

21st IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Generic Technologies for Small/Micro Platforms (6A)

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INTEGRATED AND STANDARDIZED SYSTEM ARCHITECTURE FOR SMALL STANDARD
SATELLITE BUS**Abstract**

In recent years, offering opportunities for access to space and future space utilization with low-cost and short-term delivery are requested by desires to own a satellite from emerging nations, by government-led needs of a test bed for the demonstration of new space technology, as well as by growing commercial satellite imagery businesses. In order to fulfill the expectations above, 100 kg-class satellite bus competitive in the world market (named SERVIS-3; the third verification satellite of the Space Environment Reliability Verification Integrated System) is being developed by the Japan Space Systems (J-spacesystems) and NEC Corporation (NEC) under the Ministry of Economy, Trade and Industry (METI). The development of SERVIS-3 is based on the concepts of (1) ensuring high proportion of payload mass to total satellite mass, (2) promoting effective use of commercial-off-the-shelf (COTS) components, and (3) pursuing advanced system architecture. This paper focuses on “integration” and “standardization” of satellite bus system architecture as concrete methods for the concept (3) above. The “integration” is intended to reach minimum optimal scale of the bus system for this class of satellites, which will make it smaller, lower cost, and make a contribution to reducing launch costs. The “standardization” is intended to simplify design of the satellite system, payload interface and checkout of them, which will shorten periods of the design and integration of them, and surely reduce recurring costs. Combining the “integration” and the “standardization”, J-spacesystems and NEC are aiming for the realization of the satellite system with low-cost and short-term delivery. System architecture and equipment design are proceeding with the development of the integrated system in which the number of equipment and interconnecting wiring between them are minimized on the basis of SpaceWire network. They are also proceeding with the development of the standardized system in which the satellite bus has scalability to be adjusted to possible mission specific requirements and includes payload interface function typical of these kinds of small satellites as standard equipment so as to minimize the need for mission-specific design or accommodations.