

RAPID INTEGRATION ARCHITECTURE (RIA) FOR FRACTIONATED SATELLITES

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AAC Microtec provides a modular, open, and easy to use Plug-and-Play spacecraft bus and satellite portfolio with close match to the specifics of DARPA F6 needs. AAC's Rapid Integration Architecture (RIA) systems and components have been developed to comply with Space Plug-and-Play Avionics (SPA) in a collaboration between US Air Force Research Laboratory (AFRL) and the Swedish Armed Forces and integrated on the world's first fully Plug-and-Play satellite (V1-QuadSatPnP) due for launch from India in 2012. AAC is using the Utah State University/Space Dynamics Laboratory developed Satellite Data Model (SDM) and Satellite Systems Manager (SSM) as the onboard plug-and-play manager software engines.

AFRL has chosen to utilize payload slots on V1-QuadSatPnP to demonstrate a plug-and-play NASA Tracking Data and Relay System (TDRS) software defined radio and a plug-and-play space weather monitoring Langmuir Probe.

AAC has integrated a wide range of modules into its rapid spacecraft prototyping development kits, including avionics computers, applique sensor interface modules (ASIM/RTU), distributed plug-and-play compatible power modules, star trackers, mass memories, gyros, magnetometers, high resolution cameras, etc. In addition, AAC Microtec has developed world class 3D wafer level microelectronic packaging based on a proprietary thru-silicon-via (TSV) technology (XiVIA™) which enables previously unmatched performance in small satellites.

AAC's RIA enabled platforms are being considered for use on world class space radio astronomy science missions with passive formation flying requirements featuring chip scale atomic clocks for high accuracy formation positioning and high bandwidth intersatellite communication.

AAC has recently under a joint Research and Development agreement between NASA and the Swedish National Space Board trained NASA Ames Research Center (ARC) staff and provided NASA with development kits. ARC will under the agreement evaluate AAC's unique RIA concept and carry out in-space validation through collaboration with US universities.

In October 2011, AAC demonstrated the capability of running its RIA plug-and-play system on low cost Android powered cellphones which enables utilization over the full range from low cost satellites to advanced radhard microsatellites.