# BAMS UAS & Global Hawk Joint Efficiencies

## 2011 Department of Defense Maintenance Symposium and Exhibition

**Presented by:**

**CDR Wes Naylor, USN**
**Joint Efficiencies IPT Lead, PMA-262**

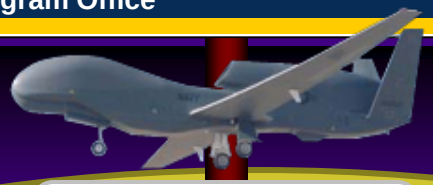
14 November 2011

# BLUF
## (Bottom Line Up Front)

- **Navy BAMS UAS and AF Global Hawk programs pursuing efforts to enable interoperability/commonality to increase operational effectiveness and reduce total ownership cost**

# GH/BAMS UAS Commonality (2009)

Persistent Maritime Unmanned Aircraft Systems Program Office



## Global Hawk (USAF)

## BAMS UAS (Navy)

### COMMON HARDWARE / SYSTEMS

**AIRFRAME–Common w/USAF**
- 78% common by weight
- Dual redundant flight control system

**PROPULSION–Common with USAF**
- Rolls Royce AE3007
- Dual FADEC
- 25 kVA AC power
- 12 kW DC power

**AVIONICS–Common With USAF**
- Dual redundant data & power
- Auto Take Off and Land

### COMMONALITY OPPORTUNITIES

**Ground Control**
- RQ-4B Unmanned Aircraft Command and Control (C2)
- USAF Graphic User Interfaces
- COTS Hardware

**Operations & Support**
- Maintenance - GH
- Basing - GH
- Training - GH
- Manpower - GH
- COTS Hardware

**DATA LINK**
- Ku band SATCOM
- CDL
- ARC-210
- Inmarsat
- CAMA

**Airspace Integration**
- Autonomous Sense & Avoid

**Ground Control**
- Unmanned Aircraft Command and Control (C2) - USAF
- Maritime Patrol and Reconnaissance Force (MPRF) Graphic Use Interfaces
- COTS Hardware

**Operations & Support**
- Maintenance – MPRF/GH
- Basing – MPRF/GH
- Training – MPRF/GH
- Manpower – MPRF/GH

**DATA LINK –Common with Multiple Platforms**
- Ka & X-band SATCOM
- Dual CDL
- ARC-210
- Inmarsat
- Link 16
- Federated Architecture

**Airspace Integration**
- Due Regard

**All Weather**
- Wing De-Ice
- Engine Inlet Anti-Ice

### SERVICE UNIQUE

**Payload**
- EISS
- ASIP
- MP-RTIP

**Payload (360º FoR)- Common with Multiple Platforms**
- MFAS RADAR
- ESM
- EO/IR (Full Motion Video)
- AIS
- Airborne Communications Relay

# GH/BAMS UAS Commonality (2010)

Persistent Maritime Unmanned Aircraft Systems Program Office

## Global Hawk (USAF)

## BAMS UAS (Navy)

### COMMON HARDWARE / SYSTEMS

**AIRFRAME**
Dual redundant flight control system

**PROPULSION**
- Rolls Royce AE3007H
- Dual FADEC
- AC generator
- DC generator

**AVIONICS**
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- Auto Take Off and Land

**AUTONOMOUS AIRBORNE SENSE & AVOID**
- Radar for Airborne Sense and Avoid
- Software for Autonomous Sense and Avoid

**GROUND SYSTEM**
- Core Architecture

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# GH/BAMS UAS Commonality
## (2009-2010 JROC through Current Plan)

Persistent Maritime Unmanned Aircraft Systems Program Office

### COMMON HARDWARE / SYSTEMS

#### Global Hawk (USAF)

**Operations & Support**
- Maintenance – MPRF/GH
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**Comms**
Ka & X-band SATCOM

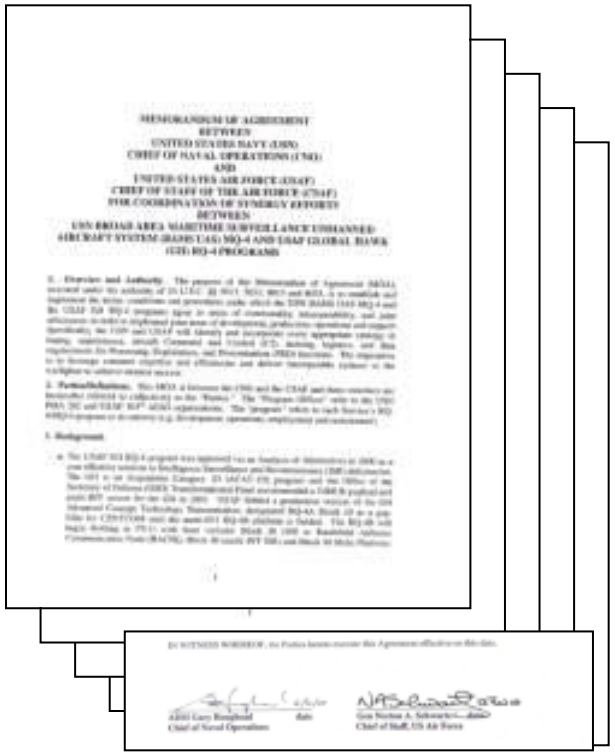
***MOA signed between PMA-262 and 303d AESG and Endorsed by PEO (U&W) and USAF ASC Executive Director***

# Cost Avoidance Achieved

- **Software**
  - **Approximately $25M cost avoidance realized in GH code reuse**
  - **Approximately $380M cost avoidance realized in total code reuse across OSD portfolio (Overall 77% software reuse)**
- **Engine**
  - **Leveraging commercial heritage and GH growth engine investment (Approximately $20M in cost avoidance)**
- **AF engine made available for BAMS fit checks**
- **Production**
  - **Block load share savings**
  - **Tooling**
  - **Learning curve**

# BAMS & GLOBAL HAWK Synergy MOA





**GH/BAMS Synergies MOA, Signed June 2010**

**Specifies USN/USAF working groups to "Identify and incorporate every appropriate synergy in basing, maintenance, aircraft Command and Control (C2), training, logistics, and data requirements for Processing, Exploitation, and Dissemination (PED) functions."**

**#1 – Deliver interoperable systems to the warfighter to achieve** mission success

- Identify BAMS/GH operations requiring unique systems
- Develop rapid and efficient system response
- Develop simplified logistics trail
- Maximize the number of interoperable systems for mission flexibility

**#2 – Save money and resources where possible**

- Eliminate redundant effort
- Reduce personnel footprint requirement
- Combine similar operations
- Maximize common configurations

Program Offices and Synergies Working Group finds optimum solutions for USN/USAF interoperability

# Joint Concept Tenets

- The following are necessary for maximum long-term efficiency:
  - Common Ground Station (CGS)
  - Organic Maintenance
  - Joint Maintenance – merge AFI & OPNAV practices
  - Common Technical Publications
  - Joint Launch and Recovery Operations
  - Joint Training – some synergies exist (MST/WST)
- JConcept provides direction for follow-on studies

# Joint Concept Details

- JConcept draft addresses Joint opportunities for :
  - CONUS and OCONUS Basing
  - Manning and Organizational structures
  - Training (pilot and maintenance)
  - Equipment (Common Ground Station, tools, support equipment)
  - Maintenance practices (common curriculum, training sites, and procedures)
  - Facilities
  - Operations (Launch & Recovery, BLOS, maintenance)
  - Other DOTMLPF actions (e.g., manpower studies)

# GH / BAMS Basing Synergies



# BAMS UAS Manpower and Personnel (Current)



- BAMS UAS
  - NAVAIR and the Navy Manpower Analysis Center developed Preliminary Squadron Manning Document (PSQMD) to facilitate fleet integration; source document for MS C Manpower Estimate Report (MER)
  - BAMS UAS PSQMDs developed 24 September 2010

- USAF
  - Using Contractor Logistic Support
  - Global Hawk maintenance uses a total force concept for manpower & personnel support, supported by active duty, ANG, AFR, and contract personnel
  - Peacetime environment two of the three FOLs (PACOM and EUCOM) will be supported by contractor maintenance. Personnel rotating out of Beale AFB support CENTCOM
  - The Global Hawk manpower estimate provided by ACC/A8U and ACC is based on twenty-four (24) Primary Mission Aircraft Inventory (PMAI)

# BAMS UAS Manpower and Personnel (Future)



- Program offices exploring future manpower and personnel requirements and constructs
  - –Working with Synergy Working Group concepts team to define possible future constructs
  - –Air Force exploring transition to blue suit maintenance
  - –Navy and Air Force exploring formation and construct of organizational units to support forward operating bases

# Training Synergy Approach

- Operator Training
  - Initial Qualification Training for pilots/AVOs at Beale AFB
  - Synergy opportunity for remainder of aircrew and pilot/AVO MQT limited by differences in mission and aircraft sensors
  - MPRF synergy leveraged for Sensor Operator / Tactical Coordinator (USN) training at NAS Jacksonville
- Maintenance Training
  - Co-located maintenance training facility at Beale AFB
  - Initial training targeted for FY17 with incremental phasing of courses
  - Consists of initial training tracks for GH Block 20 and MQ-4C UAS
  - Delta courses provided for cross-training GH to MQ-4C UAS

# Training Devices

- Common Mission Systems Trainer
  - Embedded trainer based on Navy MST
  - Incorporates AF crew training requirements
- Common Pilot Trainer
- Full Mission Simulation for individuals/crews
- Joint and Fleet Synthetic Training
- Embedded in Mission Control System
  - Redundant MCS side will be used for training
- Standalone FRS MST planned for next contract phase
- Sensor Simulations
- Aircraft Simulation – Closed Loop Simulation
- Contains both trainee terminal and scenario recording capabilities (Audio, Video, Truth Data)

# Common Ground Station (CGS)

- **CGS allows USN and USAF to fly each other's UAs**
  - **LOS L&R**
  - **BLOS Transit / Ferry**
  - **Emergencies**

# CGS Challenges

- UCI = Additional scope – Impact unknown
- DMS = Initial Capability (Early Fielding)
  - Meeting DMS need date forcing GSRA to look at Initial Capability (ICAP) or early fielding initiative
  - GH GSRA Block 20/30 ICAP Initiative
    - GS infrastructure and multi-block C2 capability ready for flight test in 2013
    - Original development strategy delayed flight testing until 2014
    - Accelerate GH Block 20/30 capability flight test for risk reduction

# CGS Status

- JCWG and JCET working towards
  - Common Pilot/AVO display content
    - Initial list developed and under refinement
  - Common moving map
    - Study in work - recommendation 11 April
  - Common operator station (hardware) configuration
    - Study completed 10 March
    - CGS execution to incorporate configuration defined
  - Sensor Operator configuration not evaluated

# Logistics Planning

- Navy Business Case Analysis will inform depot decision and serve as basis for Performance Based Logistics (PBL) solution
  - Navy engaging in Depot Source of Repair Analysis
  - Navy to coordinate with Air Force for teaming on depot and possible PBL solutions in all appropriate areas
  - Logistics Synergy Working Group established
  - Common maintenance hub planned for Beale to accommodate all O level + maintenance requirements
- Air Force Logistics Plans
  - 2 Level Maintenance concept; organizational and depot
  - Combined Contractor Logistics with organic depot support by 2016
  - Organic depot studies and Business Case Analysis by 3rd QFY 2012
  - Depot support is provided by OEM; DMAWG process

# Summary

- BAMS and GH teams realizing synergies across the programs
- Program offices working with Synergies Working Group and the operators to determine where potential for commonalities exist
- MOA structure in place to ensure areas of commonality can be acted upon by program offices expeditiously

# Questions

**CDR Wes Naylor, USN**
Joint Efficiencies IPT Lead,
PMA-262