Next Generation Digital Signal Processors for Space Applications

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Abstract

The need for processing power on spacecraft is increasing in many areas of space applications from earth observation to scientific missions. In particular in the payload area, where high processing power is an enabling technology for a range of future missions, there is a strong need for new, highly performant data processing systems. The currently available DSP technology is either outdated (like the highly successful but old 21020 DSP) or expensive (new ASIC developments). For alternative existing technologies there are access restrictions (ITAR) which cause added cost, risk, implementation delays, and commercial restrictions. In order to react to the needs of the European space community ESA has organized a round table on Next Generation Digital Signal Processors (NGDSP) at the ADCSS 2007 workshop. In collaboration with industry a number of development routes have been identified at the workshop which can lead to the availability of new high performance processing systems and components that satisfy the processing needs of future missions and payloads.

A summary of the present situation is provided, and the processing needs of some future mission candidates are presented. The development routes that have been identified at ADCSS 2007 are presented and explained. The ESA activities that have been started to address those development routes are introduced. The overall schedule for the development of performant DSP processor chips and payload data processing systems is presented, and the activities planned for the near future are explained. The issue of funding for future development activities is addressed, and the links to critical parallel technology developments are highlighted.