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16th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT (D3)
Novel Concepts and Technologies to Enable Future Building Blocks in Space Exploration and Development (3)

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ON-BOARD SPECTRUM ANALYSIS (SIGINT/COMINT) OR SAR ON-BOARD PROCESSING WITH FULL FLOATING POINT FFT-PROCESSING NOW READY FOR LIFT-OFF.

Abstract

For a long time, FFT-processing was avoided in on-board processing, due to the heavy load on general purpose processors. Nowadays there are several FFT-cores available, eg for the Virtex-5 Xilinx FPGA or independant FFT IPcores that can be installed on FPGAs, but most of them have lack of accuracy or are limited in FFT-size.

Especially spectrum analysis (e.g. for SIGINT/COMINT applications, but also optical spectrum analyzers such as a Michelson interferometer) or SAR processing require FFT-processing.

ESA developed the SkyFFT ASIC: a FFT-processing core, in radhard technology, at 100 Mega-complex-samples per second (approx 4 GFlops) with 32bits I and 32bits Q input samples. The EM-model that shows all capabilities at full performance is now ready for demonstration.

This paper will describe the capabilities of this ASIC, the design of the EM-model and the performance results.