



UH-60V Black Hawk Integrated Mission Equipment Package

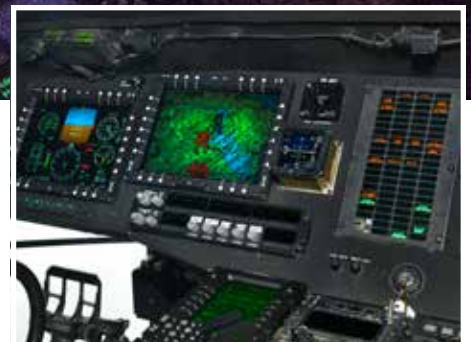
Northrop Grumman is the digital cockpit avionics developer for the U.S. Army's UH-60V program, which replaces analog gauges in UH-60L helicopters with electronic instrument displays. The upgraded helicopter will replicate the UH-60M pilot-vehicle interface and improve interoperability. The solution extends the life and mission capabilities of the UH-60 platform.

Additional benefits of Northrop Grumman's scalable, fully integrated avionics equipment package include

enhanced pilot situational awareness and mission safety, decreased workload and life cycle cost, and a common training environment.

Northrop Grumman's UH-60V avionics offer:

- Mature and proven, low-risk technology that has already been proven through an Army-validated flight demonstration on a UH-60L helicopter
- Centralized processor with a partitioned operational flight program and an integrated architecture that



- efficiently enables capability insertion through software-only upgrades
- Unprecedented flexibility with a design developed in alignment with the Future Airborne Capability Environment (FACE™) standard, supporting modularity and portability of software applications
 - DO-178C certifiable Model-based software engineering that increases the development speed while reducing the software development schedule and cost

- Redundant multi-core processor FlightPro™ Gen III mission computers manufactured by Northrop Grumman, providing excess processing power for ease of growth
- Dual redundancy of mission-critical equipment
- State-of-the-art video input and output flexibility to allow near- and far-term integration of imaging information, including compatibility with both digital and legacy video formats
- Integrated multi-sensor navigation solutions that provide data to a Federal Aviation Administration-certifiable flight management system compliant with TSO-C115b, which is then expanded to integrate the required embedded global positioning/inertial navigation capability.

Growth Capabilities

Our avionics system, which is aligned with the FACE™ standard, supports integration of off-the-shelf software and hardware. This enables rapid insertion of capabilities while reducing cost and risk for system integration and upgrades.

Additionally, key to our growth capability is an ARINC-653 partitioned software design that provides greater efficiency in the qualification of new and modified software.

Our use of non-proprietary, industry-standard interfaces and logical, functional partitioning will give the customer flexibility for future growth.

Compliance with Federal Aviation Administration Requirements

Northrop Grumman's Communications, Navigation, Surveillance and Air Traffic Management design already meets Global Air Traffic Management standards for 2020 and beyond.



Embracing Open Standards

Our avionics solution's architecture embraces open standards. We have based the data bus architecture on our extensive use of open standard buses, which allow interaction with a wide variety of devices without requiring proprietary interface designs. The redundant Ethernet backbone is primarily for high data rate synchronization communications by the FlightPro™ Gen III mission computers, control display units, advanced data transfer system and improved data modem, with redundant Ethernet switches provided for fault tolerance. The system is designed with four independently redundant MIL-STD-1553B buses — two for the digital

cockpit and two spares for future growth. The standard interfaces, design documentation, and excess capacity allows third-party development of existing and new modules.

Our Expertise

Our approach for the design and implementation of the UH-60V integrated avionics package is based on our experience with similar upgrades for the U.S. Marine Corps AH-1Z and UH-1Y helicopters and U.S. Navy E-2D Advanced Hawkeye programs.

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ES-DSEA-15-00949
ePROCS: 14-1867
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