

AT-3 Owl Wing and Bomb Bay Launched UAS

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Acuity Aerospace introduced its AT-3 Owl Wing and Bomb Bay Launched (WBBL) Unmanned Air System at AUVSI 2008. The vehicle is designed to be launched from the wing or torpedo bay of the P-3 Orion maritime patrol aircraft and its successor, the P-8 Poseidon. The AT-3 was displayed in the NAVAIR booth along with several other prototype air-launched vehicles.

The AT-3 is a multi-mission UAS, capable of launching from a manned aircraft in flight, establishing a control and data link with a P-3 or other STANAG 4586-compliant station, deploying 5 A-size or 10 G-size sonobuoys, acquiring and transmitting sensor data, video and high quality still EO/IR images, and landing at a remote location.

The Owl carries up to 200 lb in its 41 by 15 inch payload bay. Fuel capacity is 61 lb, or 261 lb fuel may be carried for very long (30+ hour) reconnaissance missions. It is designed for maximum payload with low stored drag and has the same frontal area as the larger P-3 stores but much lower weight. A

nose mounted camera head provides EO capabilities for all missions. The payload bay with plug-in racks allows combinations of payload and additional fuel. Fiberglass and carbon construction and an efficient heavy fuel engine result in long endurance, long range capability. The Owl employs a variable sweep wing which is swept back over the aft fuselage for wing and bomb bay carriage, and adjusts after launch and in flight to the changing c.g. location as fuel is used and sensors deployed.

One advantage of a universal WBBL UAS with modular interchangeable payloads is that the bomb racks are standardized throughout the P-3 and other aircraft communities, propagating cost and time savings through consolidation of efforts, and reduction of redundant technology. While there are currently commercial off-the-shelf electro-optical systems, cameras, receivers, and transmitters small enough to fit into the WBBL UAS application, there are no small tactical UAS vehicles designed to be launched from a wing or bomb bay currently in use. Since the Owl can be carried on and launched from a standard 14 inch bomb rack, other platforms can also make use of the UAS. Current and future platforms using this rack include the P-3C, the P-8A Poseidon and the SH-60B/F and MH-60R helicopters.

One significant area of technology development is the propulsion system for the AT-3. The 15 inch ducted fan Acuity is developing has demonstrated over 100 lb of thrust to date. The engine selected is the heavy fuel version of the AR-741 produced by UAV Engines Limited of Great Britain. This heavy fuel engine is in the late stages of development. Current work is being conducted with the gasoline version of the engine, and Acuity is conducting ongoing discussions with UEL and tracking their heavy fuel engine work.

The P-3 and other ASW / ASUW aircraft currently perform sonobuoy deployment and EO/IR/MAD surveillance directly from the manned aircraft. For each point of surveillance, a full aircrew is required. Sonobuoys are dropped from the P-3 directly, and no alternative exists for deploying them at a significant distance from the P-3 and receiving their short range data transmissions. The costs for multiple manned aircraft operations include direct expenses as well as risk to aircrews and equipment. The result is that reconnaissance is often limited by the number of manned aircraft available, rather than the number of locations of interest.

The Navy needs to extend the operations of its limited quantity of maritime patrol aircraft and enhance patrol effectiveness for diverse missions while increasing crew safety and reducing fatigue, according to Robert Clark, Acuity's president. Intelligence collection required of patrol aircraft is increasing, and risk to aircraft and crew from unpredictable threats is growing. During the transition to the P-8, aircraft and crew availability will be in flux, and the P-8 is less suited to low altitude operations than the P-3 and other propeller aircraft. To address these challenges effectively, NAVAIR initiated the Wing and Bomb Bay Launched UAV program in January 2005 with expected integration into the Fleet in 2012.

The AT-3 Owl is a cost-effective way to add to the unique mission capability associated with P-3 operations. If incorporated into each of these aircraft, a load-out of wing and bomb bay launched UASs with interchangeable payloads, e.g. sonobuoys, IR, MAD, or miniature SAR sensors, can be locally launched and controlled by the on-board sensor operators. This will not only enhance sensory capability, but also in effect allow the aircraft to operate in several areas at the same time due to the UAS's ability to detect/confirm contact data and relay information to the airborne crew without forcing the aircraft to leave station.

Founded in 1992, Acuity develops new unmanned aircraft designs and brings unmanned aerial systems to production-ready reliability through rapid design cycles and early prototyping and testing. Acuity is also creating imaging systems and software for video based terrain reconstruction,

navigation, and three dimensional shape and indoor environment capture. By combining these technologies, Acuity is developing new navigation capabilities for UASs, including navigation in GPS-denied situations, low-level terrain and structure avoidance, and waypoint and target matching.