



AeroVironment, Inc. Unmanned Aircraft Systems Overview

Background

[AeroVironment](#) (“AV”) is a technology company with a 40-year history of practical innovation in the fields of unmanned aircraft systems (UAS) and electric vehicles (EVs). Founded by serial innovator Dr. Paul MacCready, the creator of the world’s first human powered airplane and one of Time Magazine’s “Greatest Minds of the 20th Century”, AV has established numerous world records and has seven of its vehicles in the Smithsonian Institution. Today AV is the world’s leading supplier of hand-launched UAS for tactical ISR, and is developing entirely new UAS solutions designed to provide compelling new advantages to military and non-military customers.

Unmanned Aircraft Systems Overview

With over 20 years of experience developing, supplying and supporting small UAS, AV is the prime contractor and sole supplier to all U.S. Department of Defense (DoD)



Raven SUAS - the World’s Most Prolific

programs of record for this category of UAS and has delivered more than 15,000 new and replacement air vehicles to customers in the U.S. and elsewhere. AV’s family of small UAS includes [Raven](#)®, [Wasp](#)™ and [Puma](#)™. These backpackable/man portable, hand-launched unmanned aircraft systems are carried and used by armed forces -- who frequently operate across large geographic areas, often far removed from their bases and dependent mainly on what they can carry in their packs or vehicles – and deliver front-line, real-time situational awareness to increase combat effectiveness and force protection. By transmitting live, streaming video directly to a common, hand-held Ground Control System with an embedded color monitor, AV’s UAS provide real-time information that help U.S. and allied armed forces operate more



safely and effectively in situations where knowing what lies beyond the next hill or building saves lives.

Product	Customers	Weight	Nominal Endurance	Payload
Raven B®	US Army, Marines, Air Force, USSOCOM	4.2 lbs.	90 min.	EO or IR video sensors
Wasp™	US Air Force, Marines	1 lb.	45 min	EO and IR video sensors
Puma AE™	USSOCOM	13 lbs.	120 min.	Higher resolution EO and IR video sensors

Ground Control System

AV's [Ground Control System](#) provides a common command and control solution for the company's family of small UAS. Small, lightweight, and combat proven, the Ground Control System displays real-time video from the air vehicle's payload cameras to personnel on the ground. In addition, it allows the operator to capture screen images, store and play back data for target assessment, and facilitates real-time re-transmission of video and metadata to an operations network.



Common Ground Control System

When embedded at remote locations, the Ground Control System also can be operated as a remote video terminal, enabling command centers or monitoring stations with the same viewing and analysis capability of the UAS operator. It is compact and portable, taking up only a portion of a small backpack, and can be assembled in less than two minutes.



Digital Communications Architecture

New Raven systems now come equipped with a [Digital Data Link™](#) developed by AV. With digital Raven systems users can operate up to 10 times as many air vehicles in the same geographic area as compared to the analog systems they replace. Digital Raven systems also permit beyond line-of-sight

"UAV operators saw people placing improvised explosive devices on the side of a nearby road... They called in the report, and within a short amount of time a response team was on-scene to check out the situation. Just knowing the fact that we have the power to save lives is a great benefit to working with the Raven."

operation, the creation of an ad-hoc wireless data network for the battlefield (turning the Raven into a “miniature communications satellite”) and secure communications. AV is currently developing digital Puma and Wasp systems with the objective of creating a truly interoperable, digitally-enabled family of small UAS.

UAS Training Services

AV provides training courses to AV’s customers for a wide range of small UAS applications and tactical situations. Courses are designed to give students a comprehensive understanding of the selected UAS solution, including safety, operational proficiency, aircraft maintenance and air space management, that when applied “in theater” will enable them to accomplish their mission objectives.

UAS Logistics Services

AV’s UAS Logistics operation ensures mission success by providing quality products and logistics support anywhere in the world. AV’s UAS logistics support solutions include planning, upgrades, UAS spares and repair services. Support also is provided in the areas of technical expertise, material management, supply chain management and military and commercial logistics.



UAS In Development

AV is a technology innovator focused on solving important customer problems with new, practical solutions. In addition to a growing product line supporting demand for UAS solutions, AV cultivates a robust pipeline of new solutions under development to drive growth.

Switchblade™

One of the most dramatic capabilities in development at AV is the [Switchblade airborne munition](#). Switchblade adds a lethal strike component to small UAS, creating an entirely new capability of loitering precision munitions.

The backpackable, battery-powered Switchblade is launched from a tube, unfolds its tandem wings and sends back streaming video from an EO sensor. The operator designates a target on the AV Ground Control System when it is detected and the Switchblade becomes a weapon – autonomously guiding itself onto the target, exploding the small warhead with high precision and low probability for collateral damage.



**Switchblade Loitering Airborne
Munition**

Switchblade can rapidly provide a powerful, but expendable backpackable flying intelligence, surveillance and reconnaissance package on a beyond-line-of-sight target within minutes. The vehicle's small size and quiet motor make it difficult to detect, recognize and track even at very close range. The Switchblade is fully scalable and can be launched from a variety of air and ground platforms.



Global Observer™

AV currently is developing [Global Observer](#), which represents a new category of UAS – able to provide stratospheric global persistence with no latitude restrictions. In August 2010 AV announced that aircraft #1001 had successfully completed its maiden flight at Edwards Air Force Base.

Global Observer's unique combination of both extreme flight duration and stratospheric operating altitude is designed to deliver advantages in cost, capacity, coverage, flexibility and reliability that make it a compelling complement to existing satellite, aerial and terrestrial assets.

Global Observer is in-development under a government-funded joint capability



Global Observer #1001 at Edwards AFB

technology demonstration (JCTD). The purpose of the program is to create and exploit the ability to fly in the stratosphere for up to a week at a time providing affordable persistence for remote sensing and communication relay that does not exist

today. Reaching stratospheric altitudes of 55,000 to 65,000 feet, this revolutionary system with a 175-foot wingspan will carry approximately 400 pounds of payload, including EO and IR sensors and communications relay equipment.

This groundbreaking UAS uses a specially developed internal combustion engine that burns hydrogen to generate electricity to power four efficient electric propeller drive units and all aircraft and payload systems. The Global Observer system, consisting of at least two aircraft trading positions over a designated geographic area, is designed to provide continuous coverage at a significantly lower cost than available alternatives.



This persistent capability will address the coverage seams associated with conventional aircraft and satellites.