Status of Unmanned Systems: EXECUTING!

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Program Manager
PMS406
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USV Systems Vision
Enhanced, Efficient Capabilities

Endurance
Autonomy & Precision Navigation
Command, Control, & Communications
Payloads & Sensors
Platform Integration (L&R, etc.)

Very Small (Class 1)
- Armed Coastal Patrol
- GARC
- Mine Hunting

Small (Class 2)
- MHU 1-4 w/ AN/AQS-24
- USV w/Sweep (UISS)

Medium (Class 3)
- Sea Hunter / MDUSV
- Autonomy
- Multi-mission

Key Enablers
- Endurance
- Autonomy & Precision Navigation
- Command, Control, & Communications
- Payloads & Sensors
- Platform Integration (L&R, etc.)

Efficient, Executable Progression of Capabilities onto Common USV Hull Forms

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UUV Systems Vision
Enhanced, Efficient Capabilities

Key Enablers
- Endurance
- Autonomy & Precision Navigation
- Command, Control, & Communications
- Payloads & Sensors
- Platform Integration (L&R, etc.)

Small (Man Portable) (Surface or Submarine Launch)
- MK18 Mod 1 (Swordfish)
- MK18 Mod 2 (Kingfish)

Medium (Surface or Submarine Launch)
- LBS-AUV
- LBS-G

Large (Surface or Submarine Launch)
- ONR Innovative Naval Prototype
- Extended Range ISR
- Extended Range IPOE
- Payload Integration
- ISR / IPOE
- ASW
- ASUW

Extra Large (Pier Launch)
- ONR Innovative Naval Prototype
- XLUUV Future Capabilities
- Payload Integration
- Strike Capability
- ISR
- EW

Efficient, Executable Progression of Capabilities through Various UUV Systems

Note: Systems with Yellow background not PMS 406

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2017 USV Accomplishments

- **Minehunting USVs (MHUs) continue to support C5F in-theatre training and operations**
  - AN/AQS-24B upgrade integrated with MHU in February 2017

- **Unmanned Influence Sweep System continues Contractor Testing**
  - Completed over 350 hours of in-water testing to date
  - Currently in Builder’s Trials, will commence Navy DT/OA in the Spring with Milestone C in 4QFY17

- **MCM USV + Minehunting continues development**
  - USV craft contract (2 units) awarded in March 2017
  - Construction & Payload Integration continue through late FY18 / early FY19, followed by Integration & Testing to support initial Operator Testing in FY19

- **AQS-20C production units continue contractor testing**
  - Delivery of 10 units starting in Spring 2018
  - Navy DT is on track for Q3FY17

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2017 UUV Accomplishments

Knifefish Testing

- **Knifefish UUV will provide LCS and Vessels of Opportunity volume, bottom, and buried minehunting capability**
  - Contractor Trials completed & the system performed extremely well
  - Sea Acceptance Trials are currently in progress
  - DT/OA will commence in February with Milestone C planned Q3FY17

- **Snakehead LDUUV is executing design efforts**
  - Program completed Phase I system Preliminary Design Review
  - Detailed design is in progress
  - Initial hull long-lead raw material is on order

- **Orca XLUUV will be a modular, open architecture UUV, with a payload section**
  - Phase I Design Contracts awarded to Lockheed Martin & Boeing, 28 September 2017
  - Executing design efforts with follow on production starting in FY19

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Summary

- **Unmanned systems are high growth**
  - Key component for both LCS & Undersea Enterprise
  - Integrated with manned platforms to provide warfighting advantage to commanders at all levels

- **Family of Systems approach and Visions provide path for executing Navy’s plans**

- **Technology and innovation are our enablers**

- **Key technical areas for USV/UUV development**
  - Endurance
  - Autonomy & Precision Navigation
  - Command, Control, & Communications
  - Payloads & Sensors
  - Platform Integration (Launch & Recovery, etc.)

**Unmanned Systems are Vital Part of Future Navy Force**
### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>ASUW:</td>
<td>Anti-Surface Warfare</td>
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<tr>
<td>ASW:</td>
<td>Anti-Submarine Warfare</td>
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<tr>
<td>AUV:</td>
<td>Autonomous Unmanned Vehicle</td>
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<tr>
<td>C2:</td>
<td>Command and Control</td>
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<tr>
<td>C5F:</td>
<td>Commander, Fifth Fleet</td>
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<tr>
<td>COMMS:</td>
<td>Communications</td>
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<tr>
<td>DT:</td>
<td>Developmental Testing</td>
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<tr>
<td>EW:</td>
<td>Electronic Warfare</td>
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<tr>
<td>FSC:</td>
<td>Future Surface Combatant</td>
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<td>FY:</td>
<td>Fiscal Year</td>
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<tr>
<td>GARC:</td>
<td>Greenough Advanced Recovery Craft</td>
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<tr>
<td>IOC:</td>
<td>Initial Operational Capability</td>
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<tr>
<td>IPOE:</td>
<td>Intelligence Preparation of the Operational Environment</td>
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<td>ISR:</td>
<td>Intelligence, Surveillance, &amp; Reconnaissance</td>
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<tr>
<td>L&amp;R:</td>
<td>Launch and Recovery</td>
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<tr>
<td>LBS:</td>
<td>Littoral Battle Space</td>
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<td>LCS:</td>
<td>Littoral Combat Ship</td>
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<td>LDUUV:</td>
<td>Large Displacement UUV</td>
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<td>MCM:</td>
<td>Mine Countermeasures</td>
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<td>MDUSV:</td>
<td>Medium Displacement USV</td>
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<td>MHU:</td>
<td>Minehunting USV</td>
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<td>MIW:</td>
<td>Mine Warfare</td>
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<tr>
<td>MUSCL:</td>
<td>Modular Unmanned Surface Craft Littoral</td>
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<tr>
<td>OA:</td>
<td>Operational Assessment</td>
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<td>ONR:</td>
<td>Office of Naval Research</td>
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<tr>
<td>Ph 1:</td>
<td>Phase 1</td>
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<tr>
<td>REMUS:</td>
<td>Remote Environmental Monitoring Unit System</td>
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<tr>
<td>SAS:</td>
<td>Synthetic Aperture Sonar</td>
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<td>UISS:</td>
<td>Unmanned Influence Sweep System</td>
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<tr>
<td>USV:</td>
<td>Unmanned Surface Vehicle</td>
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<tr>
<td>UUV:</td>
<td>Unmanned Undersea Vehicle</td>
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<tr>
<td>XLUUV:</td>
<td>Extra Large UUV</td>
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