

Flight Testing Under Way Of Important Third Block Of C-5 Avionics Modernization Program Software

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Lockheed Martin and the U.S. Air Force have begun flight testing the latest block of software developed for the C-5 Avionics Modernization Program (AMP). Testing began on Dec. 12 with a 4.8-hour flight from the company's facility here in an upgraded C-5B. Called Block 2.1, this is the third of four major software builds in the modernization program. It alone represents one third of the total amount of software code to be developed for AMP. More than 90 percent of the code to be developed for AMP is now in flight test.

"Block 2.1 brings a significant increase in functionality to the C-5's new digital avionics suite," said June Shrewsbury, Lockheed Martin's vice president of Strategic Airlift. "We have a structured plan in place where each new software block builds on what was accomplished previously. When we are done, the combination of hardware and software in AMP will allow Air Force crews to fly unrestricted anywhere in the world."

AMP replaces the 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.

The Block 2.1 software, in addition to providing additional capability to the C-5's digital automatic flight control and flight management systems, adds the communications and navigation software necessary for basic GATM compliance.

A combined US Air Force and Lockheed Martin crew is scheduled to make a total of 19 flights from Dobbins ARB for Block 2.1 testing. The C-5B test aircraft is the same used for both the Block 1.1 and 1.2 test programs that concluded earlier this year. A modified C-5A that was first flown in the Block 1.2 test program also will be used during Block 2.1 testing.

The test program for Block 1.1, which was specifically limited in capability and provided the crew with the basic ability to aviate, navigate and communicate, was completed on March 7 after 10 flights and 44.8 flight hours. Block 1.1 accounted for 55 percent of the required AMP source lines of code. Flight testing of the Block 1.2 software, which provided additional capability, was completed on Sept. 10. Fifteen flights totaling 71 hours were made with 11 flights totaling 46.9 hours coming in the C-5B test aircraft, and four flights for 24.1 hours coming in the modified C-5A.

To handle software and hardware integration issues, Lockheed Martin has built a system integration laboratory that contains a hot mockup unit with the cockpit electronic boxes, the avionics interface units and the cockpit displays. Company and Air Force pilots are using a simulator with a 200-degree visual system as a development tool, helping engineers to find and potentially solve anomalies in the software as it is developed.

A number of developmental items overlap AMP and the second half of the C-5 modernization effort, the Reliability Enhancement and Re-engining Program (RERP). Capabilities that will be needed later specifically for RERP, such as an interface with the full-authority digital engine controller on the General Electric CF6 engine that will be installed on the C-5, are being included as part of the AMP software development effort now to lower total development costs.

Block 2.2 is the final block of AMP software to be developed. Containing roughly nine percent of the necessary source code, Block 2.2 is now in bench test and should be ready for flight by early 2004. Air Force operational test and evaluation of AMP is scheduled to begin in the third quarter of next year.

Earlier this year, Lockheed Martin was awarded a \$20.3 million contract for the first eight AMP production kits. Once in production, it will take approximately two months to modify each aircraft.

Fleet-wide AMP installation is expected to be complete in 2007.

Lockheed Martin Aeronautics Co., a business area of Lockheed Martin, is a leader in the design, 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, T-50, C-5, C-27J, C-130, C-130J, P-3, S-3 and U-2.

Headquartered in Bethesda, Md., Lockheed Martin Corp. 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 2002 sales of \$26.6 billion.

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