Orion Integrated Modular Avionics (IMA)

Honeywell

Fifth Generation Avionics for Space

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Background

As an innovator and leading supplier of advanced avionics systems, Honeywell brings a host proven technologies, design and integration services to our aerospace customers. Honeywell's Avionics group now provides its decades of expertise in both terrestrial aviation and manned space flight to extend the proven revolution of integrated modular avionics or Orion and NASA's future space exploration.

Reducing Risk

As flight systems have matured over time, they have also become more complex, with multiple, competing systems being tasked with an ever broadening range of requirements. The natural progress of that evolution has let to system comprises and complicated interconnections of boxes and busses.

Honeywell's integrated modular avionics, or IMA architecture brings fresh thinking to avionics systems by specifying flexible hardware components tied together with intelligent software and middleware. Combined with robust development and testing tools, the IMA architecture brings an unprecedented level of simplicity, reliability, flexibility, scalability, and openness to a wide range of avionics challenges, from vehicles to autonomous communications applications. In addition, the efficiency of the IMA architecture results in dramatically shorter development schedules and reduced costs.

Mission Success

Much more than a collection of boxes, IMA represents a revolutionary way of thinking about how avionics "should" be, and Honeywell continues to prove the validity and reliability of IMA with over 40 million hours of operation on civilian and military jets.

IMA employs a variety of architectures, processes and technologies to modularize the hardware and software, which leads to both commonality and scalability. Our IMA time and space partitioning guarantees adequate resources for each process with no chance of interference between processes. By driving all operations from tables and mapping all available memory, modifications are both simple and reliable, eliminating the need to recertify entire builds when only discrete functions are updated. And to speed coding and debugging, IMA includes a full suite of coordinated system-level tools.

The Orion integrated modular avionics from Honeywell is the culmination of over a billion dollars in research and development, with applications from launch vehicles to monitoring and control of systems, including autonomous robotics operations. The result is a system that is powerful, flexible, reliable, efficient, and open.

Proven Results

Honeywell avionics have been on 70% of all U.S. spacecraft and we have flown on every manned U.S. space flight and no mission has ever been compromised by a failure in one of our systems. From X-15 to ISS, Honeywell avionics have delivered safe, solid performance. IMA's proven performance on multiple aviation platforms, from business jets to the C-5 Galaxy, establishes a base for success. Implementing IMA on the 777ER, Honeywell realized these improvements compared to previous avionics implementation:

- 20% less software development
- 50% lower software life cycle costs
- 50% reduction in SWaP

Honeywell's Orion Avionics include:

- Vehicle Management Computer (VMC)
- Orion Inertial Measurement Unit (OIMU)
- Baro Altimeter Unit (BALT)
- Hand Controllers
- Display Isolation System
- GPS Receiver (GPSR)
- Orion Core Navigation
- Display Units
- Time Triggered Deterministic Ethernet (TT-GbE network)

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