



Marine One

THE SYSTEMS INTEGRATION LABORATORIES FOR AMERICAN PRESIDENT BARACK OBAMA'S HELICOPTER ARE NOW FULLY CAPABLE AT A NAVY BASE IN MARYLAND

BY CHRISTOPHER HOUNSFIELD

On November 4, 2008, Barack Obama defeated John McCain in a historic victory in the Presidential general election, and just three weeks later his newest ground-breaking helicopter, the VH-71 (designated 'Marine One'), attained full function capability in all the systems integration laboratories that support the Presidential Helicopter Program, after completing the Master Systems Bench (MSB) located at Naval Air Station Patuxent River in Maryland.

The NAS Patuxent River MSB, part of the Systems Integration Laboratory (SIL), contains all the aircraft avionic systems installed in a full-scale VH-71A cockpit and rear cabin, with out-the-window visual displays and aircraft simulation allowing full mission scenarios to be 'flown' while on the ground. This enables test pilots and engineers to conduct valuable training, perform system analysis, and debug problems on the ground.

"Having a fully capable laboratory at the Navy's Presidential Helicopter Support Facility is a huge plus in optimizing flight test time," Jeff Bantle, Lockheed Martin vice president and general manager of the VH-71 program, explained at the time. "Ground testing provides big cost and time savings for the program, because it reserves air time and fuel for airworthiness tests and certifications."

The aircraft-like MSB complements the avionics-based Systems Integration Bench at the

same location, which was completed in February 2008. An identical SIL at Lockheed Martin in Owego, New York, allows avionics engineers to develop and test the next version of software used in the helicopter's mission and communications systems. The advanced communications system of the presidential communications suite allows secure and non-secure communications between the helicopter and personnel at locations such as the White House, the Pentagon, and other ground and mobile platforms.

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Pressing forward

George W. Bush was still firmly ensconced in the White House when the third VH-71 helicopter built for the Presidential Helicopter Program, Test Vehicle 3 (TV-3), arrived in the USA in the middle of 2008. It was the first VH-71 to receive final assembly and mission systems integration at Lockheed Martin Systems Integration in Owego, New York.

The industry team installed and integrated the test helicopter with the advanced mission systems that will enable the VH-71 to be used by the President as a command and control platform. As a mission ready aircraft, TV-3 will be able to validate systems' in-flight performance, complementing what has previously only been evaluated in laboratories. Once mission ready, TV-3 will join the other two test vehicles, TV-2 and TV-5, already in flight testing. Including TV-1, a leased asset which will complete its required testing in May 2008, the program has accumulated almost 700 total hours of flight test. TV-4, the final test aircraft of the program's first increment of helicopters, made its initial flight on March 19, 2008, and will arrive at NAS Patuxent River in April 2009.



US Marine Corps pilots test the cockpit controls in a mock up of the new VH-71 presidential helicopter



A Lockheed Martin employee tests the avionics in a cockpit and cabin reproduction of the VH-71 Presidential helicopter. The simulator is part of the systems integration laboratory, and allows avionics engineers to test the mission systems that will be installed onto the helicopter

It was just a month after the election that the first production VH-71 presidential replacement helicopter arrived at the Naval Air Station transported by a US Air Force C-17 cargo plane from manufacturer AgustaWestland. The helicopter, pilot production one (PP-1), underwent two months of ground vibration testing before flying to prime contractor Lockheed Martin Systems Integration in Owego, New York, for installation of the mission systems, communications suite, and presidential interior and exterior livery.

"This is a watershed event in the execution of this program," said Bantle. "It's the fifth VH-71 helicopter to join the program, and an important milestone because it's the first of five

pilot production aircraft to go into testing. These pilot production aircraft will be delivered to the HMX-1 squadron after completion of a comprehensive test program for operational use as 'Marine One' helicopters for the President."

"The first production Presidential helicopter demonstrates the success of a proven platform transformed into the most capable and safe helicopter for the Presidential mission," added Stephen C. Moss, CEO of AgustaWestland North America. "PP-1's performance was superb during the initial test and evaluation, with 11.3 hours of ground runs and 6.6 flight hours, and we look forward to the VH-71 entering service." Four test aircraft are already part of the VH-71 Presidential Helicopter

"TV-3 is the first of two mission test vehicles that will test the Presidential Communication Suite. It's urgent that we press forward with this much-needed operational requirement to replace the aging VH-3D and VH-60N," said Captain Donald Gaddis, Presidential Helicopters program manager. "With attention focused on the Increment Two restructure and the FY09 budget request, let's not forget that Increment 1 Test and Evaluation is well underway. We have three helicopters on the flight schedule conducting fuel system, satellite communications, and high-powered FM Radio testing, with tail-rotor and flight-load survey testing on the horizon."

Lockheed Martin Systems Integration – Owego, USA is the prime contractor and systems integrator for the VH-71 program, with overall responsibility for the program and aircraft integration systems. AgustaWestland, the principal subcontractor to Lockheed Martin, has responsibility for the basic air vehicle design, production build, and basic air vehicle support functions.

Program's first phase, or Increment One. Two of these test helicopters are in flight testing with an integrated test team, made up of Navy, Marine Corps and industry pilots, and the other two are being integrated with mission systems. Four more pilot production helicopters are expected to arrive over the next six months.

Currently, two Increment One test aircraft are conducting flight testing with the US Navy, and the other two are undergoing integration of mission systems at the Lockheed Martin facility. Three Increment One production aircraft have also been delivered, and the first, as a production-representative aircraft, recently completed ground vibration testing, and will undergo another testing period after its mission-systems integration. "All three, plus the two remaining Increment One aircraft completing build, will undergo mission-systems integration at Lockheed Martin, as well as VIP cabin outfitting and presidential paint livery," says Monica Hallman, head of communications for Lockheed Martin Systems Integration.

With all three laboratories fully operational, the labs at Lockheed Martin and AgustaWestland are primarily used for software development. The Navy-located SIL is used to evaluate the integration and performance of the individual subsystems currently in flight test, enabling the integrated test-team engineers and operators to reduce the number of flight-test hours needed on the test vehicles, saving both time and money.

The VH-71 is based on the US101 helicopter, a variant of AgustaWestland's successful AW-101 multimission helicopter. The replacement cost of the fleet was estimated at US\$6.1 billion when contracts were signed in 2005. Then, as of March 2008, the cost of the new 28-helicopter fleet was projected to be US\$11.2 billion, about US\$400 million per helicopter. ■