Development of Next-generation Space-Grade Processors, SOI-SOC series

by Mr. Takanori Narita (Mitsubishi Heavy Industries, ltd)

Mitsubishi Heavy Industries have been working on space-grade system-on-chip processors, SOI-SOC series, in partnership with JAXA. The first product is SOI-SOC2 which is flight-proven in ASTRO-H and ERG satellites, etc.

And now, increasing demands for high-speed/high-reliability communication in spacecraft applications, we have been developing SOI-SOC3. SOI-SOC3 is a product that aimed to improve the SpaceWire function based on SOI-SOC2. It has a high-reliability SpaceWire engine, supporting upcoming SpaceWire standards for deterministic data delivery (SpaceWire-D), and reliable data transfer service (SpaceWire-R). Since our developed SpaceWire engine are mainly performed on hardware, SOI-SOC3 has achieved high accuracy scheduling and high performance with improved CPU load.

Based on these experiences, we have currently been developing SOI-SOCX simultaneously with SOI-SOC3. SOI-SOCX targets innovative space missions and Dual-Use markets. Based on the needs from such missions and markets, SOI-SOCX will have renewed semiconductor process and CPU architecture from SOI-SOC2/3, realizing higher processing speed and world¿s top-class power efficiency.

In this presentation, we introduce the overview and current status of our products.

Co-Authors:

Masaki Kusano (Mitsubishi Heavy Industries, ltd)

Naohisa Anabuki (Mitsubishi Heavy Industries, ltd)

Shigeru Ishii (Mitsubishi Heavy Industries, ltd)

Kazunori Masukawa (Mitsubishi Heavy Industries, ltd)

Yoshikatsu Kuroda (Mitsubishi Heavy Industries, ltd)

Seisuke Fukuda (Japan Aerospace Exploration Agency)

Tadayuki Takahashi (Japan Aerospace Exploration Agency)

Keiichi Matsuzaki (Japan Aerospace Exploration Agency)

Takayuki Ishida (Japan Aerospace Exploration Agency)

Kazuyuki Hirose (Japan Aerospace Exploration Agency)

Osamu Kawasaki (Japan Aerospace Exploration Agency)

Yuya Kakehashi (Japan Aerospace Exploration Agency)

Masaharu Nomachi (Osaka University)

Hiroaki Takada (Nagoya University)

Mitsutaka Takada (Nagoya University)