Title: **The Application of AADL for Marine Control Systems**

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Abstract

For decades the critical importance of functions offered and ensured by electrical or software based systems has led to the development of new modeling languages, verification techniques, methods and tools for mastering their realization and their maintenance. This is particularly true for space and avionics domains.

The application of these techniques has allowed people to respect the certification constraints that are required for embedded systems. The increasing complexity of these software and systems require to work on architecture models and proceed to the verification activities at the earliest stages of the development life-cycle.

In this paper, we show how modeling tools and verification techniques that have been initially developed for aerospace can be applied on a DP system. DPS are affected by failures originating from various components. These failures must to be identified in the earlier stages of the design and development process; otherwise the cost incurred to make the necessary changes may be huge. Nowadays DPS are aimed to be secured, reliable and available at all time. Therefore it is essential to point out these failures as early as possible.

First, DPS modelling is proposed using AADL (Architecture Analysis and Description Language). AADL is an international standard issued by the SAE (Society of Automotive Engineering). This model is then used for RAMS Analysis (Reliability, Availability, Maintainability, Safety).

Thanks to an extension to the language, the Error Model Annex, AADL demonstrates the very interesting ability to describe formally failures of components and to study the propagation of errors. This language, these analyses and methods could be considered as the next step in terms of system analysis and assessment, system optimization and FMEA (Failure Modes and Effects Analysis), etc.