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ScanEagle® Unmanned Aircraft System

Description and Purpose:

The ScanEagle® Unmanned Aircraft System (UAS) is a product of Insitu, a wholly owned subsidiary of The Boeing Company.

ScanEagle is a low-cost, long-endurance autonomous UAS that provides persistent day and night intelligence, surveillance and reconnaissance (ISR) for a variety of government and civilian applications from close-support locations, mobile vehicles and small ships. The 10-foot wingspan aircraft is launched autonomously via a catapult launcher and the system's patented no-nets runway-independent retrieval solution, SkyHook, catches the aircraft by its wingtip with a rope that hangs from a 50-foot-high boom.



Operators command preprogrammed or operator-initiated missions, while global positioning system and an onboard flight computer guide the aircraft. ScanEagle can remain covert and on station for more than 24 hours, and it can be optimized for more than 30-hours endurance.

System design is modular. This results in a reliable, adaptable system. Operations and maintenance are simplified, and field upgrade kits rapidly deliver new capabilities to existing operations.

Background:

ScanEagle has provided over seven years of uninterrupted service to U.S. Department of Defense customers. It first deployed in theater under a services contract with the U.S. Marine Corps in 2004, and with the U.S. Navy in 2005.

ScanEagle typically flies in extreme environments, carrying an electro-optic or infrared imager in a gyro-stabilized turret. It can be reconfigured quickly in the field with a variety of options, from a midwave infrared imager to custom communications relay payloads. The avionics bay as well as optional configurations like the blind nose or additional mid bay, allow for a variety of custom configurations.

The prototype ScanEagle Unmanned Aircraft System (UAS) was developed and built under a 15-month agreement with The Boeing Company that began in February, 2002. Production, research and development continued under a long-term contract between Insitu and Boeing that began in July 2003.

Dozens of new technologies and upgrades for the ScanEagle system have been fielded in response to the warfighter's needs. The 2006 introduction of the heavy fuel engine improved logistics and safe as well as system performance. The 2007 introduction of the hush engine reduced acoustic signature. The 2009 introduction of the midwave infrared imager improved imagery, especially at night and in adverse weather condition; and the 2009 introduction of the high-power launcher improved performance at high altitudes, in low-density air.

Other improvements have included the altitude encoding transponder to deconflict airspace with other air traffic, an improved video transmitter systems, ROVER remote video terminal interoperability, improved in-flight fuel measurement systems, automatic identification system (AIS) data reception capabilities for beyond-the-horizon sensing, and compliance with NATO Standardization Agreement (STANAG) 4586 specifications.

Today, at any given time, an average of 22 ScanEagle aircraft are in-flight globally.

Program History:

2011

As part of Operation Unified Protector, ScanEagle is operated organically aboard USS Mahan (DDG-72), performing cooperatively with a host of U.S. and NATO Forces in their mission to protect civilians and reduce the flow of arms to Libya. ScanEagle is credited with locating a host of contacts of interest due to its ability to capture superior image quality and to operate covertly at relatively low altitudes.

Newest narrowband communications relay from Boeing is successfully demonstrated on ScanEagle. The relay was designed to meet the needs of small distributed forces operating in areas where line-of-sight communications are not possible. *(August)*

Boeing demonstrates *swarm* reconnaissance with the successful autonomous communications and operation of dissimilar UAS in flight tests that used two ScanEagle aircraft and one Procerus Unicorn from The Johns Hopkins University Applied Physics Laboratory (JHU/APL). The aircraft communicated using a Mobile Ad Hoc Network developed by Boeing Phantom Works and swarm technology developed by JHU/APL. *(July)*

ScanEagle accrues 500,000 combat flight hours faster than any other small tactical UAS. *(July)*

Insitu Pacific achieves 25,000 operational flight hours of ScanEagle UAS services with the Australian Army in Afghanistan. *(June)*

Naval Air Systems Command (NAVAIR) awards \$83.7 million contract to Insitu to provide the U.S. Navy with operations and maintenance services in support of government-owned ScanEagle UAS. *(May)*

Insitu donates historic ScanEagle unmanned aircraft to Canada Aviation and Space Museum. The aircraft flew 2,000 flight hours supporting the missions of Canadian and allied forces before it was retired in April, 2010. *(May)*

ScanEagle achieves 25,000 combat flight hours in support of Canadian Forces in Iraq and Afghanistan. *(May)*

Australian Defence Magazine awards Insitu Pacific, in concert with Army Aviation Systems Program Office (AASPO) Unmanned Air Vehicle Management Unit, the *Team of the Year Award* for their collaborative efforts delivering ScanEagle UAS services to the Australian Army in Australia and Afghanistan. *(February)*

2010

Insitu Pacific operates ScanEagle in the first successful civilian trials of see-and-avoid technology in the Smart Skies initiative in Western Australia. *(October)*

Insitu signs its first European customer, receiving a \$7.2 million contract to deliver 10 ScanEagle UAS to Poland over the next 12 months. *(September)*

Insitu Pacific operates the ScanEagle UAS as part of the Murdoch University Cetacean Research Unit effort to determine if UAS are a cost-effective, capable alternative to fixed-wing, manned aircraft for surveying marine mammals. The study focuses on detecting dugongs and humpback whales in Western Australia. *(September)*

Insitu Pacific collaborates with Sentient Vision Systems (Australia). Sentient's Kestrel is deployed on ScanEagle for automatic target detection and tracking of objects that are easily missed by the human eye, and for live analysis of ScanEagle imagery from the battlefield into both the tactical operations center and remote video terminal. *(September)*

ScanEagle logs 350,000 combat flight hours. *(August)*

Boeing demonstrates full control of the ScanEagle unmanned aircraft system by an airborne command and control (C2) platform—a NATO Airborne Warning and Control System (AWACS) aircraft—during an operational scenario at Empire Challenge 2010. *(July-August)*

Insitu's ScanEagle unmanned aircraft system is selected by U.S. Air Force Academy to train cadets. *(June)*

Two ScanEagle unmanned aircraft and associated ground equipment are donated as part of Insitu's cooperative research and development agreement with the FAA's William J. Hughes Technical Center and the New Jersey Air National Guard to study unmanned aircraft systems and address their integration into the national airspace system. *(June)*

ScanEagle logs 17,000 combat flight hours with Canadian Forces *(May)*

ScanEagle conducts damage assessment and aids in relief efforts as part of U.S. Northern Command, Joint Task Force Alaska's Arctic Edge 2010 earthquake scenario training exercise at the University of Alaska's Poker Flat Research Range. *(April)*

Insitu successfully demonstrates interoperability between ScanEagle video with metadata and the U.S. Army's One System Remote Video Terminal (OSRVT).

The demonstration to U.S. Army personnel is conducted at Fort Rucker, Ala. in conjunction with the Joint Systems Integration Laboratory (JSIL). It is the first UAS demonstration at Fort Rucker in six years. *(March)*

ScanEagle accounts for 22 percent of the total 550,000 hours that the Office of the Secretary of Defense estimates unmanned aircraft fly annually supporting combat missions for the U.S. armed services. *(March)*

ScanEagle conducts aerial flood plain surveillance of the Red River along the North Dakota/Minnesota border. The effort, which included an FAA certificate of authorization to operate, is part of research into the effectiveness of using unmanned aircraft in U.S. airspace. *(March)*

The NanoSAR payload module is released for the dual bay configuration of ScanEagle. This small, synthetic-aperture radar payload provides high-resolution imagery that can penetrate adverse weather conditions, battlefield obscurants, camouflage and light foliage, allowing radar-enabled area searches over land and sea. *(February)*

Electronic fuel injection is successfully flight-tested on the heavy fuel engine equipped ScanEagle, providing overall improvements—especially in extreme temperatures and at high altitudes, including mountainous terrain. *(January)*

2009

The Insitu ScanEagle UAS wins the 2nd Annual C4ISR Journal Top 5 Award in the platform category. The award is a coveted distinction within the ISR industry and intelligence community conferred by the *C4ISR Journal*, a publication of the Army Times Publishing Company. *(October)*

ScanEagle is provided to the University of North Dakota (UND) for use in the nation's first program to offer a Bachelor of Science in Aeronautics Unmanned Aircraft Systems Operations. *(October)*

The heavy fuel engine (HFE) equipped ScanEagle surpasses 2,500 combat flight hours and 300 shipboard sorties flying aboard U.S. Navy ships more than 11 hours daily. *(August)*

In Alaska, intelligence from ScanEagle is used to track the progression of fires and hot spots of a 440,000-acre complex of fires. Infrared sensors identify the edge of the fires, improving the accuracy of fire maps. *(August)*

ScanEagle operated by the University of Alaska receives an emergency certificate of authority (COA) from the Federal Aviation Administration to fly in civil airspace with an unmanned aircraft beyond line-of-sight. Insitu's ScanEagle is the first entity other than NASA or the Department of Defense to receive this COA. *(August)*

ScanEagle participates in the U.S. Navy's Talisman Saber 2009 exercise, demonstrating that a submarine can control a ScanEagle UAS launched from land. *(July)*

Insitu delivers 1,000th ScanEagle UA. *(July)*

Month-long ScanEagle operations are conducted by University of Alaska Fairbanks for NOAA Fisheries Service to search for ice seals at the southern edge of the Bering Sea. The imagery is used to estimate the abundance and distribution of ice seals. *(May)*

Boeing receives a contract from U.S. Special Operations Command (SOCOM) for ISR services using the ScanEagle UAS. The contract has a potential value of \$250 million. Under the new agreement, Boeing and Insitu will operate, maintain, and support ScanEagle systems for the Special Operations Forces Mid-Endurance Unmanned Aircraft System (MEUAS) program for the next five years. *(May)*

The Canadian Government awards Insitu a US \$30 million contract to continue providing small unmanned aerial vehicle (SUAV) services to support the Canadian Forces' ISR operations in Afghanistan. The award comes after ScanEagle successfully proves itself on the battlefield in support of Canadian troops in Afghanistan under the interim contract. The new contract includes in-theater flight operations, on-demand payload reconfiguration and aircraft maintenance. *(April)*

2008

Canada awards Boeing a \$14 million interim contract to provide ScanEagle services including launch, recovery, maintenance, service support, and training. *(August)*

2007

Boeing is awarded a 3.5-year, \$18 million U.S. Marine Corps contract to provide additional ScanEagle ISR support services to the Marine Expeditionary Forces. The contract, awarded by the Marine Corps Systems Command in Quantico, Va., includes options for additional support that could increase the contract value to \$381.5 million. *(July)*

Boeing Defence Australia is awarded \$20 million to provide ISR services to the Australian Army in Afghanistan. Throughout the six-month agreement, Boeing Defence Australia works closely with the Australian Army to provide vital surveillance and reconnaissance capabilities for Australian and coalition forces in Afghanistan. The level of ScanEagle services provides a significantly higher operational tempo than those previously provided for the Army's Overwatch Battle Group in Iraq. *(June)*

Boeing announces its first contract with the U.S. Air Force for a ground situational awareness toolkit integrated with ScanEagle and a ShotSpotter[®] gunfire detection and location system to support anti-sniper missions. *(January)*

Boeing Defence Australia is awarded a contract to provide ISR services to the Australia Army using ScanEagle in Iraq. The services provided by ScanEagle are

used in southern Iraq by Australian soldiers operating with the Overwatch Battle Group (West) -2 in Operation Catalyst. *(January)*

2006

The ScanEagle team logs the longest continuous flight to date by flying a ScanEagle with a heavy fuel engine for 28 hours and 44 minutes, completing the flight with a 4-hour fuel reserve. *(November)*

2005

U.S. Navy awards Boeing a \$13 million contract modification for ScanEagle system support of high-speed vessels and an afloat staging base.

ScanEagle supports the U.K. Ministry of Defence's Joint UAS Experimentation Programme. Controlled from a Royal Navy ship off the coast of Scotland, ScanEagle is launched from land then handed over to the ship-based control station operator. *(September)*

Boeing receives a \$14.5 million service contract from the U.S. Navy for UAS services in support of Operation Iraqi Freedom and the Global War on Terror. Boeing provides ScanEagle unmanned aircraft, communication links, and ground equipment for Naval Expeditionary Strike Group and oil platform security in the Persian Gulf. *(April)*

2004

Boeing signs a service contract with the U.S. Marine Corps for two ScanEagle mobile deployment units for the First Marine Expeditionary Force in Iraq. *(June)*

General Characteristics:

Length	4.5 ft	1.37 m
Wing Span	10.2 ft	3.11 m
Empty Structure Weight	28.8 lbs	13.1 kg
Max Takeoff Weight	44.0 lbs	20.0 kg
Max Horizontal Speed	80 knots	41 m/sec
Cruise Speed	48 knots	25 m/sec
Service Ceiling	19,500 ft	5,944 m
Endurance		24+ hours
Launch	Pneumatic Catapult	
Recovery	Skyhook Wingtip Capture	

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