Impact of Distributed Multiprocessor Systems and xTratum

V. Lefftz[1], A. Crespo[2], M. Patte[2]
Astrium[1] / University Politecnica de Valencia[2]

The ESA Study SIDMS aims at understanding how to make the best use of future multi core processors while mitigating the risks due to software complexity inherent to their use.

We will start the presentation by listing the potential use of multi core architectures in the space domain. We will focus on two different applications, an integrated payload data processing and payload controller application, and an extended Integrated Modular Avionics application. We will then list for both these applications the software techniques we think should be used in order to get the best performance out of a multi core processor: lightweight hypervisor, Symmetric Multi Processing partitions and advanced I/O management.

We will then present the current status of the Xtratum hypervisor port on the Next Generation multipurpose Processor (NGMP) architecture, focusing the new functionalities dedicated to multi core processors. We will finish our presentation with an analysis of the strengths and weaknesses of the NGMP architecture both in terms of performance and time and space partitioning needs.