Theater Mission Planning Center

Air Wing Ship Integration/Unmanned Air Systems Common Control System

SLAM ER Data Link Pod

Harpoon Missile System

WASP/ TOPSCENE/ Common Components

Joint Mission Planning System-Maritime 30 T/M/ S

Joint Mission Planning System-Exploitationary

Tomahawk Weapon Control Systems

MQ-4C BAMS UAS

BAMS-D

Tomahawk

Scan Eagle

MQ-21A

Raven B

T-Hawk

VTUAV (Fire Scout)

Cargo UAS

X47B (Demo)

UCLASS

PMA-281

PMA-201

PMA-280

PMA-262

PMA-263

PMA-266

PMA-268

PMA-242

Harpoon Missile System

SLAM ER

GP BOMBS/ PRACTICE BOMBS

LBG/ DMLGB/ LGTR

SDB II

ROCKEYE/GATOR

J DAM/ LJ DAM

J SOW

AAE

Fuzes

CAD/PAD

BQM-74E

GQM-163

GQM-173

BQM-177

BQM-34

OASuW

AQM-37

TAAS

SNTC

Threat Sim

VIPER STRIKE

AMMOS

Ammo

MLMs

Paraflares

AARGM

APKWS II

GRI FF N

JAGM

J DAM

J DAM

Hellfire

Rockets

2.75”

5”

HARM

TOW

LoGI R

Lasers

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Programs Assigned

ACAT I: 5 (2 PRE-MDAP)

ACAT II: 2

ACAT III: 3

ACAT IV: 7

Non-ACAT/AAP: 88

13 Feb 13
CNO’s Sailing Directions:
• Warfighting First
• Operate Forward
• Be Ready

Unmanned systems in the air and water will employ greater autonomy and be fully integrated with their manned counterparts.

Department of the Navy’s Objectives for 2013 and Beyond:
- Proliferate Unmanned Systems
  a. Integrate Unmanned Systems into the DON Culture
  b. Develop Unmanned Systems in the Air
  c. Deploy and Establish Unmanned Systems On/Under the Sea
  d. Field Unmanned Systems on the Ground

ISR Guiding Principles:
• Increasingly sea based & unmanned
• Every platform is a sensor
• Every sensor is networked
• Data is discoverable & accessible by all
• Modular, scalable plug & play sensor payloads
• Common Unmanned Systems (UxS) Control Stations
• Common interfaces, data formats & standards
• Remoted automated sensors
PEO(U&W) UAS Experience

MQ-4C Triton
BAMS UAS

Wasp IV

Raven B

Puma

X47B
(Demo)

Wasp

T-Hawk

Scan Eagle

UCLASS

Reaper
Saber Focus

Cargo UAS
A-160

Cargo UAS
K-MAX

MQ-8C

MQ-8B
Fire Scout
VTUAV

Tactical Control System
PMA-266

Unmanned Air Systems
Common Control System

Approved for Public Release, Distribution Unlimited: NAVAIR 12-1220 Dated 5 Nov 2012

13 Feb 13
### Naval UAS Family of Systems

<table>
<thead>
<tr>
<th>Group 5</th>
<th>GW &gt; 1320 lbs</th>
<th>UCAS</th>
<th>MQ-4C Triton</th>
<th>UCLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAMS-D</td>
<td>MQ-4C Triton</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 4</th>
<th>GW &gt; 1320 lbs</th>
<th>Cargo RDC</th>
<th>MQ-8B Fire Scout</th>
<th>Potential Cargo POR</th>
</tr>
</thead>
<tbody>
<tr>
<td>MQ-8C Fire Scout</td>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 3</th>
<th>GW &lt; 1320 lbs</th>
<th>RQ-7B Shadow</th>
<th>RQ-21A STUAS</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Group 2</th>
<th>GW: 21 - 55 lbs</th>
<th>Scan Eagle</th>
<th>T-Hawk</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Group 1</th>
<th>GW &lt; 20 lbs</th>
<th>Raven-B</th>
<th>WASP III</th>
<th>WASP IV</th>
<th>PUMA</th>
</tr>
</thead>
</table>

**Key Information**
- **GW> 1320 lbs**: Group 5 and Group 4
- **GW < 1320 lbs**: Group 3 and Group 2
- **GW: 21 - 55 lbs**: Group 2
- **GW < 20 lbs**: Group 1

**Additional Details**
- **MQ-8C Fire Scout**: Potential Cargo POR
- **MQ-8B Fire Scout**: OpAlt < 18 Kft
- **MQ-4C**: Triton
- **UCLASS**: Current

**Future**
- Operational
- In Development
- Future Development
BAMS-D
- Demonstration program with real world utility
- Provides the Fleet a persistent, high-altitude, multi-INT, maritime ISR capability
- Currently on its 48th month of a 6-month deployment
- > 7,935 flight hours in CENTCOM AOR (9,571 total flight hours since 2004)
- Providing direct, actionable intelligence
- Tactics, Techniques, Procedures Development (pathfinder for BAMS/Triton)

Fire Scout
- Over 1,330 flight hours supporting five FFG deployments
- Afghanistan RC(North); direct support to USA – over 3,680 flight hours
- Counter piracy missions
- SOF and other combat support missions
- TCDL COMM Relay
- Remote Viewing Terminal exercised
- Conduct of dual H-60/VTUAV Ops & Dual VTUAV Ops
- Lessons learned to mature TTP Development

Scan Eagle / ISR Services
- Approaching 260,000 flight hours in support of forward deployed forces.
- Identification of surface vessels ISO maritime domain awareness
- Surveillance of known smuggling and piracy areas
- Persistent coverage for counter-insurgency operations
- Route Survey Support
- Strike Support
- Surveillance and protection of high value infrastructure
- Battle Damage Assessment
- ScanEagle has been deployed in numerous ground support roles and on 62 different Naval vessels within six (6) different ship classes through Dec 2012 recording in excess of 259,000 flight hours.
• Support tactical maneuver forces ashore (MEU battalions)
• ISR for afloat amphibious forces (LHD, LPD, LSD)
• USMC planned inventory of 32 systems
  – Development/operational testing began in 2012
  – Land and ship-based capability in 2014
• USN reqts = 25 systems, possible procurement deferral
• 1 system = 5 air vehicles
• 25 lb cargo bay (comm relay, radar, etc)
• Initial Operational Capability in 2013
**Baseline Program of Record**

Support LCS Mission Packages in conjunction with the H-60

- LCS-1 DI testing (Nov 2010); LCS-2 /4 DI testing (TBD)
- LCS-3 DI expansion (Aug 2013)
- COBRA land testing to complete 2013

**ISR Task Force Support**

Afghanistan

- 3 A/C, 2 GCS, 300 hrs/mo FMV using GOCO contract
- Require additional aircraft/spares/manpower/facilities to meet 600 hr/month (Spring 2013)
- First flight 2 May 2011
- 4030.5 flight hours to date

**Maritime ISR Support to SOF RDC (MQ-8B/C)**

- JEONS approved in Jan 2012
- Phased approach using MQ-8B and transitioning to upgraded aircraft (MQ-8C)
- Deployments continue aboard USS BRADLEY and USS ROBERTS in 2013
- DDG TEMPALT installations support 2014 deployments
- JHSV integration engineering analysis underway

**Weapons RDC**

- Sea Wall firing & Safe Separation scheduled for Feb 2013
- QRA in May 2013

**RADAR RDC**

- Provides wide-area maritime search capability in support of UONS
- QRA in 2014
- CPD Objective

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MQ-8B has flown over 3000 flights for over 7450.00 flights hours since 2006
Transformational Mixed Force: Effective, Efficient Mission Capability Tailored to the Warfighter’s Requirements

**Responsive Multi-Mission**
- Robust Sensor Suite
- Cue to Kill
- Onboard Fusion
- Large Weapons Payload

**Persistent ISR**
- Long Dwell Sensor Suite
- C4I Network Node (FORCEnet)
- Combat Info from MCS
- Data available to Intel Centers

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**Navy Maritime Patrol Missions**

- ASW Search
- ASW Track
- SuW Kill

- SuW Detect
  - SuW Track
  - SuW Classify/ID
  - Maintain Maritime COP

- Fleet Response Plan
- Tripwire

- ISR in support of Intel Preparation of the Environment

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Rolls-Royce AE3007H
- 23+ Million hrs
- 8,500 lb Thrust (SL)

Automatic Identification System (AIS)

Advanced Mission Management System (AMMS)
- Onboard Server
- Data Correlation
- Payload & Bandwidth Control

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Graphite Empennage

AN/ZLQ-1 ESM
- 360° FOR

Graphite Wing

AN/ZLQ-1 ESM
- 360° FOR

WB Satcom

AN/ZLQ-1 ESM
- 360° FOR

Due Regard Radar
- Safe Separation

AN/ZLQ-1 ESM
- 360° FOR

External Provisions

AN/ZPY-3 Multi-Function Active Sensor (MFAS) Maritime Radar
- 360° X-Band 2D AESA Radar
- Maritime and Air/Ground Modes

De-icing

Metallic Fuselage

External Unpressurized Space 132 cu ft

Hail and Bird Strike Resistance

Pressurized Space 180 cu ft

Backup Battery Power 45 min

Internal Payload 3,200 lb
External Payload 2,400 lb

Power AC 30.0 kVA
Power DC 400 A

Pressurized Space 180 cu ft
Unpressurized Space 45 cu ft

External Unpressurized Space 132 cu ft
Backup Battery Power 45 min

MQ-4C Triton Air Vehicle Configuration

Length 47.6 ft
Wingspan 130.9 ft
Max Takeoff Wt 32,250 lb
Cruise Speed (KTAS) 330 knots
GTO/V Rate of Climb (SL) 2,800 fpm
Operational Ceiling 60,000 ft
Max Un-refueled Range >9,550 nm
Endurance >24 hr

AN/DAS-3 EO/IR
- 360° Field of Regard
- Auto-Target Tracking
- Hi Res EO/IR at Multiple FOVs
- Multi-Mode Color Video

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**Mission:**
- Mature technologies for a carrier suitable, low observable relevant, unmanned air system to operate in a carrier environment

**Milestones:**
- First autonomous carrier landing with F/A-18 surrogate - July 2011
- X-47B flight envelope expansion complete at Edwards AFB – Nov 2011
- Autonomous Aerial Refueling demo with Lear surrogate – January 2012
- X-47B flight operations commenced at NAS Patuxent River - July 2012
- CVN control segment and autonomous operations validated – July 2012
- Shore based carrier suitability testing underway (catapults, arrested landings)
- Carrier launch and recovery operations planned for 2013
Recent X-47B Testing

Testing aboard USS HARRY S. TRUMAN (CVN 75)

X-47B CVN suitability testing continues at NAS Pax River
Unmanned Carrier Launched Airborne Surveillance & Strike (UCLASS)

• Deliver UCLASS capability
  – Carrier-based persistent ISR & strike capability
  – Unmanned, CV suitable
  – Multi-Int sensor capability
  – LOS / BLOS using existing networks
  – Integrated CVN digitized environment

• Prioritized requirements
  – Affordability--- Schedule --- Maximum Orbit Capacity

• Government to lead CS&C and CVN segments

• Scope the air vehicle for an enduring, affordable capability
  – FY-13/14 competitive solicitation to industry

Increasing sea-based capacity across the spectrum of maritime and littoral missions enabling a single CVW to provide continuous 24/7 ISR/Strike capability
The Common Control System is:

1) A software solution with instantiations for multiple hardware configurations

2) OSD UAS Control Segment (UCS) Architecture and Naval Interoperability Profile (NIOP) Compliant

3) Built on a Government managed Open COTS Framework

4) Common Services and Applications provided by multiple vendors

5) Unique Services and Applications provided by the UAS Platforms

6) A Presentation Layer decoupled from underlying functionality

7) Integrated and Tested by a Government Lead Systems Integration team

Achieve UAS common control across PEO(U&W) UAS platforms to eliminate redundant efforts, encourage innovation, and improve cost control of unmanned aviation.

Unmanned Aircraft System Common Control System
Acquisition Decision Memorandum: PEO(U&W)/11-093 dtd 01 JUL 2011

CCS key to UCLASS CS&C segment maturing
Achieving a CCS solution will enhance interoperability opportunities but interoperability inherently encompasses a much broader spectrum of issues across combatant forces, networks & customers

- Naval Interoperability Profiles (NIOPs), FACE
UAS Challenges

- Moving from Automation to Autonomy
- Common Control Systems
- Interoperability
- Tasking, Collection, Processing, Exploitation & Dissemination (TCPED) architecture & management
- Operational ISR integration C2 across all domains
- CVN operational integration
- National airspace Integration

Partnership with industry more important than ever
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

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.
Questions