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Navy Unmanned Maritime Systems

Presented to: *ONR MCM Systems for LCS Advanced Flight Mission Package Industry Day*

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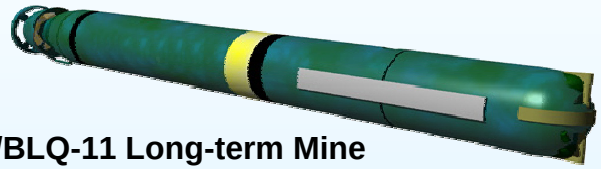
Unmanned Maritime Vehicle Systems

Mission: Develop, acquire and maintain operationally superior and affordable surface and submarine launched Unmanned Maritime Vehicle Systems for the Warfighter



AN/BLQ-11 Long-term Mine Reconnaissance System (LMRS)

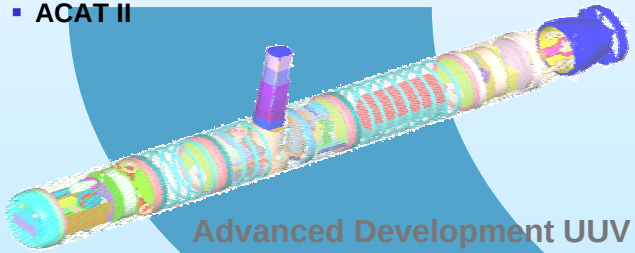
- MRUUVS risk reduction; SSN688/I torpedo tube launch and recovery
- Clandestine Mine Counter-Measures (MCM)
- ACAT II

Battlespace Prep Autonomous Undersea Vehicle (BPAUV)

- MCM search and localization capability
- LCS Flight 0
- Direct leverage of ONR investment

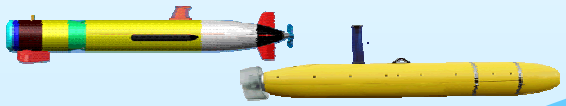
Large Displacement MRUUVS

- Future development (ACAT Undesignated)
- Significantly improved range and payload capability
- SSGN, VIRGINIA, Littoral Combat Ship compatible
- Modular payloads open systems architecture
- Extended Anti-Submarine Warfare, Mine Countermeasure, Intelligence Surveillance and Reconnaissance (ISR), and Special Operations Forces missions



Advanced Development UUV

- MRUUVS risk reduction
  - Modular payloads
  - Reconfigurable vehicle design
  - Test-bed for future payloads
- Program Terminated FY06



Surface Mine Countermeasure UUV (SMCM UUV)

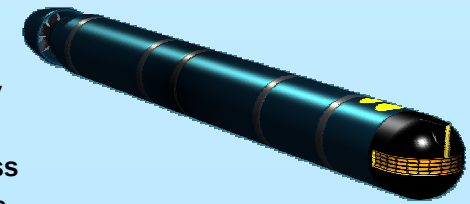
- MCM search and localization capability
- UOES – User Operational Evaluation System
- MCM-1, LCS, Craft of Opportunity
- ACAT Program will detect buried mines

USV

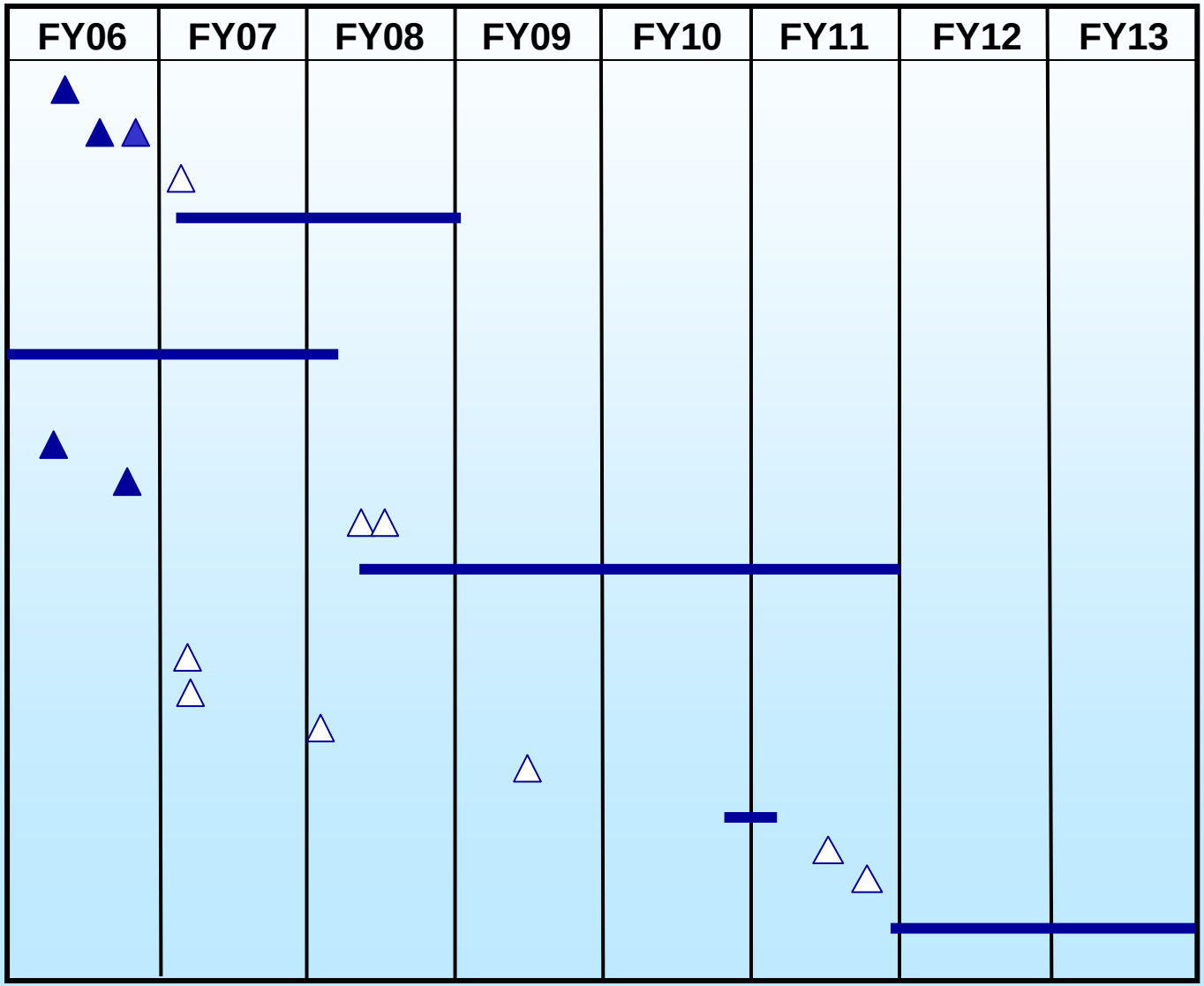
- MCM Sweep, Delivery, and Neutralization
- ISR / Gun Payloads
- SOF Support

21” Mission Reconfigurable UUV System

- Modular payloads
- Open systems architecture
- Clandestine SSN launch and recovery
- Pre-MDAP
- Current Program – MCM 688/688I Class
- Future Capability – ISR and 774 Class



Surface Launched UUV Program Schedule



BPAUV
- PDR
- CDR
- System Delivery (1)
- Fleet Demos

SMCM UUV

Increment 1
- Fleet Experimentation

Increment 2
- RFP
- Contract Award
- System Delivery (3)
- Fleet Experimentation

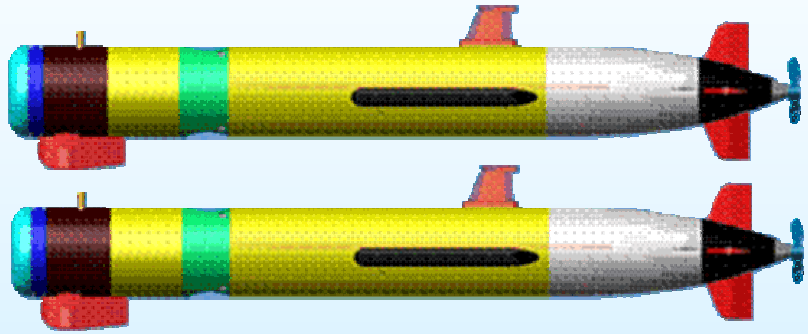
Increment 3
- AoA
- CDD
- Milestone B
- CDR
- TECH/OPEVAL
- Milestone C FRP Decision
- IOC
- Production

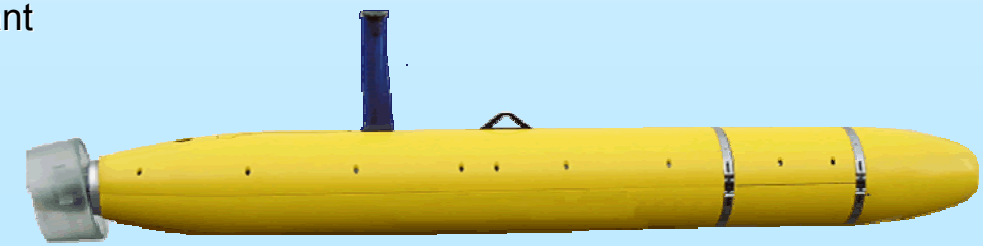
Battlespace Prep Autonomous Undersea Vehicle (BPAUV)

- **Littoral Combat Ship Flight 0 MCM mission module payload (Demo program)**
  - Mitigates ship integration risk for future UUV acquisition programs (especially launch and recovery)
- **Side scan sonar/ environmental sensors support Mine Reconnaissance and Intelligence Preparation of the Environment**
- **Tactical and environmental data is downloaded and analyzed post-mission then transmitted to MEDAL**
- **BPAUV undergoing acceptance testing at NSWC PC**
- **BPAUV system available for training in Apr 2007**
- **LCS Crew Training scheduled in Jul 2007**

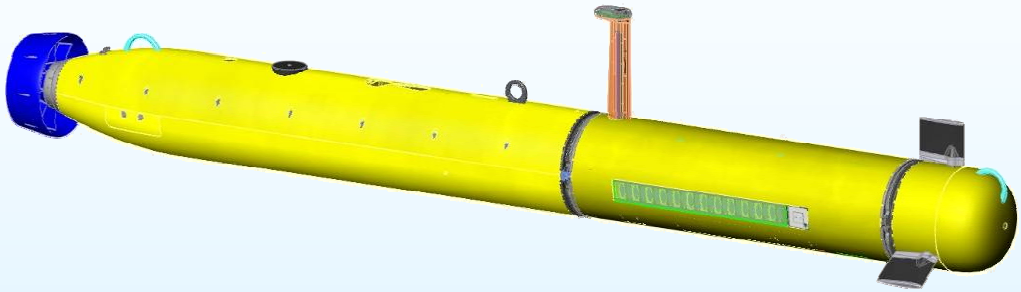
Surface Mine Countermeasure Unmanned Undersea Vehicle (SMCM UUV) Increment 1

- **User Operational Evaluation Systems employed from MCMs and crafts of opportunity**
- **2 man portable REMUS Systems**
- **1 12” UUV**
- **Systems successfully employed during NURC, RIMPAC, and GOMEX Exercises**
- **Recent exercises:**
  - **NURC – Dec 05**
  - **Gulf of Mexico Exercise (GOMEX 06-02) – USS PIONEER (MCM 9)**
  - **RIMPAC 2006 – USNS PATHFINDER and SEAFIGHTER**
    - PATHFINDER
      - 12 UUV missions
      - 25 Contact Reference Numbers (CRN) generated
      - 4 of 5 CRNs re-acquired
      - 11 CRNs correlated to mine plant
      - 72 hours in-water
      - 32 hours Post Mission Analysis
    - SEAFIGHTER
      - 5 UUV missions
      - 8 CRNs generated
      - 15 hours in-water



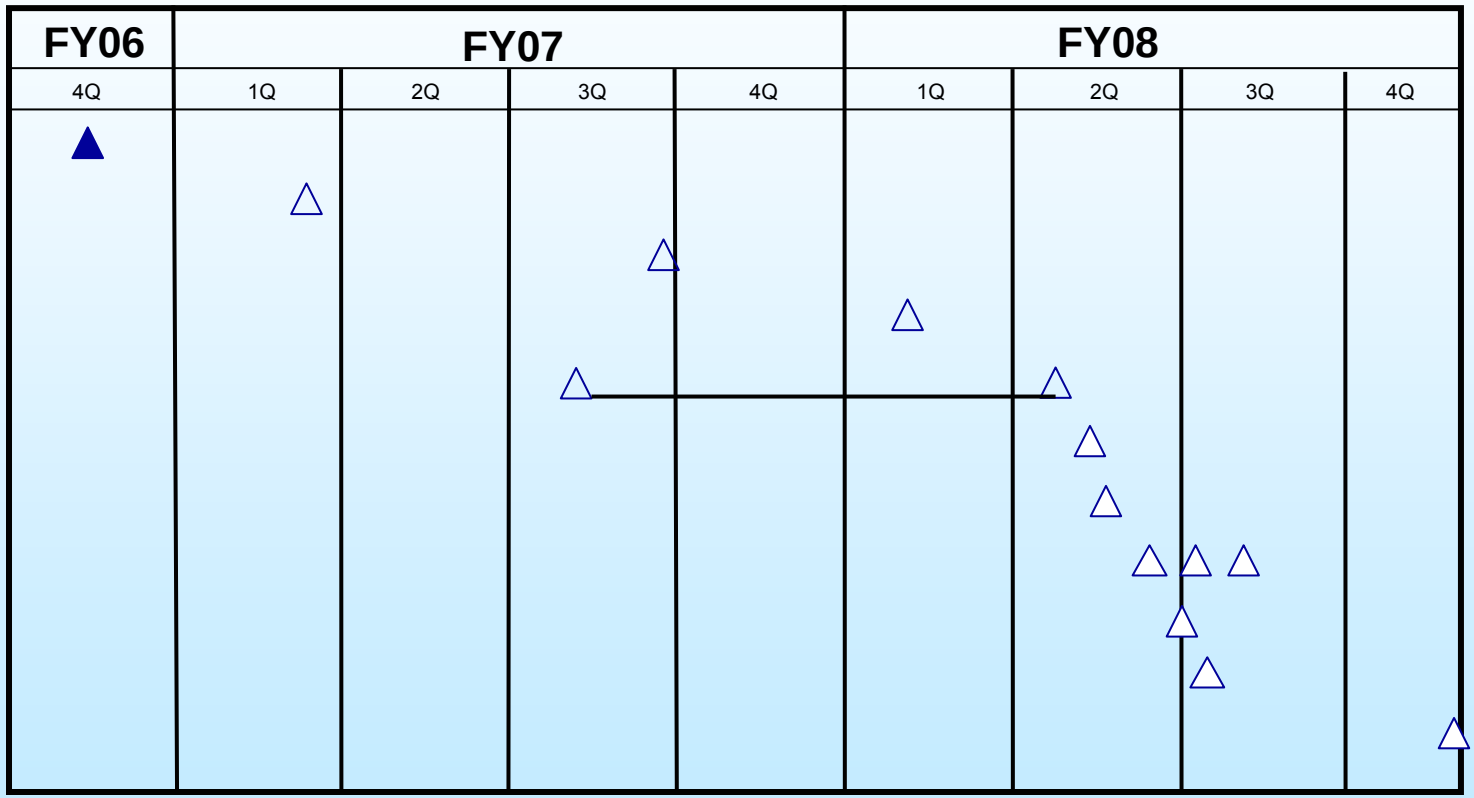


SMCM UUV Increment 2



- 3 User Operational Evaluation systems of 2 vehicles and support equipment employed from MCMs and crafts of opportunity
- Synthetic Aperture Sonar
- Contract awarded to Bluefin Aug 06
- 1st System Delivery to NMAWC 2nd Qtr 08
- Will be employed until Increment 3 IOC in FY11

SMCM UUV-2 Schedule



SMCM UUV Program
Increment 3

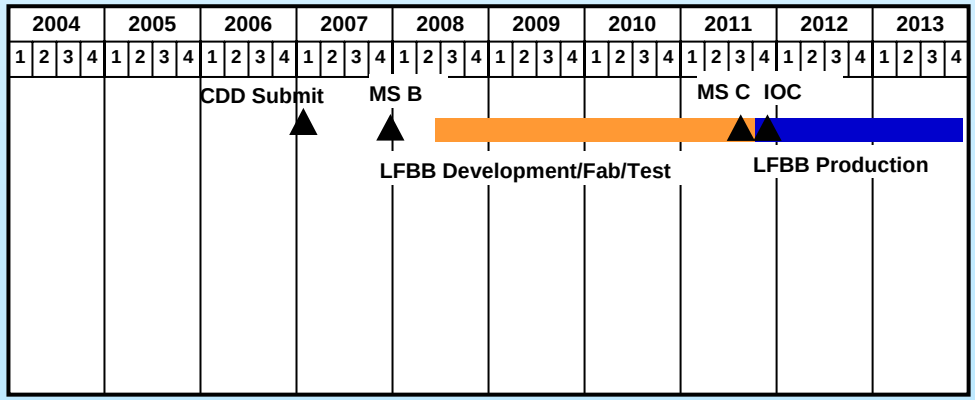
SMCM UUV Increment 3

Buried Mine Detection UUV

Status:

- Analysis of Alternatives to be completed by Jan 07
- WB&B contracted to finalize draft AoA/CDD
- N852 LFBB platform study/warfighting analysis in process
- N852 requested that the CDD not be submitted until the study results are briefed
- ONR Low Frequency Broadband vehicle rerun against buried mines (after settling) at NSWC PC in Aug 06
- Blind testing vs naturally buried mines planned for Corpus op area Dec 06

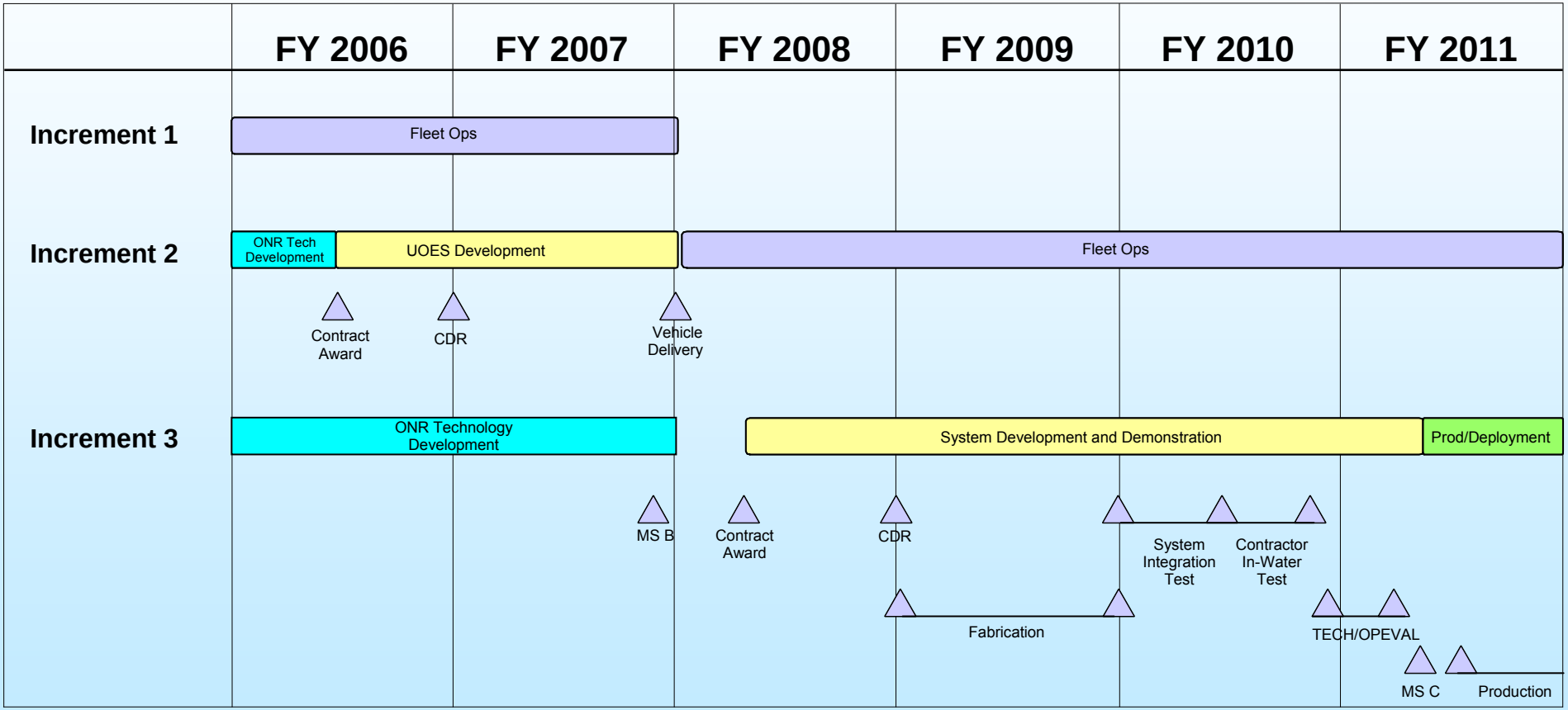
Program Schedule



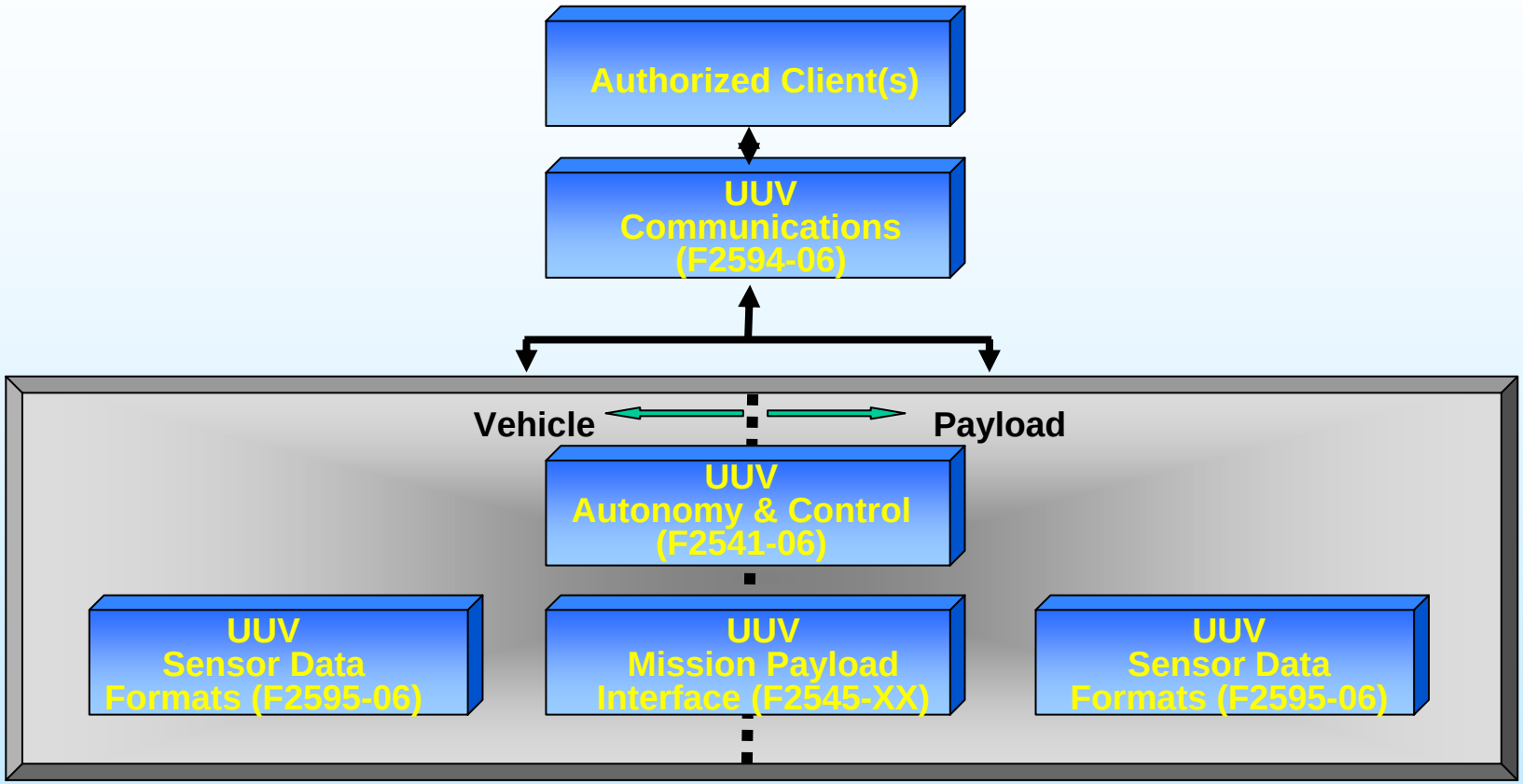
Surface Mine Countermeasure (SMCM) UUV Payload Development – Comparison of Performance

	Increment 1: UOES	Increment 2: UOES	Increment 3: Draft Capability
Payload	Sidescan Sonar	Dual Frequency SAS	Low Frequency Broadband Sonar
Endurance	8 hrs/12 hrs	10-12 hrs	12-16 hrs
Speed	3 knots	3-5 knots	2.5-3 knots
Swath Description	60 m (3" x 3" resolution) 10 m (1" x 1" resolution) Nadir Gap 5/10 m	80 m (3" x 3" or 1" x 1" resolution) Nadir Gap 10 m	500-600 m – LFBB Mine Detection No Gap
Sea Bottom Penetration	None	Limited (Lower Frequency Band)	Up to 75 cm
Comms	Iridium/Radio/Acoustic Communications	Iridium/Wireless/Acomms	TBD
Operational Capability	Improved Classification of MLCO vs. SQQ-32 Clandestine Small Area Search	Improved Classification of MLCO vs. SQQ-32 and Incr 1: UOES Clandestine Small Area Search	Buried Mine Detection Clandestine Wide Area Search
Equipment	7.5 " Remus 100 – 2 UUVs 12.75" Bluefin – 1 UUV	System of two 12.75" UUVs Contractor TBD	System of at least two 21" UUVs Contractor TBD
Delivery	Sept 2005 – 3 UUVs	Sept 2007 – 3 Systems	1 refurbishedEngineering Development Model System 6 Production Systems

Surface MCM UUV Acquisition Schedule



ASTM UUV Standards



Refinement and improvement of standards will continue

Approved Standards available in public domain via ASTM website

Unmanned Maritime Vehicle Technology Focus Areas

- Reliable launch and recovery
- Reliable communications
- Open system architecture
- Vehicle
- Platform integration
- Information assurance
- FORCEnet & C^{4}I Compliance
- Energy
- Reliable/robust autonomy
- Advanced sensors
- Signature
- Real time sensor processing
- Payload deployment
- Net mitigation
- MCM neutralization
- ASW sensors
- EM signature for mine ID
- RCS/IR/optical signature for far forward ISR
- Non-lethal ASW weapons

Near-Term → Far-Term