Lockheed Martin Test Flies Composite Aircraft

Source: Lockheed Martin

PALMDALE, CA -- On Tuesday, June 2, Lockheed Martin (NYSE: LMT) and the Air Force Research Lab (AFRL) successfully conducted the initial demonstration flight of the Advanced Composite Cargo

Aircraft (ACCA). This flight marks the final and most significant milestone of Phase II of AFRL's ACCA program, in which Lockheed Martin replaced the mid/aft fuselage and empennage of a Dornier 328J aircraft with an advanced composite structure.

"Yesterday was one of those perfect days where I get to be the first to fly a new aircraft and everything goes as planned. The aircraft was a real pleasure to fly and we experienced no issues," said Rob Rowe, Lockheed Martin test pilot.

ACCA took off to the east from USAF Plant 42 at 6:55 a.m. The aircraft then banked west and climbed to an altitude of approximately 10,000 feet where the two-pilot crew took the vehicle through a series of airspeed and stability and control tests. These tests are important to understand how the composite cargo aircraft performs at varying speeds, attitudes, and altitudes. This data will be used as a baseline for future tests.

"Historically aircraft cost has been determined by the size and weight of the vehicle. With ACCA we are proving that while size does matter, it isn't the final determination of aircraft cost," said Frank Mauro, vice president of Advanced System Development, Lockheed Martin. "ACCA is an important step in proving that composite technologies are real game changers in reducing design and manufacturing costs along with extending life and reducing maintenance costs over

traditional metallic aircraft structures."

The road to this first flight started over a decade ago with industry and government laboratories collaborating in the AFRL-led Composites Affordability Initiative (CAI), a series of critical development steps in both materials and manufacturing technologies designed to mature dramatic, cost-saving processes.

Out-of-autoclave curing of large, unitized and co-bonded structures minimizes part count and mechanical fasteners. The "ripple effect" of this approach spreads across every aspect of airframe production expense. Tooling, raw material, fabrication man-hours, quality control and floor space utilization efficiency are just a few of the factors that combine to create a compounding effect on cost when applied in a holistic manner. ACCA is the "capstone" test of integrating these CAI principles all the way from conceptual design through certification and flight.

"This successful flight is the culmination of years of teamwork between government and industry labs involving hundreds of dedicated researchers across the country," said Barth Shenk, Air Force Research Lab's ACCA program manager. "This has the potential to change aircraft manufacturing as we presently know it, for the better."

"NASA Dryden Flight Research Center and AVCRAFT (Myrtle Beach, SC) have been lynchpin partners in our program's success," Shenk said. "NASA's expertise in experimental flight test programs helped us streamline our test preparations and AVCRAFT (the domestic maintainer of the Dornier 328J) provided critical support on the aircraft subsystems so that Lockheed Martin could focus on the structural design, fabrication and integration issues."

Upcoming test activity will focus on establishing the flight envelope of the ACCA to baseline its flight performance and validate predicted structural performance. Accurate prediction of structural behavior in the flight environment is a key step in establishing the eligibility of the technologies for transition into future programs so that the cost savings ACCA has demonstrated can be realized.