Unmanned Combat Air Systems
26 July 2006

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OUSD(AT&L)/PSA/Air Warfare

#06-S-2070

2006 QDR Guidance

- The 2006 Quadrennial Defense Review Report emphasizes the importance of Unmanned Aircraft Systems
  - Department will also increase procurement of unmanned aerial vehicles to increase persistent surveillance, nearly doubling today's capacity
  - Approximately 45% of the future long-range strike force will be unmanned
  - Establish a SOF unmanned aircraft systems squadron
  - Maritime aviation will include unmanned aircraft for both surveillance and strike
  - Restructure the Joint Unmanned Combat Air System (J-UCAS) program and develop an unmanned longer-range carrier-based aircraft capable of being air-refueled to provide greater standoff capability,
  - Increase investment in unmanned aerial vehicles to provide more flexible capabilities to identify and track moving targets in denied areas
  - Nearly double UAV coverage capacity by accelerating the acquisition of Predator UAVs and Global Hawk

Persistent Surveillance

- The Department will also increase procurement of unmanned aerial vehicles to increase persistent surveillance, nearly doubling today's capacity. It also will begin development of the next generation long-range strike systems, accelerating projected initial operational capability by almost two decades. Page-6
- Nearly double UAV coverage capacity by accelerating the acquisition of Predator UAVs and Global Hawk. Page-46

Unmanned Aircraft (UA) 2006

Theater & Tactical (>10lbs)	
• Buster	20
• Pioneer	34
• Shadow 200	140
• Neptune	15
• Tern	15
• Mako	14
• Tigershark	6
• SnowGoose	25
• Hunter	32
• I-Gnat	4
• Predator	70
• Predator B	6
• Global Hawk(GH) - ACTD	4
• Global Hawk - Prod	5
• GH Maritime Demo	2
• Sub-total	392

309% Increase from 2002

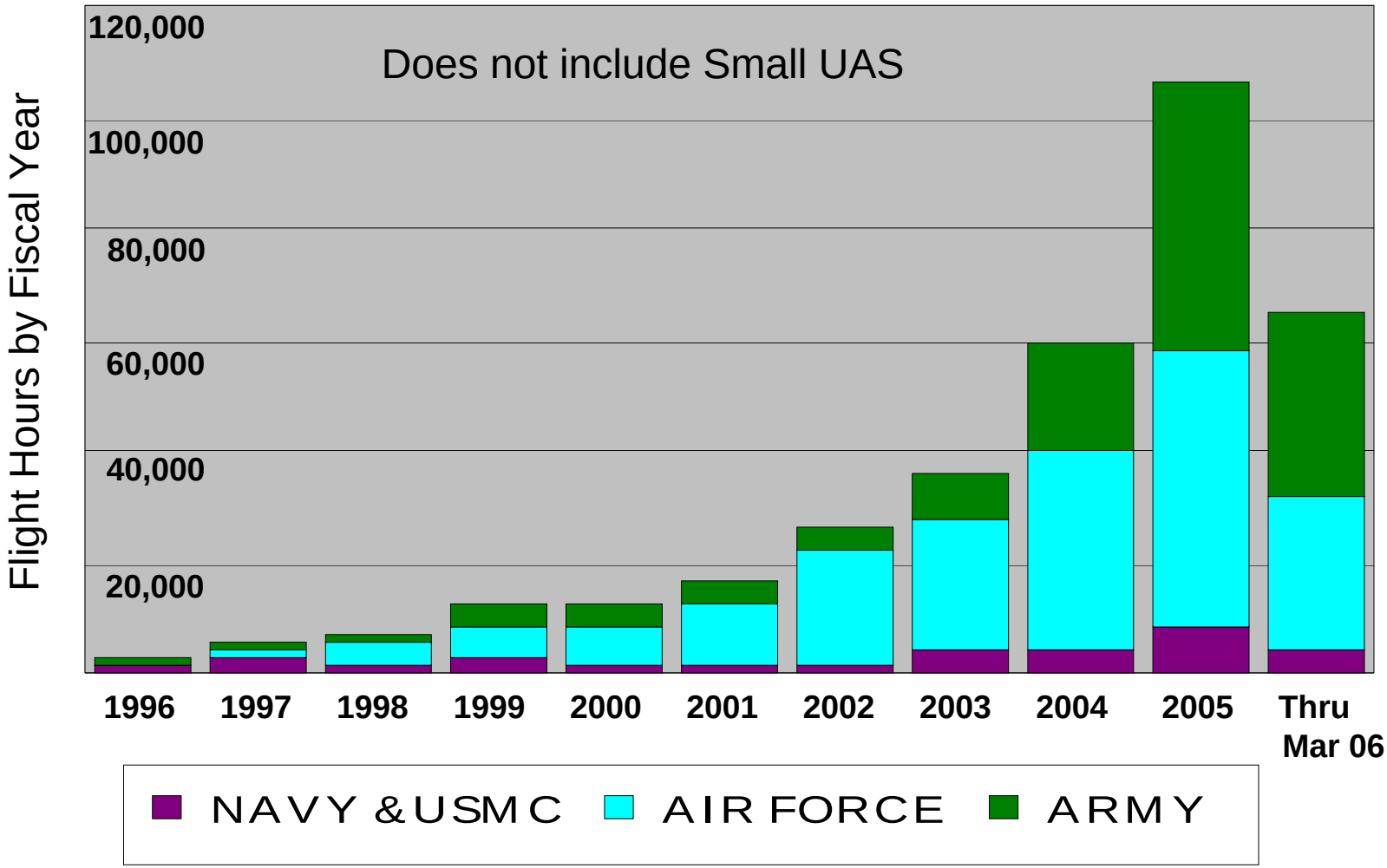
Small (<10lbs)	
• Pointer	126
• Raven	1776
• Dragon Eye	402
• Desert Hawk	126
• BATCAM	54
• Swift	212
• Sub-total	2570

1,773% Increase from 2002

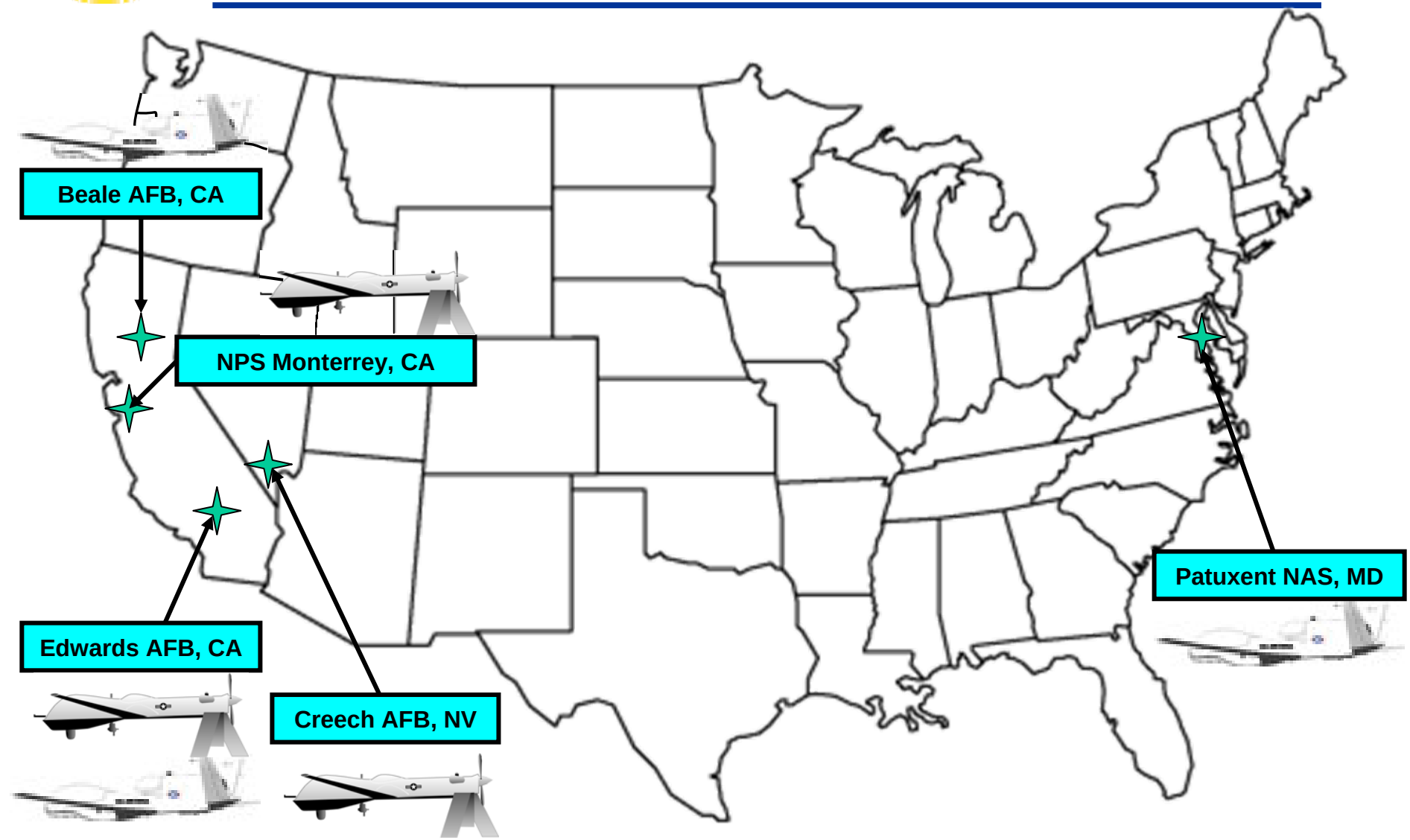
2002	167 Aircraft	$ 763M
2004	727 Aircraft	$1,631M
2006	2,962 Aircraft	$1,627M

Total R&D and Procurement costs per year

DoD UAS Flight Hours



Current Predator & Global Hawk Operations



Persistent Surveillance

RQ-4 Global Hawk

Attributes:

- Ceiling – 65,000 ft
- Endurance – 32 hours
- Radius – 5,400 nm
- Sensors – EO/IR, SIGINT, SAR/MTI
- Payload – 1,950 lbs
- Data Link (s) – BLOS (SATCOM)/ LOS

MQ-1 Predator

Attributes:

- Ceiling – 25,000 ft
- Endurance – 14 hours (armed)
  24 hours (unarmed)
- Radius – 500 nm
- Sensors – EO/IR, SAR
- Payload – 450 lbs
- Data Link (s) – BLOS/ LOS

Future Long-Range Strike

- The Air Force has set a goal of increasing its long-range strike capabilities by 50% and the penetrating component of long-range strike by a factor of five by 2025. Approximately 45% of the future long-range strike force will be unmanned. Page-46

Air Force Long Range Strike
Way Ahead

3-Phased Approach

- **Phase 1 – Continues modernization of legacy bombers to upgrade combat effectiveness**
- **Phase 2 (Next Generation Long Range Strike) – Leverages near-term technologies to start development of long range strike capability to augment current fleet**
  - **Technology maturity a key consideration to meet QDR-directed 2018 IOC**
  - **Analysis of Alternatives being conducted, results due Spring 2007**
- **Phase 3 – Cutting edge *producible* technology in the 2035+ timeframe**
  - **Directed energy, hypersonics, exo-atmospheric**
  - **Speed, range, accuracy, connectivity & survivability improvements**

Air Force Long Range Strike
(Phase 2) AoA Desired Capabilities

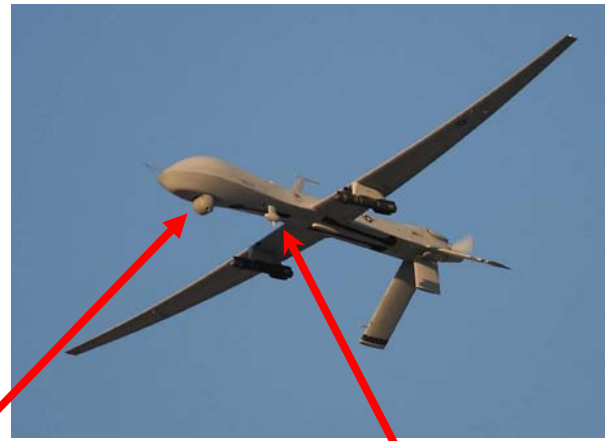
- **Long-range** – Global from CONUS or forward operating bases
- **Persistent** – 24/7 capability in anti-access environment
- **Responsive** – Respond globally within hours to minutes
- **Flexible, precise weapons payload** – Mixed load, nuclear capable
- **Highly survivable – Self-defending** – reduces support
  - Low observable, standoff weapons, speed, altitude
  - Manned, unmanned, or optionally manned
- **Global situational awareness**
  - Robust, fused sensor suites
- **Real-time, robust beyond line of site connectivity** – Fully netted
- **Autonomous operations** – Onboard sensors, offensive, defensive, non-traditional ISR
- **Flexibility /adaptability** – easily incorporate new capabilities, open architecture – "plug and play"

Joint Tactical Air Control

- Expand the Air Force Joint Tactical Air Control program by jointly training personnel for air/ground operations and use of Unmanned Aerial Vehicles. Page-43

Tactical Air Control Party

A TACP is generally a two-airman team, working in an Army ground unit and directing close air support firepower toward enemy targets on the ground in close proximity to friendly forces.



Special Operations UAS Squadron

- The Air Force will establish an Unmanned Aerial Vehicle Squadron under U.S. SOCOM. Page-5
- Establish a SOF unmanned aerial vehicle squadron to provide organic capabilities to locate and target enemy capabilities in denied or contested areas. Page-45

Special Operations UAS Squadron

The Air Force is currently standing up a special operations Predator UAV squadron at Creech Air Force Base, NV. The squadron will initially consist of 24 MQ-1 aircraft but could eventually add the larger MQ-9 Predator B when the aircraft completes development. The Air Force has not announced a specific timetable for the completion of the stand up of the AFSOC Predator squadron.

MQ-9 Predator B

Naval Aviation

- Maritime aviation will include unmanned aircraft for both surveillance and strike. Page-45
- Restructure the Joint Unmanned Combat Air System (J-UCAS) program and develop an unmanned longer-range carrier-based aircraft capable of being air-refueled to provide greater standoff capability, to expand payload and launch options, and to increase naval reach and persistence. Page-46

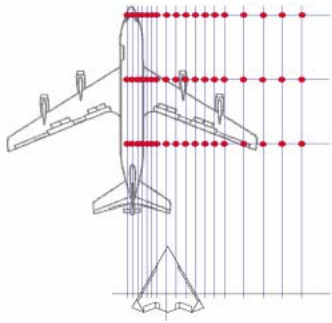
Navy Unmanned Combat Air System

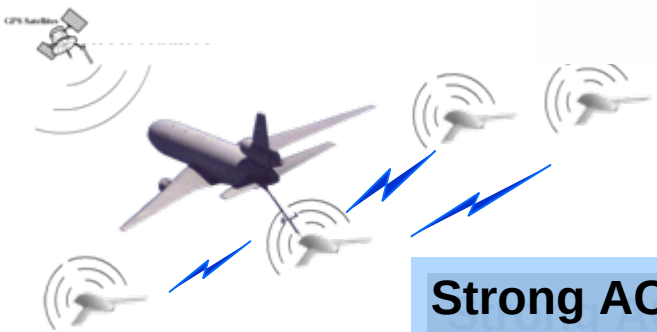
Restructure the Joint Unmanned Combat Air System (J-UCAS) program and develop an unmanned longer-range carrier-based aircraft capable of being air-refueled to provide greater standoff capability, to expand payload and launch options, and to increase naval reach and persistence.

	FY07	FY08	FY09	FY10	FY11	FY07-11
RDT&E-Navy ($M)	**+239**	**+310**	**+369.4**	**+491.1**	**+421.1**	**+1,830.5**

CAT/TRAP Demonstration planned for FY11

Automated Aerial Refueling





Goal: Develop and Flight Demonstrate Initial AAR Capability

Initial User/TAD: J-UCAS, FY07

Technology Challenges:

- **Rendezvous**
- **UAS Operations near tanker**
  - **Precise relative position**
  - **Collision avoidance**
- **C2: MCS supervised, Boomer breakaway**
- **Systems integration**

Strong ACC & AMC participation in effort - Includes desire to minimize impact to existing tanker fleet and con-ops

Reserve Component

- The Air Force is optimizing Reserve Component personnel for new missions that can be performed from the United States, including unmanned aerial vehicle (UAV) operations and ISR reach-back, leveraging the core competencies of the reserves while reducing stress on the force. Page-45

Reserve Component

- Grand Forks initially is scheduled to receive Predators in 2009 and Global Hawks in 2010, North Dakota Senator Kent Conrad
- The details of the Grand Forks and Fargo missions were embedded in the Air Force's Total Force Integration program, which lays the ground rules for military strategies and acquisitions. Under this program, the North Dakota Air National Guard's 119th Wing was assigned two missions at Hector International Airport. Those missions are flying an unidentified joint cargo aircraft and operating a Predator UAV ground control station.
- The Guard will create a new maintenance unit at Grand Forks Air Force Base that will support Predator launch and recovery operations. The new maintenance squadron also may be asked to support Global Hawk UAV operations once those aircraft arrive on base, Senator Conrad said.

UNMANNED AERIAL VEHICLES : 'Victory for North Dakota‘ Air Force, National Guard work out additional details of Predator mission
By Elisa L. Rineheart Herald Staff Writer 28Jun2006

Reserve Component

- Air National Guards units will conduct Predator unmanned aircraft systems missions in a reachback capacity over long distances from their home states.
- Air Force Reserve members will participate in all mission areas at the Air Warfare Center at Nellis Air Force Base, Nev. The first new reserve-component mission will be Predator unmanned aircraft systems missions.

- 5 Predator Squadrons
  - Arizona – Davis-Monthan/ Fort Huachuca
  - California – March ARB
  - New York – Hancock Field Syracuse
  - North Dakota – Fargo/Grand Forks
  - Texas – Ellington Field
- Global Hawk Units
  - North Dakota - Grand Forks
- United States Air Force Warfare Center
  - Reserve & Guard augmentation

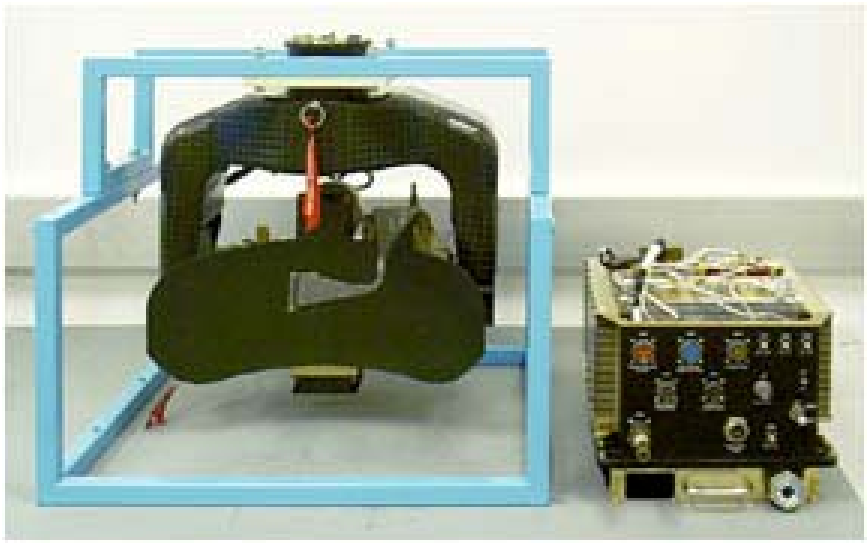
Proposed Guard and Reserve Predator and Global Hawk Locations

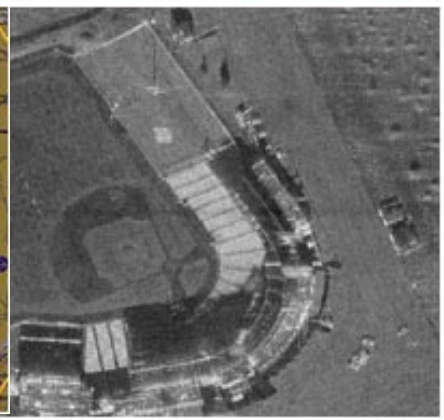
#06-S-2070

Moving Targets

- Increase investment in unmanned aerial vehicles to provide more flexible capabilities to identify and track moving targets in denied areas. Page-57

Lynx II Synthetic Aperture Radar/Ground Moving Target Indicator (SAR/GMTI)





- Mission
  The Lynx II SAR/GMTI is a multi-function radar that operates in Synthetic Aperture Radar (SAR) and Ground Moving Target Indicator (GMTI) modes. High-resolution SAR and GMTI data is processed on-board and is data-linked to a Ground Station for exploitation.
- Description
  The *Lynx II* consists of a Radar Electronics Assembly (REA) and an Antenna/Gimbal Assembly. SAR modes operate in 0.1 m to 3.0 m resolution. In the GMTI mode, the radar detects moving targets at speeds of 10-70 kph and overlays their locations on a digital map. The *Lynx II* is slated for production in FY07 and is sized for operations on the UA Class IV, ER/MP and Hunter UAVs.
- Applications
- **All-condition RSTA of moving and stationary targets**
- **Battle Damage Assessment (BDA)**
- **Wide area surveillance**
- **Brigade/Division intelligence operations**
- **Multi-mode cueing**

Office of the Secretary of Defense Unmanned *Systems* Roadmap ***2007-2032***

- **Focus**
  - **Interoperability of air, ground, and sea systems**
  - **Remains on customer, technology and industry**
- **Adds**
  - **Unmanned Ground Systems**
  - **Unmanned Surface Systems**
  - **Unmanned Underwater Systems**
- **New Format**
- **Long term plan is to publish an integrated Unmanned Systems Roadmap in 2009**
- **The goal is for the 2009 Road map to influence the FY 2010 POM**

Unmanned Systems Roadmap, 2007

Very Rough **Format Straw Man**

- **Executive Summary**
- **Chapter 1 – Introduction**
- **Chapter 2 – Strategic Planning, Policy, Guidance, & Organization**
- **Chapter 3 – Capabilities**
- **Chapter 4 – Joint Mission Areas**
- **Chapter 5 – Technology Application (appendices in current version of the roadmap)**
- **Chapter 6 – Experimentation and Test**
- **Chapter 7 – Roadmap – programs/capabilities/timeline**
- **Annex A – Unmanned Aircraft Systems**
- **Annex B – Unmanned Ground Systems**
- **Annex C – Unmanned Sea Systems**
- **Annex D – Standards Listing**

- **Separate volume with detailed appendices...?**

- **Targeting completion Fall FY07**


Questions?