforts which will be required for ATN and other complex SARPs.

Proposal

The JWG is invited to note that this paper is being submitted to ATNP/2.

Aeronautical Telecommunication Network Panel

Second Meeting

Montreal, 4 - 14 November 1996

Agenda Item 3: Development of the ATN SARPs

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Summary

The ATN SARPs will be subject to a significant amount of validation and correction after its acceptance by ATNP/2 in November 1996. True validation will not be complete until the first operational avionics and ground systems have been fielded for a reasonable period of time. A process for reporting and correcting defects, publishing SARPs corrections in a timely manner, and exchanging implementation lessons learned must be formally defined and explicitly implemented. Failure to provide this process will lead to informal and incomplete communication, non-interoperable work-arounds, and systems build deviant from the specifications.

The Panel is requested to develop a configuration management process, for adoption by ICAO, that will ensure that ATN and other complex SARPs can be kept current and accurate.

Background

Development of complex systems is never done perfectly the first time. ATN definitely qualifies as a complex system. The aircraft and avionics manufacturing community has found through long experience that a typical complex avionics system, such as the Flight Management Computer, normally requires a year or more from specification development to “Red Label on Dock”, another year of laboratory testing, and yet another six months of flight testing. Defects continue to be discovered throughout this time and even after the system is in operational service. Some of these are implementation defects and others are operational problems, where the environment is different from the designers’ assumptions.

While the Flight Management Computer is required to interface only with other airplane systems, the ATN will require inter-operation between systems, such as avionics and air traffic automation, procured by multiple organizations. The impact of ambiguous specifications and incorrect assumptions expands significantly in such a case.

Existing Configuration Management

The developers of the ATN Manual initiated a configuration control and defect reporting system to track proposed changes as the Manual was developed. This effort has continued to be refined in ATNP Working Group 2 to manage the configuration of the ATN draft SARPs Sub-Volume 5 as well as to track the validation activities for that Sub-Volume. The current process is described in WG2WP261, presented at the Brussels meeting of Working Group 2. The remaining SARPs Sub-Volumes were subject to less formal configuration control methods.

Significant characteristics of the Working Group 2 configuration control and defect reporting system are:

1. Identified defects are widely published, using an e-mail exploder, to allow many other experts to review and comment;
2. A formal voting process is conducted by an appointed Configuration Control Board on whether the identified defect is a valid correction of an error, a necessary improvement of the specification, or a proposed new feature that should not be added at the present time; and
3. The defect correction is made to the specification, with traceable change documentation.

There is currently no plan in place to continue these configuration management activities once the SARPs are formally adopted.

Validation and Lessons Learned

Validation is a means for generating defect reports. Validation planning, execution, and results are reported for the various Sub-Volumes at the respective ATNP Working Group meetings. This activity will need to be continued long after the ATNP/2 meeting as systems are implemented, first in prototype and eventually in operational systems.

Additional information at a level of detail beyond that found in the specifications will be required by the implementors. Such information will be generated as implementations are developed and problems are solved. This information needs to be discussed in an open forum and widely published, to ensure interoperability of all implementations. If the ATNP Working Groups continue to meet after ATNP/2 this may provide the near-term solution for documenting and discussing lessons learned.

Examples of Other Industry Forum Activities

The OSI community formed a series of Implementors Workshops to support information sharing. In North America, the Open Systems Environment (OSE) Implementors’ Workshop (OIW)

performs this function. The equivalent in Europe is the European Workshop for Open Systems (EWOS) and the Asia-Oceanic Workshop (AOW) performs this function for that part of the world. A series of Stable Implementors Agreements was published as a result of the combine efforts of these workshops. The workshops have transitioned from a formal meeting atmosphere to their current environment, which is heavily dependent on networked databases and e-mail. The lessons learned by that community and their current methodology would be instructive in helping the ATN community establish validation and implementation processes.

The International Telecommunication Union (ITU) has published a standard method for interchange of data among participants. This information exchange system, named ITUDOC, is described in Telecommunication Standardization Bureau (TSB) Circular 38. This process is similar to the archive service for working papers and draft SARPs provided by CENA to the ATN Panel Working Groups.

Configuration Management After ATNP/2

Many changes can be expected in all Sub-Volumes for a significant period of time. This is indicated by the amount of continuing modification of Sub-Volume 5 and its predecessor the ATN Manual, which have had many years of development. The remaining Sub-Volumes of the ATN have had significantly less time for development and therefore can be expected to be less mature than Sub-Volume 5. Therefore, a configuration control and defect reporting system is needed for all Sub-Volumes of the ATN SARPs. This system will need to be in place for a minimum of four years or until the defect rate has been reduced to a level that would allow a less active configuration control system to function. Such a system is required for SARPs other than the ATN, as well.

The details of this system need to be fully defined. The following characteristics should be considered:

1. All of the Sub-Volumes of the ATN SARPs need to be brought into the system;
2. A mail exploder is required, to continue the work of “atn-internet-technical” and the other mailing lists provided by the CENA server and described in WG2WP261;
3. A defect database must be maintained, with public access, to allow tracking of defect status by experts world-wide;
4. A Configuration Control Board must be established to continue the work of the current CCB, and
5. A means of sharing lessons learned during ATN validation and implementation must be established and maintained.

Recommendations

The Panel is requested to consider the above information and to develop a configuration management system for complex SARPs. Such a system would include:

- A method of reporting and correcting defects found during validation and implementation,
- A method of providing timely copies of corrections to the SARPs to all implementors, and
- A method for implementors to discuss and document interoperability details not covered in the SARPs.

Such a system should be used immediately for the ATN SARPs as a pilot effort and should be proposed to ANC for wider ICAO implementation.