ATNP Working Group 3

16th - 20th October 1995
Banff, Canada

Agenda Item 6: Air/Ground Applications SARPS

Stepped approach for A/G applications SARPS Validation

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Summary

This working paper presents a stepped approach strategy for the validation of the air/ground application SARPS.

Background

As mandated by the ATNP/WG3, Sub Group 2 has prepared SARPS material for the four air/ground data link applications foreseen in CNS/ATM - 1 Package. As part of the programme of their latest meeting, just prior to the WG3 meeting in Banff, the Sub Group reviewed the sequence of events which have to take place between the preparation of draft material, through validation, to full operational implementation.

Needs for validation

The SARPS material, for each application, as submitted to WG 3, is composed of 7 Sections, and at least two appendices. Each section of the SARPS has been carefully reviewed by the Sub Group on a line by line basis.

These reviews were aimed at tracking operational, technical and design defects, in order to facilitate, to the largest extent possible, the rapid validation of these applications, and hence speed up their implementation.

Although sections 1 through 6 are seen as being ready for validation, it appeared that for all applications, Section 7 (User Requirements) may be incomplete, since total capture of all the operational requirements has yet to be confirmed by the relevant national and international organisations. This may limit capability for a total validation in the short term.

The Sub Group appreciated that a thorough validation process has to be initiated as soon as possible in order to detect possible defects not revealed during the early review stages and preparation of the draft material. The Sub Group agreed a proposed multi-step validation strategy as outlined below. This strategy will allow a rapid identification of problems, provision of solutions through consultation with the Sub Group editors and expedite progress towards the next implementation step.

Multi-step validation

The multi step validation should be composed of 4 stages -

° Formal validation of protocols;

° Software requirement specification (Software Design);

° Implementation, and

° Application protocols validation tests

Formal validation of protocols

As a first step, a formal validation of the protocols used in the air/ground applications should be performed. It will demonstrate that the defined protocols have no locking states nor events not taken into account.

This step is necessary before any implementation of the protocols in the validation system.

If defects are found during this phase, they will have to be referred to the Sub Group 2 SARPS editors as part of the configuration control procedures.

Software requirement specifications (Software design)

The second step of the validation should be the development of a complete software requirement specification. This process will allow implementors to identify possible errors in :

a.   The way the requirements are presented,

b.   The way the requirements may be interpreted,

c.   Possible inconsistencies between different sections of the SARPS,

d.   Functionalities which are difficult to implement.

This step is necessary before any implementation of the protocols takes place.

Defects found during this step will have to be referred to the Sub Group 2 SARPS editors with a first indication of their severity (for example prevention of implementation, enhancement of technical capability or comprehensibility).

Depending on their severity, the defects will be considered as part of the configuration control procedure with the requesite urgency.

In order to facilitate the progress of validation, means should be put in hand to permit rapid access by any organisation engaged in the validation process to all related defect reports and replies.

Implementation

As a result of being confident with both the software specifications and design, and the SARPS they are derived from, the implementation phase should take place with a lower risk.

During this phase, very few defect reports are expected. However, any which do arise will have to be forwarded to the Sub Group to be taken into consideration as part of their validation support.

Application protocols Validation tests

Ater a validation system has been produced, it will be possible to run extensive validation tests on the application protocols and their interfaces with user applications.

As with the other steps, defect reports and their replies will have to be made available.

This system will be the basis for the final stage - the application user validation.

It is to be expected that several organisations will develop programs to validate the SARPS. Interoperability checks will have to be carried out to confirm a common understanding of the SARPS material.

Recommendation

It is recommended that organisations which are planning to undertake validation of the air-ground applications SARPS consider this multi step validation strategy as a means of achieving the early and efficient validation of the SARPs within the timescales defined by the ATNP.

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