Aircraft And Automobiles Thrive In Hurricane-Force 'Winds' At Lockheed Martin

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Hundreds of aircraft and automobiles have survived wind speeds of up to 200 miles per hour and emerged not only unscathed but actually safer and better for the experience. Those wind speeds were not due to a Category 5 hurricane. They were simulated in the Lockheed Martin Low Speed Wind Tunnel, which today hosted a celebration to mark its 100,000th test hour.

The 100,000-hour milestone further marks the Low Speed Wind Tunnel as one of the premier test centers of its kind in the country. Located at Lockheed Martin's Marietta, Ga., facility, the LSWT tests large-scale aircraft models and full-scale automobiles and race cars at wind speeds of up to 200 mph. The Marietta wind tunnel, opened in 1967, is one of only five tunnels in the United States that can accommodate large scale aircraft models. It is also one of only two wind tunnels that tests both government and commercial vehicles on a regular basis.

"The importance of wind tunnel testing in developing aircraft cannot be understated. Basically, every aircraft ever built, including the Wright Flyer, has been tested in a wind tunnel," said Tom Blakely, vice president of Engineering for Lockheed Martin Aeronautics Company. "Wind tunnel testing gives a remarkably good understanding of how a new aircraft will perform in actual flight. Over the last 20 years, tunnel testing has also become an increasingly important part of automobile, truck, and race car development."

The first automotive test came on Oct. 11, 1968, when Chrysler (now Daimler-Chrysler) brought a Dodge Racing car in for testing. Since then, more than 57,000 test hours have been run on all types of wheeled vehicles, including passenger cars, stock cars, dragsters, open wheel race cars, and trucks. Ford, General Motors, Nissan, Harley-Davidson, and NASCAR have all tested vehicles in the Low Speed Wind Tunnel. In 2002, 34 of the 43 cars that started at the Daytona 500 NASCAR race were tested in Marietta. NASCAR regularly impounds the top-finishing cars after a race and brings them to the Marietta wind tunnel to ensure the cars are within specifications.

The first aircraft test came on Sept. 20, 1967, when a crew egress test was conducted on a model of the C-5A Galaxy strategic transport. In 2002, models of the new engines and pylons for the C-5 under the Reliability Enhancement and Re-engining Program were first tested in the tunnel. The first real C-5 modernized with new engines, pylons, and more than 70 other improvements is expected to be flown from Lockheed Martin's Marietta facility early next year.

More than 15 aircraft types have recorded at least 100 test hours, with seven aircraft types recording more than 1,000 test hours. The three F-35 Joint Strike Fighter variants -- conventional takeoff, short takeoff/vertical landing, and Naval -- have logged 10,262 hours so far, surpassing totals from the C-130 Hercules transport (6,341), and F/A-22 Raptor air dominance fighter (2,774), which are ranked second and third on the total test hour list. First flight of the first F-35 is expected next year. The wind tunnel has also tested aircraft from other manufacturers in addition to Lockheed Martin.

The relatively low speeds produced in the LSWT are especially useful for testing aircraft in the approach to landing and post-takeoff flight regimes. High yaw testing and stores separation tests, such as weapons or external fuel tanks released from an aircraft, are other areas where the wind tunnel has proven especially beneficial in aircraft testing.

A number of other subjects, such as satellite dish antennas, lighting fixtures, parachutes and aircraft defensive systems, have been tested in the wind tunnel's 16-by-23 foot main test section. Although the Low Speed Wind Tunnel has been opened for 38 years, nearly three-quarters of the 100,000 test hours have come since 1980.

The Low Speed Wind Tunnel is a closed loop system, nearly 370 feet long and more than 75 feet wide. The air is moved through the loop by a 39-foot diameter fan powered by a 4,160 volt, 9,000 horsepower motor, which turns the fan at a maximum of 250 revolutions per minute.

Updated continuously over the years, the Low Speed Wind Tunnel now features a digital data acquisition system; large-screen liquid crystal and plasma displays in the control room that allow more data to be displayed as the tests progress; better cooling to maintain a constant temperature and pressure, which allows for more accurate data collection; and an improved data reduction system.

Lockheed Martin Background

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 2004 sales of $35.5 billion.

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