BAMS UAS & Global Hawk Joint Efficiencies

2011 Department of Defense Maintenance Symposium and Exhibition

Presented by:

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• 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)**

**Global Hawk (USAF)**

**AIRFRAME**—Common with 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

**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

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

**Ground Control**
- Unmanned Aircraft Command and Control (C2) - USAF

**Operations & Support**
- Maintenance – MPRF/GH
- Basing – MPRF/GH
- Maritime Patrol and Reconnaissance Force (MPRF) Graphic Use Interfaces
- Manpower – MPRF/GH
- COTS Hardware

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

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

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

**DATA LINK**—Common with Multiple Platforms
- Wing De-Ice
- Engine Inlet Anti-Ice

**All Weather**
- Due Regard

**Airspace Integration**
- Autonomous Sense & Avoid

**GH/BAMS UAS Commonality (2009)**

**BAMS UAS (Navy)**
Global Hawk (USAF)

**Commonality Opportunities**

- **Ground System**
  - 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
- **Communication**
  - Ku band SATCOM
  - CDL
  - ARC-210
  - Inmarsat
  - CAMA

**Unique Features**

- **Payload**
  - EISS
  - ASIP
  - MP-RTIP
- **All Weather**
  - Wing De-Ice
  - Engine Inlet Anti-Ice

**Hardware / Systems**

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

**AVIONICS**

- Dual redundant data & power
- Auto Take Off and Land

**Airframe**

- Dual redundant flight control system

**Autonomous Airborne Sense & Avoid**

- Radar for Airborne Sense and Avoid
- Software for Autonomous Sense and Avoid

**Ground System**

- Core Architecture

**Communication**

- Ka & X-band SATCOM
- Dual CDL
- ARC-210
- Inmarsat
- Link 16
- Federated Architecture

**Operations & Support**

- Maintenance – MPRF/GH
- Basing – MPRF/GH
- Training – MPRF/GH
- Manpower – MPRF/GH

**Payload (360º FoR) – Common with Multiple Platforms**

- MFAS RADAR
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- Airborne Communications Relay

BAMS UAS (Navy)

**Commonality Opportunities**

- **Ground System**
  - Unmanned Aircraft Command and Control (C2) – USAF
  - Maritime Patrol & Reconnaissance Force (MPRF) Graphic User Interfaces
  - COTS Hardware
- **Operations & Support**
  - Maintenance – MPRF/GH
  - Basing – MPRF/GH
  - Training – MPRF/GH
  - Manpower – MPRF/GH

**Unique Features**

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

**Airframe**

- Dual redundant flight control system

**Autonomous Airborne Sense & Avoid**

- Radar for Airborne Sense and Avoid
- Software for Autonomous Sense and Avoid

**Ground System**

- Core Architecture

**Communication**

- Ka & X-band SATCOM
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- Federated Architecture

**Operations & Support**

- Maintenance – MPRF/GH
- Basing – MPRF/GH
- Training – MPRF/GH
- Manpower – MPRF/GH

**Payload (360º FoR) – Common with Multiple Platforms**

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

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
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
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
• 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

GH MOB #1 - Beale AFB
- Block 10 current ops
- Block 20/30 1QFY10
- Joint Ops/MX training

GH FOL – CENTCOM:
- Block 10: Current Ops
- Block 20/BACN Current Ops
- Replace Block 10 w/Block 30 2QTR FY11
- Add Block 40 in FY14

GH MOB #2 - Grand Forks:
- Block 40 initial fielding in FY11
- First ops sortie late FY13
- BACN ops (MCE-only)

GH FOL – EUCOM:
- Block 30 2QTR FY11
- Add Block 40 in FY14

GH FOL – PACOM:
- Block 30(I) 1QTR FY11
- Add Block 40 in FY14

BAMS FOB – Beale
BAMS MOB - Jax
BAMS FOB – EUCOM
BAMS FOB – CENTCOM
BAMS FOB – PACOM
• 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)
• 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
• 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

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