



## ScanEagle<sup>®</sup> Unmanned Aircraft Systems

### About

ScanEagle<sup>®</sup> unmanned aircraft systems (UAS) are a product of Insitu Pacific, a wholly owned subsidiary of The Boeing Company. ScanEagle is a cost-effective, long-endurance autonomous UAS that provides persistent daytime and nighttime intelligence, surveillance and reconnaissance (ISR) for a variety of government and civilian applications. The aircraft is launched autonomously via a catapult launcher, and the system's patented no-nets, runway-independent retrieval solution, SkyHook<sup>®</sup>, catches the aircraft by its wing tip with a rope that hangs from a 50-foot-high boom. ScanEagle can remain covert and on station for 18-plus hours.

### Background

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

ScanEagle first deployed in-theater under a services contract with the U.S. Marine Corps in 2004. Since that time, coalition forces in the Middle East have used the ScanEagle UAS to collect actionable ISR with 99 percent availability, 24/7.

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 mid-wave infrared imager to custom communications relay payloads. The avionics bay, as well as optional configurations such as the blind nose or additional mid-bay, allow for a variety of custom configurations.

Dozens of new technologies and upgrades for the ScanEagle system have been fielded to serve civilian and defense operations: the heavy fuel engine has led to better logistics, safety and system performance while the hush engine has reduced acoustic signature; the mid-wave infrared imager improved imagery, especially at night and in adverse weather conditions; and the recently released Compact Mark 4 Launcher is extending the aircraft's maritime capabilities by providing a small-

footprint ground support option. Today, at any given time, an average of 17 ScanEagle aircraft are in flight globally.

## Features and Specifications

### Performance

- Endurance: 24+ hours
- Ceiling: 19,50 ft / 5,950 m
- Max horizontal speed: 80 knots / 41 m/s
- Cruise speed: 50-60 knots / 25.7-30.9 m/s

### System features

- Engine: gasoline or heavy fuel (JP-5 or JP-8)
- Power: 60W available for payloads
- Navigation: autonomous GPS
- Launch: pneumatic catapult
- Recovery: SkyHook® wing tip capture

### Dimensions

- Wingspan: 10.2 ft / 3.11 m
- Length: 5.1-5.6 ft / 1.55-1.71 m

### Weights

- Empty structure weight: 30.9-39.68 lb / 14-18 kg
- Max takeoff weight: 48.5 lb / 22 kg

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## Program history

### 2013

ScanEagle receives restricted category type certification for commercial operations from the FAA, making it the first-ever unmanned aircraft certified for commercial beyond-line-of-site operations. The event marks a fundamental milestone in the planned integration of unmanned aircraft systems (UAS) into national airspace by 2015. *(July)*

Insitu Pacific, delivers a ScanEagle Unmanned Aircraft System (UAS) to its partner Mitsubishi Heavy Industries (MHI) of Japan. This delivery means that

the ScanEagle UAS is now ready for operational use by the Japanese Ground Self Defence Forces (JGSDF). *(May)*

## 2012

Insitu Pacific announces the successful integration of the McQ iScout Unattended Ground Sensor (UGS) into the ScanEagle UAS. The integration extends ScanEagle's capabilities in complex surveillance scenarios. *(October)*

Insitu Pacific donates historic ScanEagle aircraft to The Museum of Flight in Seattle. The UA was part of the highly publicized 2009 rescue mission that freed Captain Richard Phillips, who was being held hostage by Somali pirates. *(October)*

The Netherlands customer is authorized to fly ScanEagle under a limited military aircraft type-classification certificate from the Military Aviation Authority of the Netherlands. *(August)*

ScanEagle flies new turrets for multi-mission sorties. MWIR/EO turret brings multi-mission sorties to small tactical UAS, and SuperEO turret sees wide-area and close-up simultaneously. *(August)*

Insitu Pacific signs contract to deliver ScanEagle to Mitsubishi Heavy Industries Ltd. for comprehensive operational evaluation by the Japanese Ground Self-Defense Force. *(July)*

Insitu Pacific expands its existing Australian Defence Force contract with the Australian Army to include provision of ScanEagle services for trials with the Royal Australian Navy. *(July)*

Insitu Pacific awarded contract to provide ScanEagle to the Republic of Singapore Navy. *(July)*

Insitu Pacific will employ its ScanEagle on behalf of the Queensland Government for the Department of Agriculture, Fisheries and Forestry for the first Siam weed detection trials using UAS. *(June)*

ScanEagle exceeds 600,000 combat flight hours, maintaining a 99 percent mission-readiness rate. *(June)*

ScanEagle completes its first hydrogen-powered fuel cell flight during a 2.5-hour flight test. *(April)*

Insitu Pacific signs contract to deliver ScanEagle to Composites Technology Research Malaysia. *(April)*

Insitu Pacific signs contract to deliver ScanEagle to the Netherlands to provide ISR for the Ministry of Defense. *(March)*

## 2011

As part of Operation Unified Protector, ScanEagle is operated organically aboard USS Mahan (DDG-72), performing cooperatively with 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 operate covertly at relatively low altitudes. *(August)*

The 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 achieves 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 awards an \$83.7 million contract to Insitu Pacific to provide the U.S. Navy with operations and maintenance services in support of government-owned ScanEagle UAS. *(May)*

Insitu Pacific donates historic ScanEagle unmanned aircraft to the 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 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 Pacific 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 from 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 aircraft — during an operational scenario at Empire Challenge 2010. *(July–August)*

The U.S. Air Force Academy selects the ScanEagle UAS to train cadets. *(June)*

Two ScanEagle unmanned aircraft and associated ground equipment are donated as part of Insitu Pacific's cooperative research and development agreement with the FAA's William J. Hughes Technical Center and the New Jersey Air National Guard to study UAS 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 Pacific successfully demonstrates interoperability between ScanEagle video with metadata and the U.S. Army's One System Remote Video Terminal. The demonstration to U.S. Army personnel is conducted at Fort Rucker, Ala., in conjunction with the Joint Systems Integration Laboratory. 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 Forces. *(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)*

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 Pacific ScanEagle UAS wins the second 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 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-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 in a 440,000-acre complex of fires. Infrared sensors identify the edge of the fires, improving the accuracy of fire maps. *(August)*

A 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 Pacific'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 Pacific delivers the 1,000th ScanEagle UAS. *(July)*

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

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

The Canadian government awards Insitu Pacific a U.S. \$30 million contract to continue providing small, unmanned aerial vehicle 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)*

ScanEagle contributes to the rescue of a ship captain held hostage. *(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<sup>®</sup> gunfire detection and location system to support anti-sniper missions. *(January)*

Boeing Defence Australia is awarded a contract to provide ISR services to the Australian Army using ScanEagle in Iraq. Australian soldiers operating with the Overwatch Battle Group (West) -2 use ScanEagle services in southern Iraq 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 four-hour fuel reserve. *(November)*

## **2005**

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

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 and 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 UAS, communication links and ground equipment for Naval Expeditionary Strike Group and oil platform security in the Persian Gulf. *(April)*

## **2004**

ScanEagle deploys to Iraq with the U.S. Marine Corps First Marine Expeditionary Force. *(July)*

ScanEagle demonstrates the ability to provide persistent ISR data during the U.S. Joint Forces Command's "Forward Look III" exercise at Cherry Point, N.C. (with Boeing's Shadow and Predator). The exercise was designed to improve interoperability among multiple UAVs in operational scenarios. *(June)*

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)*

ScanEagle's predecessor, SeaScan, completes its first autonomous flight on a moving ship with perfect launch and recovery. *(April)*

ScanEagle achieves an altitude of more than 19,300 feet. *(March)*

## **2003**

ScanEagle demonstrates communications relay with enhanced position locating and reporting system. *(November)*

ScanEagles demonstrate ability to fly together, or swarm. *(August)*

ScanEagle participates in U.S. Navy's "Giant Shadow" exercise, designed to test how a network of forces working with a UAV could collect and implement ISR. *(January)*

## **2002**

Insitu Pacific and Boeing partner and begin ScanEagle development. *(February)*

## **2001**

SeaScan, the prototype for ScanEagle, is developed for the commercial fishing industry.