

**“A New Network Paradigm for the On-board
Reference Architecture”
(OSRA-NET)**

Final Presentation Abstract

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Final Presentation – Abstract

Title: “A New Network Paradigm for the On-board Architecture” (OSRA-NET)

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“A New Network Paradigm for the On-board Architecture” (OSRA-NET) is a TRP R&D study funded by ESA.

The study was led by Thales Alenia Space in France.

GMV (Spain), Teletel (Greece) and Bright Ascension (UK) participated as sub-contractors.

The main objective of the activity was to extend the concept of On-board Software Reference Architecture (OSRA) to new communication paradigms (such as those promoted by SpaceFibre, ARINC 664 Part 7 or TTEthernet) that emerged in the past few years so as to enable the implementation of a distributed On-Board Software Reference Architecture (OSRA-NET).

This required two major areas of work:

- the specification of the high-level communication system requirements for the OSRA;
- the definition of an extended OSRA methodology and process for the analysis of communication needs, so as to confirm the feasibility of an architecture design spread on multiple nodes, and possibly to refine such architectural design into OSRA components to proceed with automated code generation and implementation.

The OSRA Communication System Requirements specification was written after an extensive review of the communication needs of current and future avionics, which permitted to have a detailed understanding of communication needs for on-board devices (e.g., guaranteed delivery, determinism, max latency, jitter, etc...).

An impact analysis on current SAVOIR specifications, relevant standards and recommended practices was carried out.

A prototyping activity of the OSRA-NET methodology extended the OSRA toolchain, with extensions to the OSRA component model and its graphical model editor to permit specification of coarse-grain and fine-grain communication needs, so as to take them into account in the architectural specification of the system.

A software implementation of an ARINC 664 Part 7 stack over Spacewire was implemented.

The TASTE toolchain was extended accordingly.

The new integrated OSRA-NET toolchain permitted to exercise a small-scale yet representative case study on space-representative hardware (RASTA boards, Spacewire cables and 8x switch, an iSAFT PVS SpW EGSE).

The major outputs of this study, and in particular the OSRA Communication Requirements Specification, were reviewed by the SAVOIR-UNION Working Group, comprising members of ESA, CNES, DLR and prime industry.

The major lessons learnt of the study will be presented.