SPACEWIRE DRIVEN ARCHITECTURE FOR THE ASTRO-H SATELLITE

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Long Paper

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ABSTRACT

ASTRO-H is the 6th Japanese X-ray astronomy satellite, which is scheduled to be launched in 2014. The requirements for the satellite controlling units, such as of system management, telemetry-and-command handling and attitude controlling, are more complicated than for past scientific satellites. In addition to this, the satellite carries 4 different kinds of scientific payloads, X-ray micro calorimeter (SXS), X-ray CCD camera (SXI), hard X-ray imaging spectrometer (HXI) and soft gamma-ray detector (SGD), each of which has different type of sensor and on-board data processing scheme from others. They make the satellite structure complex and force

multiple companies to be deeply involved in the interface coordination, which usually introduces long negotiation, development and integration phases and lead the project to a cost-consuming way.

SpW motivated us to define a new system architecture to solve these problems, which is applicable not only to ASTRO-H but also to other projects. We thus build up a new standard that defines network protocol, router, the standard computer architecture and the standard I/O module, which are constructed on the SpW standards and can be implemented by multiple companies. In addition to them, we also defined a handling scheme of the CCSDS Space Packet on the network.

In parallel to the standard definition process, we organized a SpW user community with other JAXA satellite projects, which works as the technical forum among the standard developers, component developers and users.