

U.S. Air Force C-5 Fleet To Gain Advanced Capabilities As Lockheed Martin Begins Avionics Upgrade Installations

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Lockheed Martin began field installation of Avionics Modernization Program (AMP) kits into the U.S. Air Force's fleet of C-5 Galaxy strategic airlifters on June 4. The first aircraft is a C-5B flown by crews from both the 436th Airlift Wing and the Reserve Associate 512th Airlift Wing here. The Air Force plans to modify all 112 aircraft in the C-5 fleet over the next several years.

"The induction of this first aircraft marks a major program milestone, shifting from development to production," said June Shrewsbury, Lockheed Martin's vice president of Strategic Airlift. "We have successfully followed a structured development and testing plan over the past five years to reach this point. The combination of hardware and software in AMP provides an eight-fold improvement in avionics reliability while allowing Air Force crews to fly their C-5s unrestricted anywhere in the world."

AMP replaces the legacy analog cockpit instruments and systems in the C-5 with digital displays and equipment. It also provides the necessary communications and navigational avionics to comply with Global Air Traffic Management (GATM) requirements, the new set of international standards for aircraft movement and reduced separation in flight. Non-compliant aircraft will be forced to take longer, less efficient routes across the ocean.

Each AMP kit consists of seven Honeywell 6-inch by 8-inch flat panel, color, liquid crystal displays, with six for the pilot and copilot and one on the flight engineer's panel. These displays produce little heat and are fully readable in sunlight. It also includes a Honeywell embedded global positioning/inertial navigation system. Rockwell Collins multimode receivers provide a communications suite that adds satellite communications and a high frequency datalink. Safety and crew situational awareness is increased by an enhanced ground proximity warning system and a collision avoidance system.

A contract field team will perform the AMP kit installation, which is expected to take 110 calendar days for the first aircraft. The span time is expected to be reduced to 60 calendar days on later aircraft. A second C-5B will be inducted into the AMP modification process later this summer, and when it is complete, the Air Force will use that aircraft to conduct operational test and evaluation of the AMP hardware and software later this year.

Flight testing of Block 2.2, the last of four major AMP software builds, is scheduled to run through August. The Block 2.2 software, which represents the final 9 percent of the total amount of software code needed for AMP, provides additional capability to the C-5's digital automatic flight control and flight management systems, and adds a more precise capability to measuring vertical separation for GATM compliance. Initial AMP software testing began in December 2002.

A number of hardware and software items overlap AMP and the second half of the C-5 modernization effort, the Reliability Enhancement and Reengining Program (RERP). Capabilities that will be needed specifically for RERP, such as an interface between the aircraft's mission computer and the full authority digital engine controller on the General Electric CF6 engine that will be installed, were included as part of the AMP software development effort to lower total development costs.

Once installation of the AMP kit is complete in the first aircraft, it will be flown to Lockheed Martin's facility in Marietta, Ga., where it will then become the first aircraft to undergo the RERP modifications. Both the C-5A and C-5B aircraft previously modified for the AMP test program will also receive the RERP modifications. First flight of the RERP aircraft is scheduled for October 2005. The RERP test program is expected to last until 2007.

In addition to the new engines, the RERP modification effort will also include more than 70 improvements to the aircraft's electrical, fuel, hydraulic, flight control and environmental control systems, as well as upgrades to the aircraft's structure and landing gear. These enhancements

include replacing old components with new or technologically updated components. Aircraft that have received both the AMP and RERP modifications will be redesignated C-5M.

Lockheed Martin Aeronautics Co., a business area of Lockheed Martin, is a leader in the design, research and development, systems integration, production and support of advanced military aircraft and related technologies. Its customers include the military services of the United States and allied countries throughout the world. Products include the F-16, F/A-22, F-35 JSF, F-117, C-5, C-130, C-130J, P-3, S-3 and U-2. The company produces major components for the F-2 fighter, and is a co-developer of the C-27J tactical transport and T-50 advanced jet trainer.

Headquartered in Bethesda, Md., Lockheed Martin employs about 130,000 people worldwide and is principally engaged in the research, design, development, manufacture and integration of advanced technology systems, products and services. The corporation reported 2003 sales of \$31.8 billion.

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