U.S. Navy and Marines Corps Family of Unmanned Aircraft Systems

Presented to
2016 Precision Strike Annual Review

Presented by:
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Deputy PEO(U&W) for UAS Programs

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Embracing Unmanned … Yesterday, Today and Tomorrow
“The DON must provide emerging operational capabilities a clear and expedient path to the fleet. We must reduce barriers and promote a culture willing to accept new concepts such as adaptive force packages, unmanned/autonomous systems, non-lethal weapons, directed energy, and additive manufacturing.”

Task Force Innovation

It’s not just what we do differently, It’s how we do it…
Lead a strategic and pioneering rapid development cycle to introduce innovative unmanned system (UxS) technologies to the fleet, from warfighting requirements to prototyping, demonstration, and development.

Collaborate with OPNAV, Fleet, DASN, S&T, WDCs, Industry

Warfighting Requirements

Identify Warfighting Capability Needs/Concepts

Acquire, Refine, or Terminate

Recommend Acquire, Refine, or Terminate

Technology Priorities

Prioritize Promising Technologies

Prototyping & Demonstration

Conduct Rapid Prototyping & Demonstration
## UAS Groups

<table>
<thead>
<tr>
<th>UAS Groups</th>
<th>Max Weight (lbs)</th>
<th>Normal Operating Altitude (ft)</th>
<th>Speed (kts)</th>
<th>Representative DoN UASs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1</strong></td>
<td>0-20</td>
<td>&lt;1200 AGL</td>
<td>100</td>
<td>RQ-11 Wasp</td>
</tr>
<tr>
<td><strong>Group 2</strong></td>
<td>21-55</td>
<td>&lt; 3500 AGL</td>
<td>&lt;250</td>
<td>Scan Eagle</td>
</tr>
<tr>
<td><strong>Group 3</strong></td>
<td>&lt;1320</td>
<td>&lt;FL 180</td>
<td>&lt;250</td>
<td>RQ-21A Blackjack</td>
</tr>
<tr>
<td><strong>Group 4</strong></td>
<td>&gt;1320</td>
<td>&lt;FL 180</td>
<td>Any</td>
<td>MQ-8 Fire Scout</td>
</tr>
<tr>
<td><strong>Group 5</strong></td>
<td>&gt;1320</td>
<td>&gt;FL 180</td>
<td>Any</td>
<td>MQ-4C Triton</td>
</tr>
</tbody>
</table>
Naval Group 4-5 UAS

INCREASED CAPABILITIES

<table>
<thead>
<tr>
<th>Group 5</th>
<th>2012</th>
<th>2016</th>
<th>2020</th>
<th>2024</th>
</tr>
</thead>
<tbody>
<tr>
<td>GW&gt; 1320 lbs</td>
<td>BAMS-D</td>
<td>UCAS</td>
<td>MQ-4C Triton</td>
<td>CVN Capable UAS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 4</th>
<th>2012</th>
<th>2016</th>
<th>2020</th>
<th>2024</th>
</tr>
</thead>
<tbody>
<tr>
<td>GW&gt; 1320 lbs</td>
<td>MQ-8B</td>
<td>Cargo RDC</td>
<td>MQ-8C</td>
<td>Potential Cargo POR</td>
</tr>
<tr>
<td>OpAlt &lt; 18 Kft</td>
<td>MQ-8B Fire Scout</td>
<td>MQ-4C Triton</td>
<td>USMC Group-4 ???</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MQ-4C Triton</th>
<th>MQ-8 Fire Scout</th>
<th>CVN Capable UAS</th>
</tr>
</thead>
</table>

Common Control System (CCS)

Approved for Public Release, Distribution Unlimited
Group 3 UAS

RQ-7B Shadow

RQ-21A Blackjack
ScanEagle

Aerosonde

Total flight hours (FH): >425,000 (as of February 2016)
Land FH: >391,000 | Ship FH: >33,500
34 ship installs | 30 deployments | 8 classes of ships
Group 1 UAS

- RQ-20A Puma
- RQ-11B Raven
- InstantEye Nano
- SkyRanger VTOL
- RQ-12A Wasp
<table>
<thead>
<tr>
<th>Unmanned Attributes</th>
<th>Unmanned Domains</th>
<th>Cross-Domain Challenges &amp; Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence</td>
<td>Air</td>
<td>➢ Autonomy</td>
</tr>
<tr>
<td>Expendability</td>
<td>Surface</td>
<td>➢ Common Control Architecture</td>
</tr>
<tr>
<td>Precision</td>
<td>Sub-Surface</td>
<td>➢ Interoperability Standards</td>
</tr>
<tr>
<td>Scalability</td>
<td>Ground</td>
<td>➢ TCPED</td>
</tr>
<tr>
<td></td>
<td>Space</td>
<td>➢ Manned-Unmanned Teaming</td>
</tr>
</tbody>
</table>

- Autonomy
- Common Control Architecture
- Interoperability Standards
- TCPED
- Manned-Unmanned Teaming
- Open Architecture / Modularity
- Sensor and Component Reuse
- Collision Avoidance
- Cyber Vulnerability
- Propulsion/Power Endurance
- Miniaturization
- Swarming / Net-Enabled
- Training, Support, Culture
- Acquisition Velocity (Speed to Fleet)
Summary

- Navy's intent is to produce a family of capable, effective, and interoperable unmanned systems that integrate with manned platforms and ships to provide situational awareness and warfighting advantage to commanders at all levels.

- The Navy is on glide slope to provide:
  - Persistence via unmanned systems, increasingly from the sea.
  - Capacity with more platforms and sensors.
  - Capability with automated sensors.
  - Flexibility with modular, scalable "plug & play" sensors.
  - Timeliness through effective TCPED process.
  - Connectivity through secure information sharing.
Questions