ScanEagle Overview

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ScanEagle Value

Boeing and Insitu in Partnership

Real-time Actionable Intelligence to the Warfighter
ScanEagle Unmanned Aircraft System
The ScanEagle Unmanned Aircraft System
- USMC -

Command, Control, Comms (C3) Subsystem

Air Vehicle Subsystem: number of air vehicles dependent on customer specific circumstances

Mission Area/Sensor Payload Subsystem

Ground Control Station (GCS): mission planning, air vehicle control, mission area/sensor payload control

Ground Support Subsystem

Pneumatic Launcher

Skyhook Recovery

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ScanEagle EO Unmanned Air Vehicle

Wingspan: 10 ft
Length: 4 ft
Diameter: 7 in
Max Gross Weight: 44 lbs
Max Container Dim: 7 x 2 x 1.5 ft
Max Container Wgt: 112 lbs
Max Level Speed: 75 kts
Cruise @ max wt: 48 kts
Ceiling @ max wt: 19,500 ft
Endurance: >20 hours
Four Key Hardware Differentiators

**Flexible Basing with Catapult & Near Vertical Landing**

**Smallest UAV with Inertially Stabilized EO/IR Turret System**

**Smallest UAV With Expansion Slots & Tight Integration**

**Demonstrated**

20 hrs endurance on < 2 gal gas increases mission flexibility while decreasing logistics footprint

**Modular Engine Change**
Sensor Turret System

- Electro-Optical Camera
  - Streaming color video
  - 25:1 Optical Zoom
  - Image Stabilization

- Infrared Camera
  - Uncooled
  - Long-Wavelength
  - 18 deg FOV
  - 30 Frames per Second
  - Image Stabilization
Stabilized Camera System

Stabilized Video Camera System
11:1 at 2000 ft

Wide Angle FoV at 2000 ft
• Flight path control not operator flight control
  – Automatic Launch and Recovery
  – Pre-flight and In flight mission planning
    • Waypoints, orbits, object tracking, etc.
  – Automatic and Manual Control modes for the sensor to meet ISR requirements

• Data Exploitation Suite based on Sarnoff’s TerraSight system

• Data dissemination through various standard formats
  – Video with synched metadata
  – Snapshots
  – Cursor-on-target
Communication

• Command and Control Link
  – 900MHz or 1.3GHz available

• Video Downlink
  – Analog video on 2.4GHz

• Long Range Antenna
  – 1.8m Circular Polarized Dish
  – 50-100KM Effective Range
  – Ship & land versions

• Mode 3/C transponder on UAV

• Forward Eyes Remote Video Terminal
  – Receives Video and metadata downlink directly from UAV
    • Approx 5 - 10 Km
    • Omni directional antenna
  – Includes standard GCS software for image exploitation

• Rover III compatibility
  – L-band antenna on UAV for direct analog video downlink to Rover III or other remote video terminals
Launch and Recovery

- **SkyHook concept**
  - Differential GPS / RTK on recovery
  - Autonomous recovery

- **Small Footprint**
  - Launcher and Skyhook Eliminate Need for Runway
  - Small Manpower Needs
  - Ground control handoff allows hub and spoke operations for further reduction in footprint

- **Shipboard compatible**
  - USN L-class ships
  - 53-ft fishing boat

- **Transportable**
  - 2 HMMVWs with trailers
ScanEagle partnered with Boeing Support Systems to implement adaptable Sustainment Data System
- Systems configuration tracking; Managing maintenance activity; operator/maintainer proficiency; deployment anomalies

Insitu uses pieces of the system to “birth” each production system
- Working to better integrate with Insitu’s toolsets easier data tracking
Boeing’s ScanEagle School
Clovis, NM

• ScanEagle partnered with Boeing Aerospace Operations (BAO)
  – First class graduated in mid 2006
  – First International students graduated in fall 2006
  – First US military students in class now for GSAT program

• Clovis Community College
  – Military friendly & supportive environment
  – Facilities to practice “equipment handling” w/o impact to Flt Ops
  – Opening all facilities to students

• Cannon AFB / Melrose Range
  – Support for active duty personnel
  – MOA allows range time scheduled one week in advance
  – Tanks, vehicles, TELs, etc available for both optical and IR spotting
  – Ability to handle classified equipment and info
ScanEagle and the GWOT
An Operationally Mature System

USMC
- USMC I-MEF / II-MEF >23K Combat Hours in OIF (since Jul 04)
- Filling the USMC Tier II Requirement Gap

USN
- >7,000 GWOT at Sea Hours/>500 sorties
- USS CLEVELAND / ESG-1: completed
- GOPLAT - North Arabian Gulf: extend to 9/07
- USS OAK HILL (LSD-51): completed
- USS TRENTON (LPD-14): completed
- HIGH SPEED VESSEL (HSV-1): completed
- USNS STOCKHAM (T-AK-3017): at sea
- USS SAIPAN (LHA-2): completed
- USS ASHLAND (LSD-48): at sea
- USS CARTER HALL (LSD-50): install starting
- USS WHIDBEY ISLAND (LSD-41): install 7/07
- USS FORT MCHENRY (LSD-43): install 7/07

Pending Deployments / Other Ops
- USN – USS Carter Hall Jan ’07, USS Whidbey Island and USS Fort McHenry Jul ’07, HSV-X2 and DDG TBD under consideration
- USAF – 820 Security Forces
- Numerous Military Exercises
- Australians with ScanEagle now in Iraq
ScanEagle USMC Summary

• >22,000 operational hours in support of OIF

• Hub / Spoke Concept
  – Hub handles launch/recovery/maintainence
  – Handoff of Aircraft and sensor control to forward bases

• ScanEagle has become embedded in the fabric of everyday operations
  – USMC ISR Service Contract extended and expanded
ScanEagle Operations in Iraq
US Navy Deployment

- ISR Services
  - Organic ship airborne ISR
  - Services contract
  - Deployed operationally
  - Seven ship installations to date
  - >7000 flight hours
Australian Pursuits

- Australia ADF Iraq (Afghanistan)
  - Special Operating Forces Support
  - Operating Base Force Protection
  - Training Conducted at Clovis, NM
  - In Theater Ops Underway
Advanced Unmanned Systems | ScanEagle

- Customer team is:
  - USAF UAV Battle Lab (Creech AFB)
  - RSW/SDLGSSS-TX is SPO (Wright Patterson AFB)
  - 820th SFG is end user (Moody AFB)

- Contract Award 20 DEC 06

- System Evaluation 5 MAR 06 thru 30 JUN 06

- Air Force owned and operated system
  - USAF personnel training @ Clovis, NM – Analyst (1), Operators (3), Maintainers (2), Mission Commander (1)

- System consists of:
  - ScanEagle aircraft
  - Transportable GCS (TGCS) - ShotSpotter: Vehicle and man worn sensors - system will slew SE camera to area of shot
  - TerraSight Product Suite, video exploitation software hosted in S-VEST
UK JUEP ‘Vigilant Viper’ Trials - 2006

Advanced Unmanned Systems | ScanEagle

- All objectives accomplished:
  - Operated in spite of bad weather in Hebrides in March 2006
  - Demonstrated full operational, launch, and recovery with a Type 23 frigate (Full Level 5 Autonomy)
  - Streaming imagery provided to Sea King AEW helicopter
  - Naval gunfire target acquisition and correction
  - Asymmetrical warfare capability
  - ISR Services
ScanEagle Technology Insertion

**Available Now**
- 20+ Hour Endurance
- Single or Dual Bay configuration
  - Color EO Turret System with Coordinate Hold
  - IR Video Turret System
- Mode 3/C transponder
- Hand-Off to Other Control Stations
- Flight path control including automatic orbits, object tracking, etc
- Plug and Play Swap of Payloads
- Catapult Launcher
- SkyHook or Belly Landing
- GCS Ability to Take Snap Shots, Annotate, and Send Meta-Data
- Optional S_VEST with additional image exploitation and dissemination capabilities

**Under Development**
- 40+ Hour Endurance
- Alternate Sensors
  - Improved Infrared Camera, Low Light EO
  - Magnetometer
  - Biological / Chemical Detection
- Autonomous Tracking of Moving Targets
- Highly Accurate Geo-positioning
- Mini-Forward Eyes
- STANAG 4586 compliant vehicle specific module
- Iridium (Satellite) Relay for Data-Link
- More Communications Options
- Tightly Integrated with User Networks
- Reduced Footprint Ground Support Equipment

** Relay Options with Some Non-Recurring Engineering**
- EPLRS
- Secure 802.11b
- Maritime Automatic Identification System (AIS)
UAV systems are creating new capabilities
- Small, persistent, capable systems

Focusing on UAV systems features:
- Additional payloads
- Network enabled capability
- Runway independence
- Long endurance
- Multiple vehicle control from standards compliant ground stations
- Reduced logistics footprint
- Payload flexibility & modularity
- Fully autonomous systems