

# 73rd MORSS CD Cover Page

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# Manpower Requirements Determination for New Systems

***Broad Area Maritime Surveillance (BAMS)  
Unmanned Aerial Vehicle (UAV)***



**73rd MORSS Conference  
WG 20**



***23 June 2005***

Prepared by:

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# Overview

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- **Tasks and general approach**
- **Manpower ConOps development**
- **Manpower requirements determination**
- **Manpower drivers**
- **Manpower requirements**
- **Lessons Learned**



# The Challenge



## BAMS UAV Concept of Operations:

- High altitude (above 40K), Long dwell (over 24 hrs), autonomous
- Persistent, forward deployed ISR (5 x 24/7/365)



## Traditional Approach

- Current system upgrade or new system replacing old
- Specific vehicle/system
- ROC/POE
- Workload metrics available (maintenance & Human Systems)
- Predominately Military (Active & Reserve) manning

## BAMS UAV

- Completely new system – no Baseline Comparison System
- Vehicle not selected
- No ROC/POE
- No maintenance or HS data
- Guidance:
  - Total Force approach
  - Sea Warrior / TF Excel context
  - Optimum manning to reduce total numbers and life cycle cost
  - No end strength growth
  - Stakeholder concurrence on requirement on manpower conops and requirement





# BAMS UAV Manpower

## Plan of Attack



**Task: Go from blank sheet of paper to detailed manning document in 8 months -**

- *Develop Manpower Concept of Operation (build Fleet consensus)*
- *Determine Manpower and Personnel requirements*
- *Articulate results in Manpower Estimate Report (MER) – Milestone B requirement*

**1** Operational CONOPS

- *Fleet and OPNAV approved ConOps identified constraints on manpower concept*

Manpower CONOPS

**2**

- *Identify key manpower drivers*
- *Develop manpower ConOps feasibility space*
- *Consider fixed number of ConOps alternatives*
- *Apply metrics and analysis*
- *Build Fleet consensus for final ConOps Alternative*

Manpower Analysis

- *Coordinate with N-12/NAVMAC*
- *Employ defensible and agreed-to methodology*

**3**

MER

- *Follow approved format, coordinate with POCs*
- *Address all critical issues*
- *Final document details final recommendation*



# BAMS Manpower ConOps Approach



- **Identify key Manpower ConOps variables**
  - Enough generality to capture only the major MPT drivers
  - Enough resolution to build Manpower ConOps alternatives
- **Get Fleet and Stakeholder input early**
  - 11 “variables” considered
  - 3 “options” within each variable
  - **177,147** potential “alternatives” available for consideration

## Variables

	Organization	Air Vehicle	Capability Package	Force Structure	OPS Support Concept	Maintenance Support Concept	Support Concept	Community Ownership	TSC Capability	Number of Bases	Ship Capability
Options	Squadron	Global Hawk-like	Multi-INT	MMA POR	Contractor	Contractor	O to D	MPR	MSN & Data Exploitation	3	Specific
	Detachment (Deploy)	Unmanned Manned Aircraft	RF EO/IR	MMA Reduced POR	Mix	Mix	3 Level	UAV Community	MSN & Support	5	Trained
	Detachment (PCS)	Predator-like	Active or Passive	IOC	NAVY	NAVY	Partial O to D	Other	L & R	7	None



# BAMS Manpower ConOps Development Methodology



**Variables**

**Options**

Organization	Air Vehicle	Capability Package	Force Structure	OPS Support Concept	Maintenance Support Concept	Support Concept	Community Ownership	TSC Capability	Number of Bases	Ship Capability
Squadron	Global Hawk-like	Multi-INT	MMA POR	Contractor	Contractor	O to D	MPR	MSN & Data Exploitation	3	Specific
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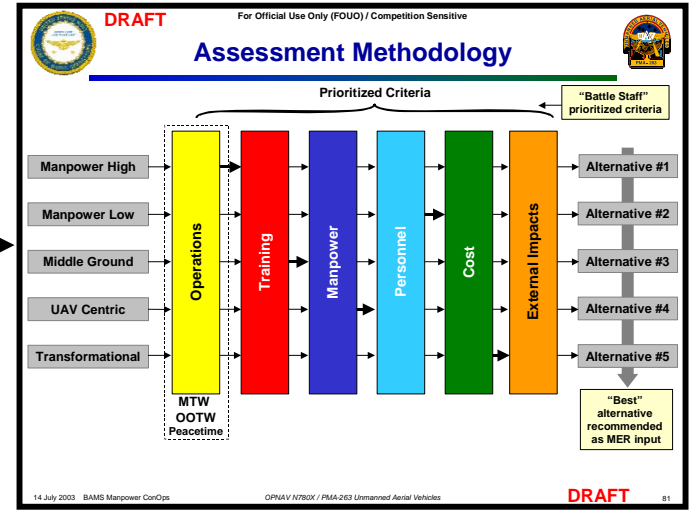
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Detachment (PCS)	Predator-like	Active or Passive	IOC	NAVY	NAVY	Partial O to D	Other	L & R	7	None

177,147 **1**  
Alternatives

7776 **2**  
Alternatives

**3**  
Alternatives

**4**  
Adequately cover the trade space



## ConOps Steps:

- 1** Identify manpower variables and options
- 2** Apply constraints – eliminate infeasible variables and options
- 3** Neck down pathways by identifying manpower themes that “cover the waterfront”
- 4** Select alternatives for detailed analysis



# Manning ConOps Alternative “Paths”



Organization	Air Vehicle	Capability Package	Force Structure	OPS Support Concept	Maintenance Support Concept	Support Concept	Community Ownership	TSC Capability	Number of Bases	Ship Capability
Squadron	Global Hawk-like	Multi-INT	MMA POR	Contractor	Contractor	O to D	MPR	MSN & Data Exploitation	3	Specific
Detachment (Deploy)	Unmanned Manned Aircraft	RF EO/IR	MMA Reduced POR	Mix	Mix	3 Level	UAV Community	MSN & Support	5	Trained
Detachment (PCS)	Predator-like	Active or Passive	IOC	NAVY	NAVY	Partial O to D	Other	L & R	7	None

- 5 chosen alternatives “bracketed” trade space
- Evenly distributed across variable “options”

- **Manpower High:** Highest Manpower requirement
- **Manpower Low:** Lowest Manpower requirement
- **Middle Ground:** Between High and Low Manpower requirements
- **UAV Centric:** Most acceptable from a UAV community perspective
- ☐ **Transformational:** Supports DoD Transformation concept



# BAMS MP Assessment Model

## Cost Effective Combat Capability

### Operations

### Support

#### Responsive

#### Flexibility

#### Sustainability

#### Effectiveness

#### Manpower

#### Personnel

#### Training

Manpower High

Manpower High

Manpower High

Manpower High

Manpower High

Manpower High

Manpower High

Manpower Low

Manpower Low

Manpower Low

Manpower Low

Manpower Low

Manpower Low

Manpower Low

Middle Ground

Middle Ground

Middle Ground

Middle Ground

Middle Ground

Middle Ground

Middle Ground

UAV Centric

UAV Centric

UAV Centric

UAV Centric

UAV Centric

UAV Centric

UAV Centric

Transformational

Transformational

Transformational

Transformational

Transformational

Transformational

Transformational

Overall Objective

Weight Objectives

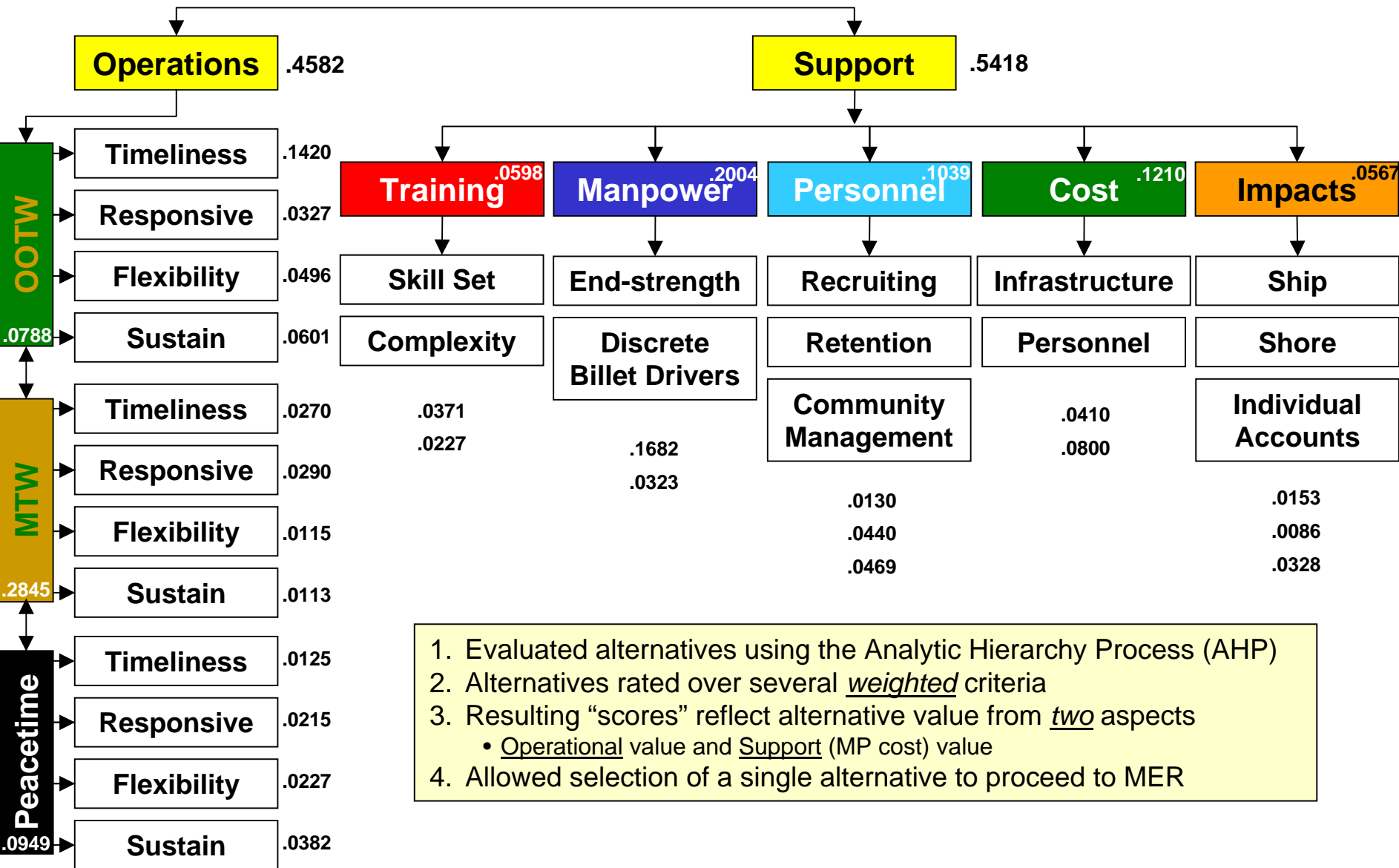
Weight Decision Criteria

Alternatives

9 criteria x 5 alternatives x 3 scenarios = 135 Assessments



# Assessment Model Weighting



1. Evaluated alternatives using the Analytic Hierarchy Process (AHP)
2. Alternatives rated over several *weighted* criteria
3. Resulting “scores” reflect alternative value from *two* aspects
  - Operational value and Support (MP cost) value
4. Allowed selection of a single alternative to proceed to MER

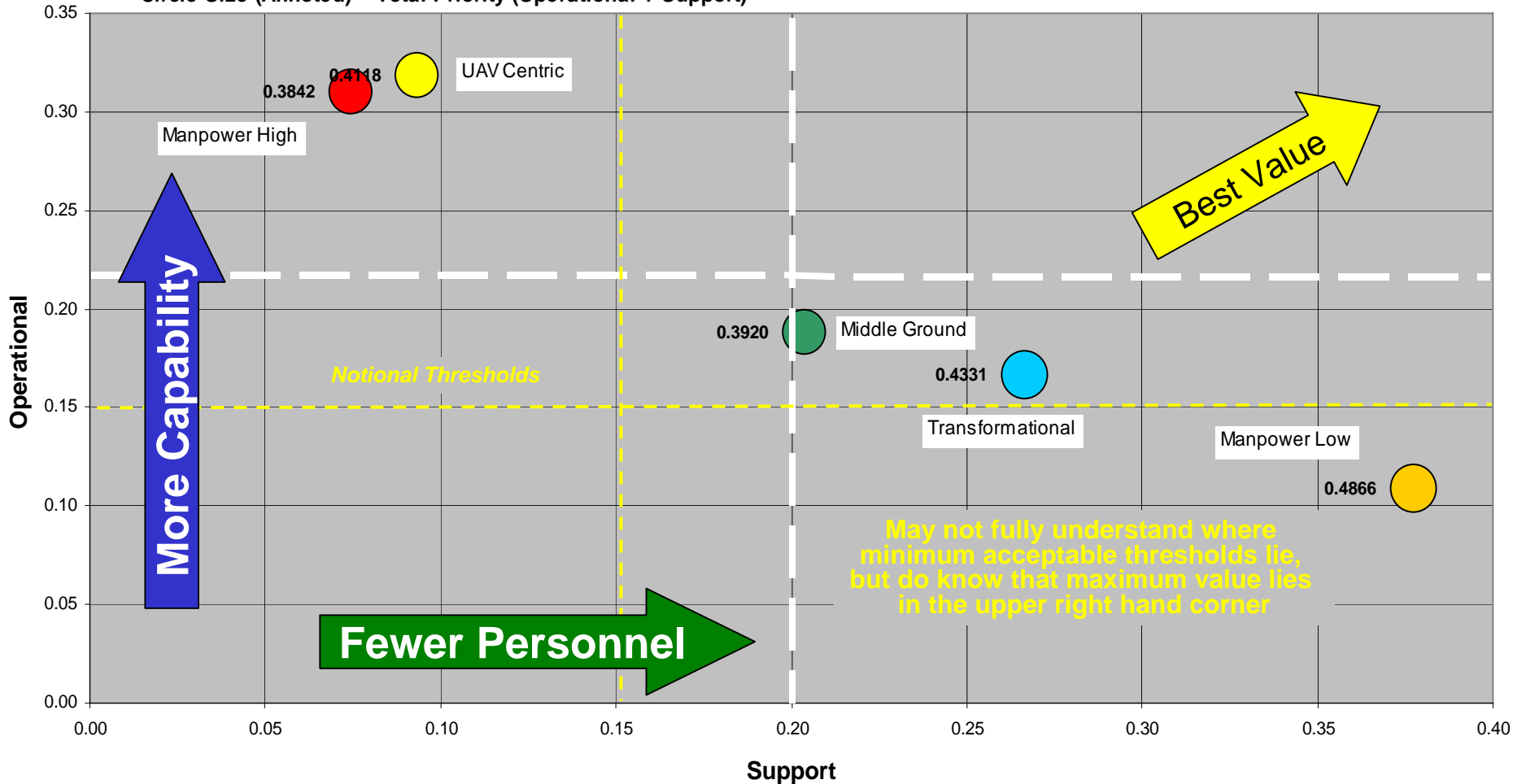


# BAMS MP Assessment Results

## Dual Criteria Assessment



Circle Size (Annotated) = Total Priority (Operational + Support)



- From a “balanced” perspective, two alternatives break out
  - Middle Ground & Transformational
- Both had significant value from both an Operational and Manpower perspective

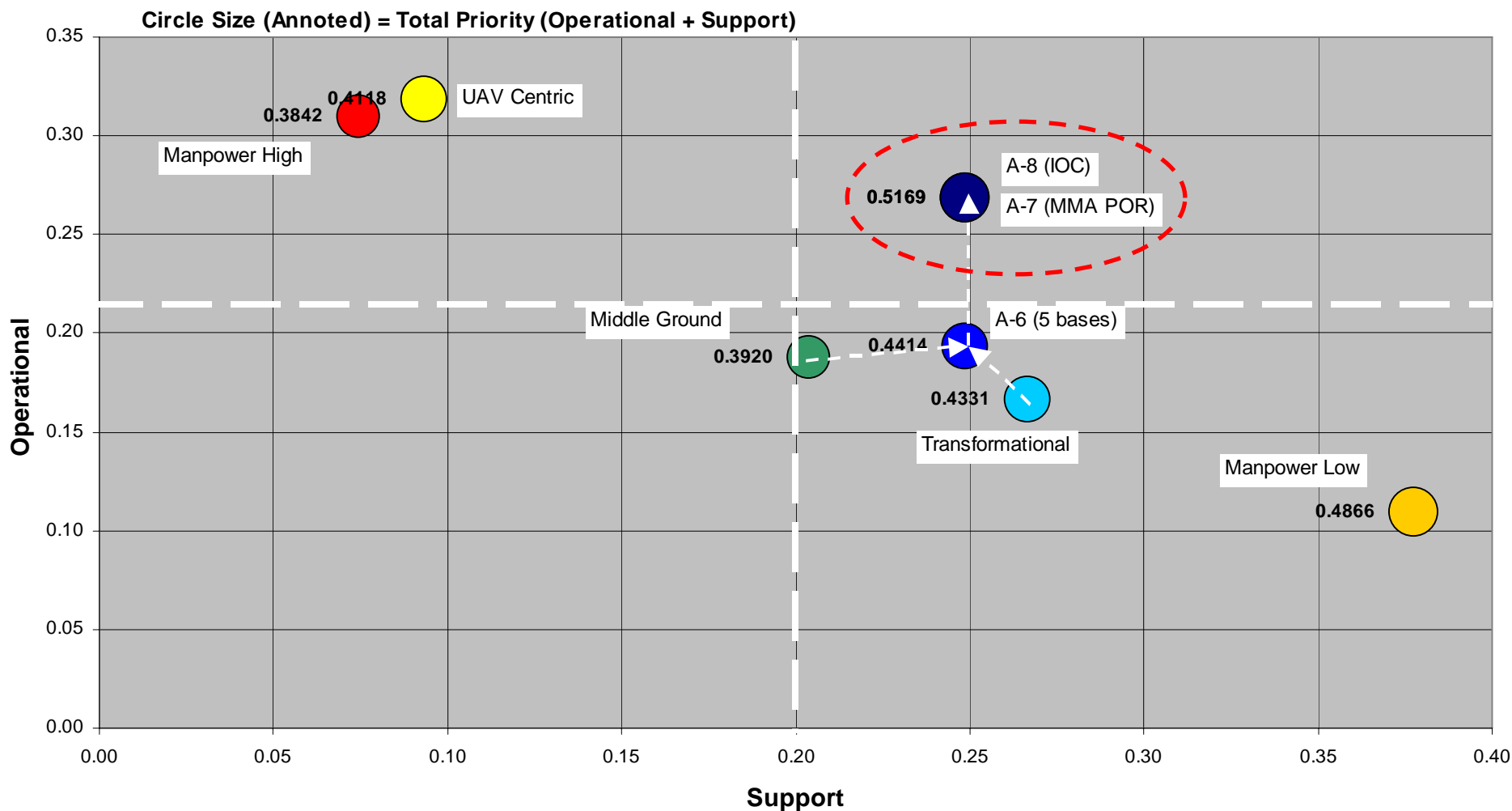


# BAMS MP Assessment Results

## ConOps Improvement



*Using weights from the AHP model, LP was used to determine optimum manpower conops variable options ...*





# Final Manpower ConOps



Organization	Air Vehicle	Capability Package	Force Structure	Ops Support Concept	Maint Support Concept	Log Support Concept	Community Ownership	TSC Capability	Number of Bases	Ship Capability
Squadron	<b>Global Hawk like</b>	<b>Multi-INT</b>	MMA POR	Contractor	<b>Contractor</b>	<b>O to D</b>	<b>MPR</b>	MSN & Data Exploitation	3	Specific
Detachment (Deploy)	Unmanned Manned Aircraft	RF EO/IR	MMA Reduced POR	<b>Mix</b>	Mix	3 Level	UAV Community	<b>MSN &amp; Support</b>	<b>5</b>	<b>Trained</b>
<b>Detachment (PCS)</b>	Predator like	Active or Passive	IOC	NAVY	NAVY	Partial O to D	Other	L & R	7	None

- 5 vehicles / 2 MCS per site / 1 vehicle airborne 24 / 7 / 365
- Limited surge: FOV ops
- 8 crews per site:
  - 2 UAV pilots
  - 2 Sensos
  - 1 IS
  - IFTs on duty 24/7 (Data link & UAV ground systems)
- 8-hr watches, 6hr missions, 2hr overlap, officers are DHs/DivO's
  - Mission crews handle mission planning

- Shore duty
  - NAVMAC policy: 33.4hr standard workweek for military
- FRS training done at CONUS squadron
- Maintenance supervisory training done at factory
- No unique maintenance skill sets required – no unique training
- 7 civilians = 10 active duty
  - NAVMAC and NAVAIR policy
- Reserves not directly addressed



# Analysis Methodology



## 1. Started with USAF Global Hawk manpower requirement

- GH MER
- Current GH “SQMD” and operational experience



## 2. Translated AF manpower ratings & designators into USN

- Adjusted for USN/USAF differences in operational and manpower ConOps

	USAF GH MER	USAF GH Current	USN BAMS UAV
<b>ConOps</b>			
Vehicles/MCS per site	4/2	4/1	5/2
OPTEMPO	24/7 at 3 sites (w artime)	24/7 at 3 sites (w artime)	24/7 at 5 sites continuous
Exploitation	Centralized	Centralized	Limited onsite capability
Capabilities Package	Multi-INT	Multi-INT	Multi-INT
OPS Support	Active/Reserve	Active/Reserve	Active/Contractor
Maintenance Support	Active/Reserve	Active/Res/Contractor	Contractor
<b>Manpower</b>			
Individual MOEs/Ratings	7 Officer / 33 Enlisted	7 Officer / 28 Enlisted	4 Officer / 15 Enlisted
Active/Civilian Mix	4.5%	4.1%	76.0%
Total Program Requirement	1,772	998	631

## 3. Build USN all military requirement using modified Aviation Sqdn Model

- BAMS UAV skills requirement different from current USN UAV inventory
- Higher tech, less maintenance

## 4. “Civilianize” USN military billets subject to military essentiality

- 7:10 for non-watch billets (maintenance & support)
- 1:1 for watch and supervisory billets(Pilot, Senso, MMCO, etc)



# BAMS UAV Manpower Estimate

Manpower based on most conservative (highest) estimate of contractor requirement ...

	CONUS +	(4X) OCONUS	= TOTAL
<b>Officers</b>	<b>16</b>	<b>12</b>	<b>64</b>
<b>Enlisted</b>	<b>22</b>	<b>15</b>	<b>82</b>
<b>Contractor</b>	<b>112</b>	<b>92</b>	<b>485</b>
<b>Program Total</b>	<b>155</b>	<b>119</b>	<b>631</b>

## Highlights:

- 75% of manpower Contractor
- 50/50 mix for operational manning

### Resulted in:

- 80% reduction in required milpers
- 15% reduction in total manpower
- No military end strength growth

TF Makeup

PSQMD



# Lessons Learned

- **Manpower ConOps critical for new systems**
  - Bounds manpower trade space
  - Shows that all reasonable alternatives were considered
  - [Fleet participation](#) fosters ownership of manpower solution (and bill)
- **Identifying a surrogate BSC is important**
  - Provides acceptable analytical framework for Milestone B manpower estimate
  - Translation from BSC to new system must be logical
- **New process – First USN MER in new OSD format**
  - Total Force approach and close coordination with N125, NPC and NAVMAC facilitated buy-in from Navy manpower community
- **Continuous involvement with Stakeholder generates concurrence**
  - N1, FUNCWINGs, TYCOMS, CFFC, PATWING
- **BAMS UAV Manpower**
  - Lead turned CNO's Human Capital Strategy initiatives
  - Total Force approach in sync (15% less people, 80% less uniforms)
  - Able to execute the program with no growth in end strength or robbing from Fleet
  - Contractors not necessarily cheaper than military (overseas)
  - Fleet does not understand the issue of personnel “right sizing” – sees problems with assignments, rotations, TAD billets ...



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# BACKUPS & LINKS



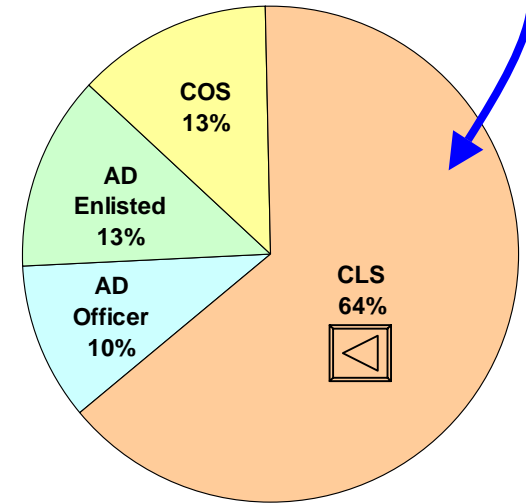
# Total Force Makeup



## Military Enlisted

	E1-3	E4	E5	E6	E7	E8	E9	TOTAL
APO					5	5	1	11
AW			10	12				22
ET				1				1
EW			10	12				22
IS				15				15
PN			1					1
YN				5	5			10
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>21</b>	<b>45</b>	<b>10</b>	<b>5</b>	<b>1</b>	<b>82</b>

*Three fourths of BAMS manpower contracted*



## Military Officer

	O-5	O-4	O-3	O-2	TOTAL
13XX	10	13	30		53
1520			1		1
1630			5		5
6330			5		5
<b>TOTAL</b>	<b>10</b>	<b>13</b>	<b>41</b>	<b>0</b>	<b>64</b>

*Officer Career Path*

*Reserve participation was not fully determined ...*

### Contractor Support impact:

- 40% reduction in officer,
- 87% reduction in enlisted





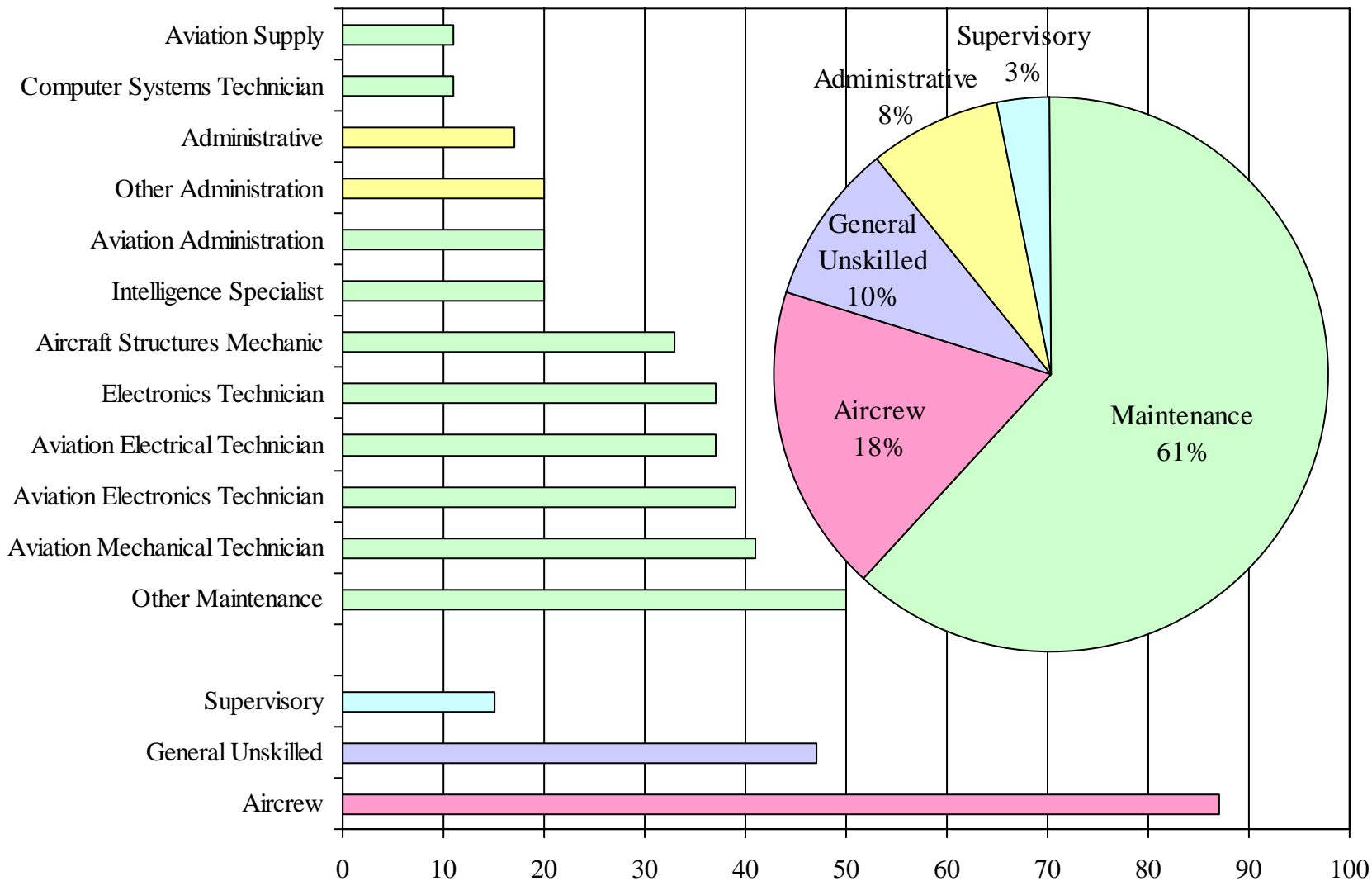
# BAMS UAV Manpower Estimate

Billet Title	CONUS Squadron/FRS			OCONUS Squadrons			Total Program		
	Officer	Enlisted	CLS	Officer	Enlisted	CLS	Officer	Enlisted	CLS
<b>EXEC DEPT</b>	<b>3</b>	<b>1</b>	<b>9</b>	<b>3</b>	<b>0</b>	<b>9</b>	<b>15</b>	<b>1</b>	<b>45</b>
<b>ADMIN DEPT</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>6</b>	<b>10</b>
<b>FIRST LT OFFICE</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>25</b>
<b>OPERATIONS DEPT</b>	<b>8</b>	<b>12</b>	<b>25</b>	<b>8</b>	<b>12</b>	<b>25</b>	<b>40</b>	<b>60</b>	<b>125</b>
OPERATIONS OFFICE	0	1	1	0	1	1	0	5	5
UAV CREW (8)	7	8	16	7	8	16	35	40	80
UAV MSN PLANNING & SUPPORT	1	3	4	1	3	4	5	15	20
MCS FLIGHT TECH	0	0	4	0	0	4	0	0	20
<b>SAFETY DEPT</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>5</b>
<b>TRAINING DEPT</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>5</b>	<b>10</b>
<b>MAINTENANC DEPARTMENT</b>	<b>2</b>	<b>2</b>	<b>65</b>	<b>1</b>	<b>2</b>	<b>50</b>	<b>6</b>	<b>10</b>	<b>265</b>
MCS MAINTENANCE	0	0	7	0	0	5	0	0	27
MAINTNANCE CONTROL W/C 020	1	1	2	1	1	2	5	5	10
MAINTENANCE ADMINISTRATION W/C 030	0	0	1	0	0	1			5
QUALITY ASSURANCE/ANALYSIS W/C 040	0	1	6	0	1	4	0	5	22
MTL SCRNG/PROCURMT/ACCTG W/C 05A/B	0	0	3	0	0	2	0	0	11
IMRL MANAGER/TOOL CTL CENTER W/C 05C/D	0	0	2	0	0	2	0	0	10
AIRCRAFT DIVISION W/C 100	0	0	1	0	0	1	0	0	5
POWER PLANTS BRANCH W/C 110	0	0	6	0	0	4	0	0	22
STRUCTURE/HYDRAULIC SHOP W/C 12A/B	0	0	6	0	0	5	0	0	26
CORROSION CONTROL SHOP W/C 12C	0	0	4	0	0	3	0	0	16
PERIODIC MAINTENANCE BRANCH W/C 140	0	0	1	0	0	1	0	0	5
AVIONICS/ARMAMENT DIVISION W/C 200	0	0	1	0	0	1	0	0	5
ELECTRONICS BRANCH W/C 210	0	0	9	0	0	7	0	0	37
ELECTRICAL/INSTRUMNT BRANCH W/C 220	0	0	8	0	0	6	0	0	32
LINE DIVISION W/C 300	0	0	1	0	0	1	0	0	5
PLANE CAPTAIN BRANCH W/C 310	0	0	7	0	0	5	0	0	27
<b>UAV SQUADRON TOTAL REQUIREMENTS</b>	<b>16</b>	<b>22</b>	<b>117</b>	<b>12</b>	<b>15</b>	<b>92</b>	<b>64</b>	<b>82</b>	<b>485</b>
<b>UAV PROGRAM TOTAL REQUIREMENTS</b>			<b>155</b>			<b>119</b>			<b>631</b>



# Civilian Skill Sets

*Liaison with industry suggested these skill sets are obtainable ...*





# Number of Crews

Crews	AVG Workweek	Shift Overlap	Ground Job Time	Surge Capacity
6	28.0	None	5hrs	None
7	27.3	1 hr	6hrs	Minimal
8	27.8	2hrs	5hrs	Some

## Assumptions:

- Shore duty (33.3hr effective workweek)
- Work week applied to civilians >> ground time is surplus.
- Intel and MCE Tech not part of crew:
  - 6 Intel, 8hr shifts, no overlap, 5hr surplus
  - 5 MCE Techs, 8hr shifts, no overlap or surplus

## Observations:

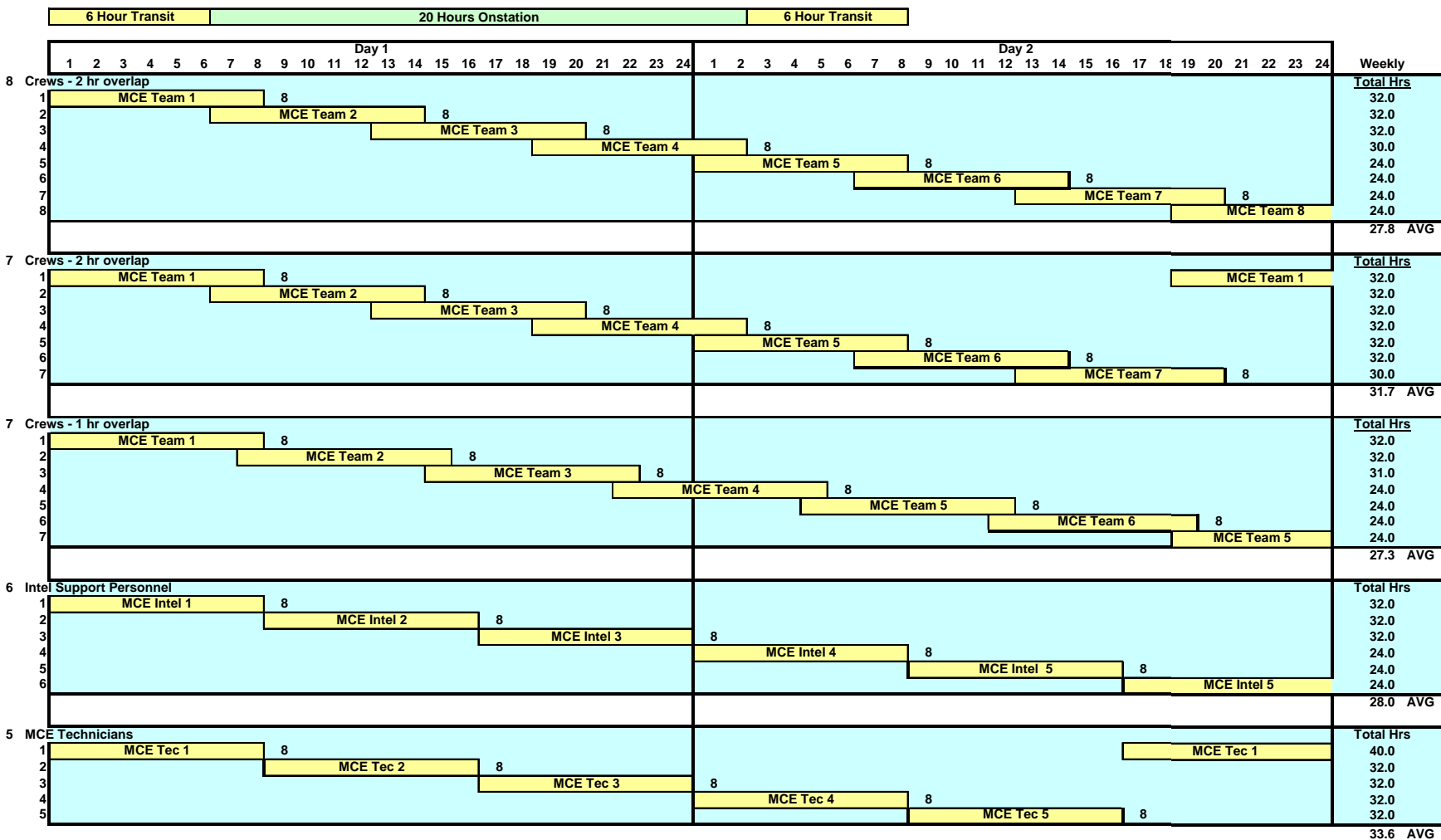
- 6 crews is minimum to support 24/7 and allow for some ground job time.
- 7 crews is minimum to support 24/7, allow for some ground job time and surge.
- 8 crews allows most flexibility
- 1 hr crew overlap = 1 additional crew



# Crew Cycle

8 crews, 8-hr missions, 28/5hr ops/admin work week

- Minimal "ground job" with 75% civilian contingent





# Number of Vehicles

6 hr  
Transits



<b>Vehicles</b>	<b>Maint Shifts Between Flights</b>	<b>Avg. Annual Flight Hours</b>	<b>FLE</b>	<b>Surge Capacity</b>
<b>6</b>	<b>3.5</b>	<b>2,184</b>	<b>1.2X</b>	<b>2 UAV's 24/7 continuous</b>
<b>5</b>	<b>3</b>	<b>2,621</b>	<b>X</b>	<b>Significant</b>
<b>4</b>	<b>2</b>	<b>3,276</b>	<b>.8X</b>	<b>Some</b>
<b>3</b>	<b>1</b>	<b>4,368</b>	<b>.6X</b>	<b>None</b>

## Assumptions:

- 6hr transits, 20hr on station, 32hr flights
- Single 8 hour maintenance shift
- Continuous 24/7 operations

## Observations:

- 6 vehicles will support 2 UAV's 24/7 continuously
- 5 vehicles will support almost 24/7 x 2
- 4 vehicles will support 24/7
- 3 vehicles will not support continuous 24/7



# Number of Vehicles

2 hr  
Transits



Vehicles	Maint Shifts Between Flights	Avg. Annual Flight Hours	FLE	Surge Capacity
6	6	1,629	1.2X	2 UAV's 24/7 continuous +
5	4.5	1,955	X	2 UAV's 24/7 continuous
4	3.5	2,444	.8X	Significant
3	2.5	3,259	.6X	Some

## Assumptions:

- 2hr transits, 28hr on station, 32hr flights
- Single 8 hour maintenance shift
- Continuous 24/7 operations

## Observations:

- 6 vehicles will support 2 UAV's 24/7 continuously and provide some surge capacity.
- 5 vehicles will support 2 UAV's 24/7 continuously.
- 4 vehicles will support 24/7 and significant surge.
- 3 vehicles will support 24/7 with some surge.





# 5-person Crew

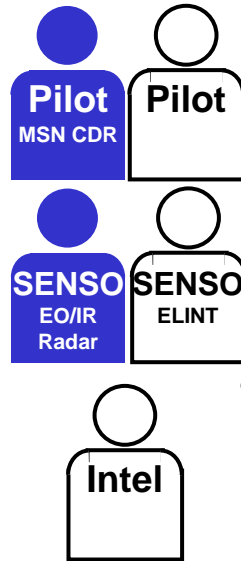
## Knowledge, Skills & Abilities (KSAs)

### • Mission Commander

- Responsible for UAV safety of flight
- POC for coordination with supported commands
- Pilot station duties
- KSA for Maritime Dominance MSN
  - VP, VQ, VS, HS, HSL type skill

### • Pilot

- Mission planning
  - Includes input to supported commands mission plans
- UAV control
- Launch and recovery
- Flight and MSN plan adherence
- Position UAV to employ sensors
- Adjust flight track when mission tasks or priorities change
- Employ sensors when necessary
- KSA for Maritime Dominance MSN
  - Fleet aviator experience probably adequate



### • SENSO 1 (EO/IR - Radar)

- Support mission planning
- Plan sensor employment
- Process sensor data
- Recommend actions to MC / supported command
- Recommend flight path adjustments to optimize sensor employment
- KSA for Naval Aircrewman, OS, IS, other

### • SENSO 2 (ESM)

- Same tasks as SENSO 1
- KSA for EW, CT
  - Also OS, AT, IS with formal training

### • Intel Specialist

- Support mission planning to factor Intel specific needs
- Prepare and brief Intel section for mission
- Perform ad hoc assessment of data collected within MCS capability
- Screen data and forward high interest items to supporting reach-back facility for exploitation
- Prepare mission and post-mission reports

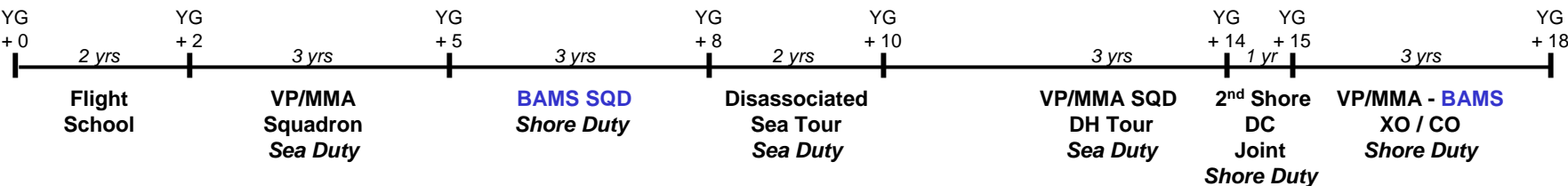


# Potential BAMS Career Paths

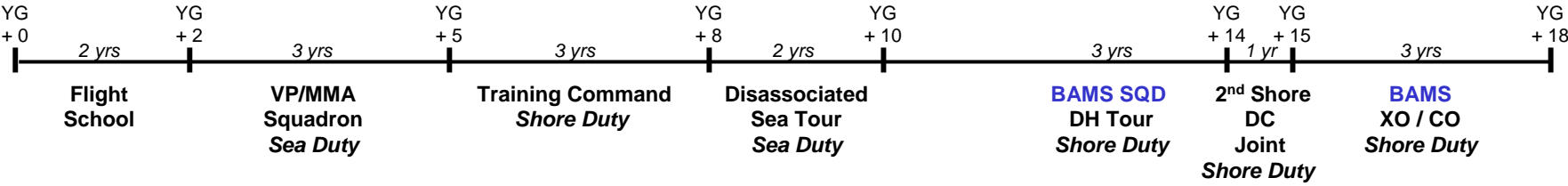
## Pilot / NFO



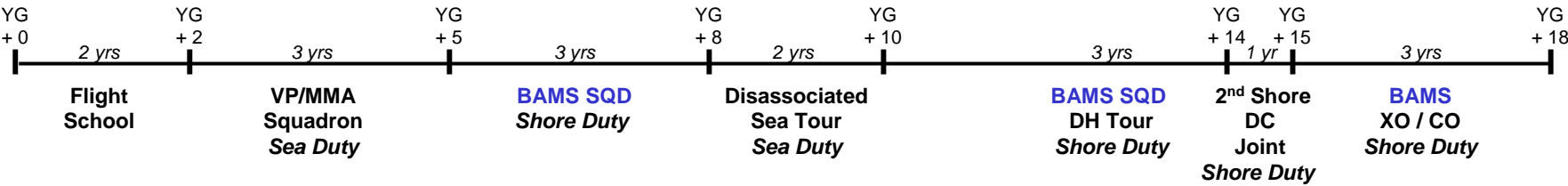
### VP Centric



### No VP DH Screen



### BAMS Centric





# Military Essentiality Criteria\*



- **Direct combat or combat support (flying bullets)**
- **Military readiness**
  - Flight surgeons, EOD, etc
- **Military experience**
  - Program/Requirements officers, RTC instructors, etc.
- **Military tradition or custom**
  - Navy Band, Recruiters, Chaplains, etc
- **Uniformed representative in external services/agencies**
  - Exchange tours, military attaché's, etc.
- **Civilian skills unavailable**
- **Required by law**
- **Sea-shore rotation and career progression (enlisted)**
- \* *TFMMS Coding Manual*



# USN/USAF Manning



**USN BAMS UAV manpower patterned after USAF Global Hawk – similar people requirement when adjusting for deltas in conops and manpower structure**

	USAF	USN
Peacetime OPTEMO	40 24hr sorties from each of 4 sites	24/7 at 5 sites continuous
Wartime OPTEMO	10 orbits continuous (war)	Same as Peacetime
Crew Concept	2O/2E 6hr mission time	2O/2E 6hr mission time
Intel Support Concept	12O/33E at CONUS site	1O/7E at each of 5 sites
Support Concept	Independent of base facilities	Utilizes base facilities
OPS Support	Active & Reserve	Active & Contractor
Maintenance Support	Active & Reserve	Contractor
Individual MOEs/Ratings	7 Officer / 33 Enlisted	4 Officer / 15 Enlisted
% CLS	4.5% CLS    0% COS	99% CLS    50% COS
Total Program Requirement	1772 *	631

\* 2001 USAF GH MER: 324AD off, 1110 AD enl, 17 Civ TechReps, 254 Res, 67 CLS

- **USAF manpower supports full wartime requirement (10 continuous orbits)**
- **USAF ConOps requires full mission crew stateside PLUS L/R crews at OCONUS sites**
- **Support ConOps different – Medical, weather, comm, security and other USAF billets not included in BAMS UAV**
  - 5 Flt Surgeons/5 Corpsman
  - 45 WX support, 36 Comm support
  - 60 Crew Chiefs, 165 Security, others
- **USAF MOS structure inherently drives higher manpower**
  - 3 USAF comm maint MOS's = 2 USN AT's
- **USAF limited use of CLS result in higher total manpower**
  - 15% reduction for BAMS using CLS

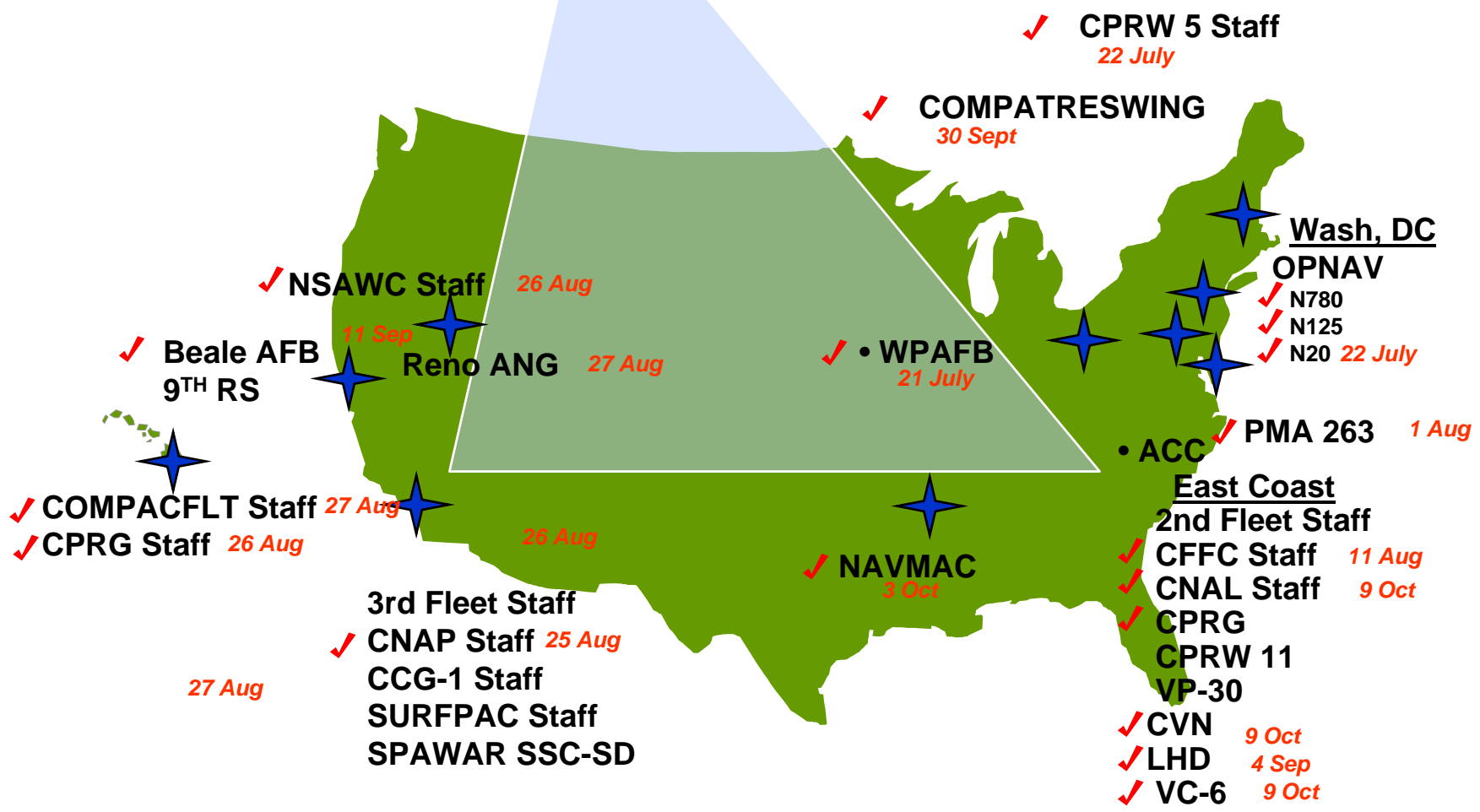


# BAMS Manpower ConOps Briefings



**Others:**

✓ VP OAG 12 Aug





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# BACKUPS & LINKS

**Manpower ConOps Variables**



# Organization Squadron



- **Self-sufficient / stand-alone squadron**
  - Fully responsible for, and capable of all aspects of training, operations and maintenance
  - Squadron supports base TAD needs
- **Personnel are PCS to individual BAMS squadron UICs**
  - Located at Sigonella, Jacksonville, Diego Garcia, Oahu, Kadena (notional)
- **Number of squadrons = number of permanent BAMS operating bases**
  - 3, 5, 7
- **CONUS-based squadron also serves as FRS**
  - If there are two CONUS-based squadrons, only one is an FRS



# Organization

## Detachment (Deploy)



- **CONUS-based “Mother” Squadron(s)**
  - Detachments at 4-5 OCONUS bases
- **Detachments are capable of supporting normal operations**
  - 24/7 for 7 days
- **Detachment does not have manning to support high-tempo operations**
  - Relies on VP personnel for augmentation
- **Supports CNO “surge” concept**
- **Concept may require VP squadron manpower increase**
  - Option A (Deploy)
    - Deploy with VP Squadron
    - IDTC Training at mother squadron
    - 2 home / 1 deploy (PERSTEMPO)
    - Most manpower intensive unit



# Organization

## Detachment (PCS)



- **CONUS-based “Mother” Squadron(s)**
  - Detachments at 4-5 OCONUS bases
- **Detachments are capable of supporting normal operations**
  - 24/7 for 7 days
- **Detachment does not have manning to support high-tempo operations**
  - Relies on VP personnel for augmentation
- **Supports CNO “surge” concept**
- **Concept may require VP squadron manpower increase**
  - Option B (PCS)
    - BAMS personnel PCS at TSC UIC
    - Training, operations and maintenance conducted at the Det level

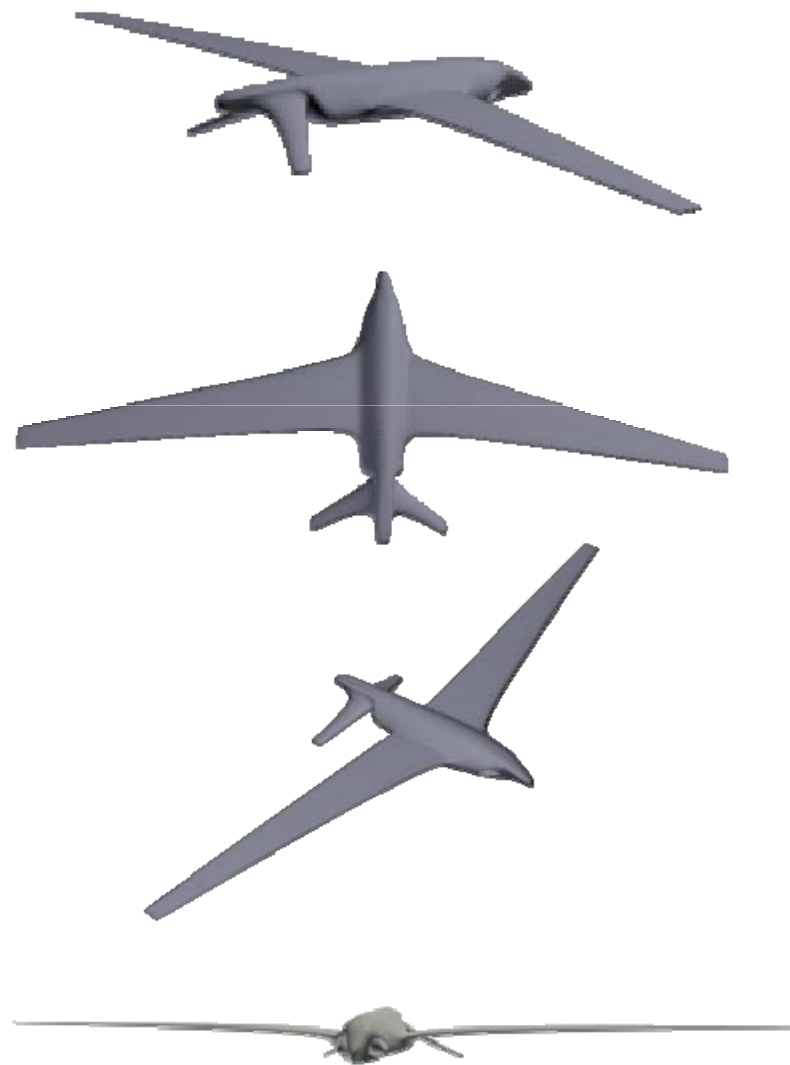


# Air Vehicle

## Global Hawk-like



- **Payload Capacity** 2800 lbs
- **Loiter Altitude** 45 kft
- **Range** 5400 NM
- **TOS** 34 hrs
  
- **Fuselage Length** 44.4 ft
- **Wing Span** 117 ft
- **Vehicle Height** 15.2 ft
  
- **Engines** 1 Turbofan

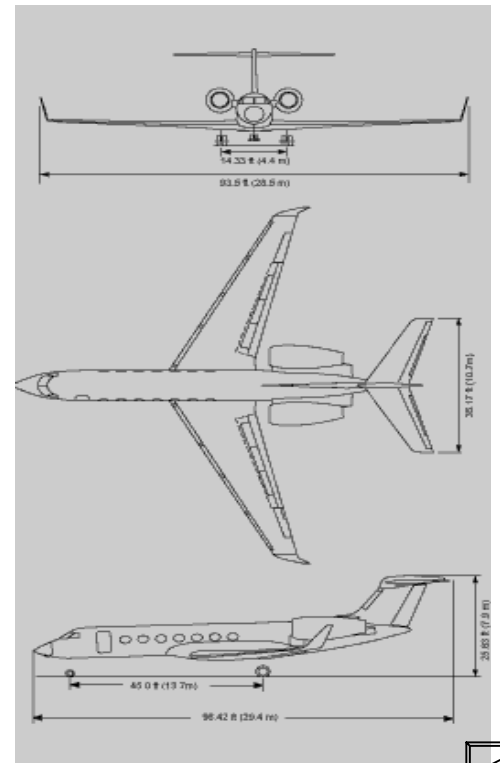




# Air Vehicle

## Unmanned Manned Aircraft

- **Payload Capacity**      **2800 lbs**
- **Loiter Altitude**      **35 kft**
- **Range**      **4650 NM**
- **TOS**      **23.5 hrs**
  
- **Fuselage Length**      **96.5 ft**
- **Wing Span**      **93.5 ft**
- **Vehicle Height**      **25.8 ft**
  
- **Engines**      **2 Turbofan**





# Capability Package

## Multi-INT



- **UAV possesses full spectrum sensor suite**
  - EO and IR
  - Radar with maritime and overland modes
  - Multi-INT
    - ESM suite but specific capability not yet defined
    - COMINT capability minimum, possibly none - TBD
    - Imagery from EO / IR sensor
  - On board vs. off board data integration and fusing not yet defined
- **Limited comm and data relay**
  - Potential for modular avionics design to allow reconfiguration for dedicated comm and data relay mission
- **Largest mission operating crew to operate UAV and sensor suite**
- **Largest data exploitation crew**
- **Typical capability**
  - Provide wide area ocean surveillance with a maximized area coverage
  - Classify maritime targets using ISAR
  - Detect moving targets on land, open ocean and littoral environments
  - Provide strike support through SAR imaging – to include in-theater cueing



# Capability Package

## RF EO / IR



- **UAV possesses fully capable RF and EO / IR suite**
  - EO and IR
  - Radar with maritime and overland modes
  - ESM, level of capability less than ELINT quality suite
  - On board vs. off board data integration and fusing not yet defined
- **Limited comm and data relay**
  - Potential for modular avionics design to allow reconfiguration for dedicated comm and data relay mission
- **Mission operating crew to operate UAV and sensor suite**
- **Data exploitation crew**
- **Typical capability**
  - Provide wide area ocean surveillance with a maximized area coverage
  - Classify maritime targets using ISAR
  - Detect moving targets on land, open ocean and littoral environments
  - Provide strike support through SAR imaging – to include in-theater cueing



# Force Structure

## MMA POR



- **12 x VP squadrons**
  - 6-8 MMA per squadron (type aircraft dependent)
  - 12 crews per squadron
    - Sized to CONOP requirements
  - Crew size (9-11)
    - Boeing – 3 Pilots, 2 NFOs, 3-4 Sensor Operators and 1 Inflight Tech
    - Lockheed Martin – 3 Pilots, 2 NFOs, 2 Flight Engineers, 3 Sensor Operators and 1 Inflight Tech.
  - MC rates ~ 0.85 increase CSR 2.0
- **MMA Maintenance concept TBD**
  - Mixed contractor to uniformed
  - Significant reduction due to increased reliability and commercial logistics
  - 30–70% reduction squadron and AIMD

**This alternative represents OPNAV current plan  
for the MMA Program**



# Force Structure

## MMA Reduced POR



- **Fewer squadrons of the current POR size**
  - Bottom line is force needs to be sized to win war
  - Requirement is for aircrew/aircraft not squadrons
- **9 x VP squadrons - fewer squadrons but same size**
  - 6-8 MMA per squadron (type aircraft dependent)
  - 12 crews per squadron
  - Crew size 10 (possibly 11)
    - Current 11 man crew but without a flight engineer
- **MMA Maintenance concept TBD**
  - Mixed contractor to uniformed
  - Significant reduction due to increased reliability and commercial logistics
  - 30–70% reduction squadron and AIMD

**This alternative represents least number of VP aircrew available to augment BAMS Det personnel**





# Force Structure

## BAMS IOC



- **Current VP force structure with P-3 aircraft**

- P-3 FLE issue will reduce inventory of aircraft:
  - CNAF proposed
    - Maintain current force structure
    - Reduce P-3 inventory to 150 aircraft
    - Transition to 18 month IDTC (reduce FLE and increase surge ops capability)
  - MMA Offsite CNO agreed to
    - 150 x P-3 inventory
    - Maintain force structure
    - Acknowledge need to integrate reserves 12-0-3-1 (decision pending)

- **12 x VP squadrons**

- 8-9 x P-3 PAA per squadron deployed
- Variable PAA during IDTC
  - Broken into three phases (0-6, 6-12, 12-18)
- 12 aircrews per squadron
- Crew size = 11
- 18 month IDTC

- **Maintenance concept remains uniformed**

**This alternative represents greatest VP aircrew available to augment BAMS Det personnel**



# OPS Support Concept

## Contractor Only



- **Contractor personnel used to man UAV aircraft and sensor stations**
- **Limited uniformed personnel in the Det**
  - Provide uniformed personnel to complete chain of command
  - Skills where clearances or training for data exploitation make civilian use impractical
  - Insight into tactical and operational needs of supported command
  - Better understanding of current tactics
- **May pose a problem for status of forces agreements at OCONUS bases**
- **Training is the contractor's responsibility**





# OPS Support Concept

## Contractor & Navy



- **~ 50% of mission watch stations manned by contractor**
- **Several options available - need to reduce**
  - Contractor mans sensor stations with USN pilot and NFO controlling the UAV
  - Contractor fills pilot / NFO watch stations with qualified personnel while Navy pers man sensor watches
  - Even split of watch stations
- **Uniformed personnel fill management positions**
  - Department head, training, ...
- **Skills where clearances or training for data exploitation make civilian use impractical**
- **May pose a problem for status of forces agreements at OCONUS bases**
- **Training at the Det is a Navy responsibility**
  - Includes civilian personnel





# OPS Support Concept

## Navy Only



- **Navy pers man all watch stations**
  - Pilot, NFO, and enlisted aircrewmen required
  - Data exploitation personnel
- **Training a uniformed responsibility**
  - Contract support at RAG for training is an option





# Maintenance Support Concept

## Contractor Only

---



- **Contractors provide all maintenance on site**
- **Uniformed officer and CPO liaison between contractor and Det operations (need to check how done in Training Command)**
- **May pose a problem for status of forces agreements at OCONUS bases**
- **Training is the contractor's responsibility**
- **Potential problem if BAMS must forward deploy to support limited duration operations**



# Maintenance Support Concept

## Contractor & Navy



- **Contractors provide all maintenance for UAV specific components**
  - Airframe, engine, flight controls, data links
  - May perform all UAV unique ground station (data link) maintenance
  - Navy personnel provide maintenance for avionics
    - Rationale: most avionics are off the shelf, non-developmental systems
- **Uniformed officer and CPO liaison between contractor and Det operations**
- **May pose a problem for status of forces agreements at OCONUS bases**
- **Training responsibility split by systems**
- **Potential problem if BAMS must forward deploy to support limited duration operations**





# Maintenance Support Concept

## Navy Only

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- **Normal Naval Aviation maintenance operations modified by any emerging concepts**
  - Example: KSA personnel policies
- **Includes civilian “tech reps”**
  - Can be more than normal if impact reduces uniformed personnel requirements
    - May perform all UAV unique ground station (data link) maintenance
- **Training is USN responsibility**
  - RAG training can be contracted





# Support Concept

## O to D



- **Organization to Depot support concept implies**
  - Very reliable components
  - Spares on hand to prevent supply caused NMC aircraft
  - Automated ordering system
  - Short transport time from depot to squadron
- **All UAV specific parts are O to D**
  - Example: engine, actuators, pumps, ...
- **Legacy components, especially avionics, are supported through the USN repair and supply system**
  - Example: UHF/VHF radio, IFF, FLIR, ...
  - I level support may be in theater or in CONUS
  - No 'I level' repair facilities generated by BAMS
    - Use existing facilities





# Community Ownership

## MPR Force



- **MPR Community**
  - MPR Flags and Wings already involved, leading definition of BAMS
  - Potential large pool of skilled personnel to draw from in order to support BAMS
- **BAMS UAV Training**
  - Utilize VP pilots, NFO's, enlisted aircrew, and maintainers but do not consider it a "disassociated tour"
    - Reap benefit of personnel, experienced in maritime patrol
    - Take "BAMS specific" training prior to BAMS tour, return to MMA community
      - Dovetails with Task Force Excel (TFE), just-in-time training
      - Leverage experience into MMA community
    - Have discrete BAMS community within MMA Community
      - Potential to become "second class citizens"
- **Career Path**
  - Incentivize desirability of BAMS tour by pay, auction (\$\$) (Assignment Incentive Pay-AIP), or promotion
- **Advocacy**
  - Requires Community leaderships' collective commitment and support



# Community Ownership

## UAV Community



- **Stand up new BAMS UAV Community**

- Non aviator focus
- Will likely add to endstrength requirements

- **Training**

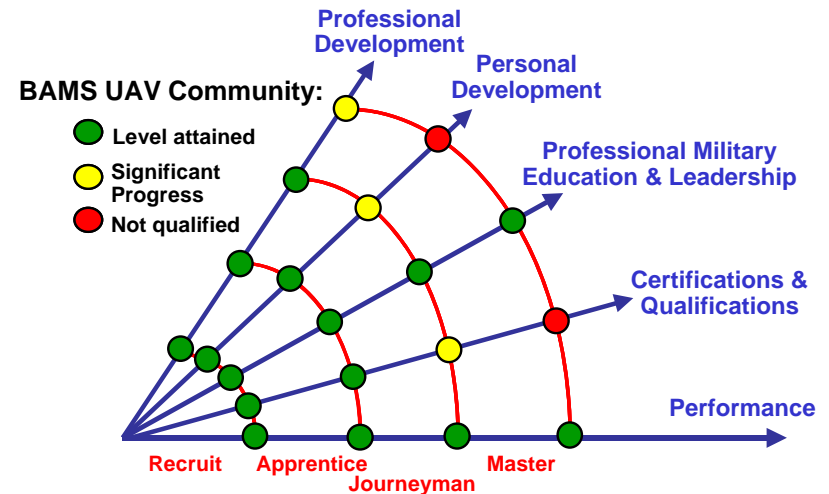
- Specific BAMS UAV training pipeline (aircrew, operators, maintainers), follows common VP training
- Likely shorter pipeline, reducing Individuals Account bill
- Over a career, less individual training required as proficiency maintained

- **Career Path**

- Provide BAMS Command tours (sea and shore)
- Provide a base for sea shore rotation
- Will it be viewed as a desirable career?

- **Advocacy**

- Career path will not likely lead to Flag and advocacy will be lacking





# TSC Capability

## MSN & Data Exploitation



- **‘TSC Capability’ represents the ability of the TSC at each BAMS to support BAMS missions**
  - Planning, execution, post-mission processing and assessment
- **Personnel involved are assigned to the BAMS Det UIC**
- **Facilities are TSC owned**
  - Similar to CVW personnel working in CIC or CVIC during deployments
  - TSC may use facilities to support VP and VQ missions
- **TSC has equipment and personnel to independently execute a BAMS mission**
- **Includes number and types of specialists**
  - Examples: IS, AW, CT, Intel Officer, Cryptology Officer, ...
- **This variation complies with roadmaps for exploitation**
  - Example: FIST concept
  - **List other constraining plans**



# TSC Capability

## MSN & Support



- **Same assumptions as the Mission and Data Exploitation option**
- **TSC has equipment and personnel to execute a BAMS mission with the following exceptions**
  - Capability similar to a VP crew
  - No Cryptology personnel - officer or CT
  - Limited number of IS personnel
    - Specifically limited numbers of imagery analysts
      - Rely on CONUS or JIC support





# Number of Bases

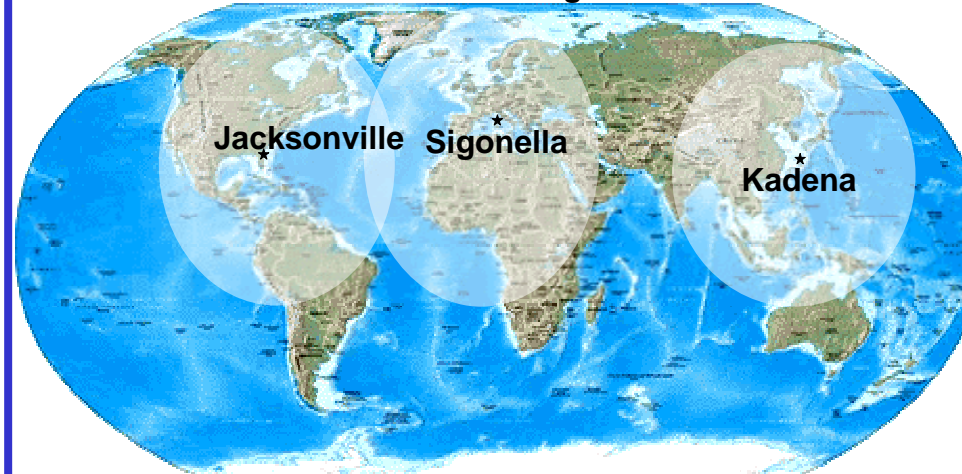
3



## • Overview

- Five bases
- 4 OCONUS
- Baseline concept
- Provides world wide access
- Leverage current TSC infrastructure
- CONUS based squadron would be FRS

## Notional Basing Alternatives



\* Open ocean commercial SATCOM coverage limited

## • Capability

- 3 bases offers less coverage than required for world-wide access
- World-wide access attainable only through MOCC capability and Surge Concept
- UAV range & endurance critical

## • Infrastructure

- 3 bases
  - Supports "Surge" concepts
- 2 OCONUS
- Leverage current TSC infrastructure
- Least infrastructure cost
- Fewest personnel, lower cost
- Added cost to configure Dets to routinely deploy to other bases





# Number of Bases

5



## • Overview

- 5 bases
- 4 OCONUS
- Baseline concept
- Provides world wide access
- Leverage current TSC infrastructure
- CONUS based squadron would be FRS

## • Capability

- 5 bases offers coverage required for world-wide access
- 4 OCONUS
  - Provides opportunity for interoperability with host nation(s)
- UAV with GH-like endurance required
  - In order to provide global coverage

### *Notional Basing Alternatives*



\* Open ocean commercial SATCOM coverage limited

## • Infrastructure

- 5 bases
  - Baseline concept
- 4 OCONUS
- Leverage current TSC infrastructure



# Number of Bases

7



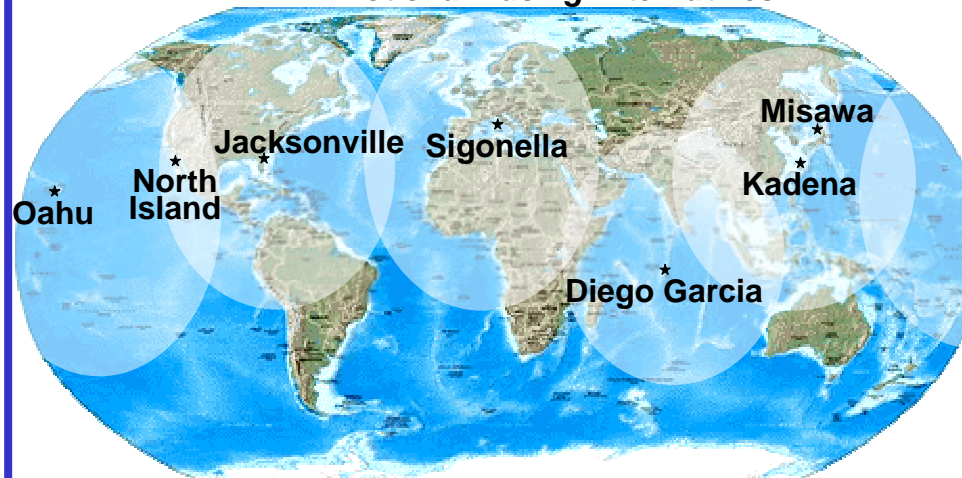
## • Overview

- 7 Bases
- 5 - 6 OCONUS
- Leverage available TSC infrastructure
- 2 CONUS based squadrons could support HD/HS
- Only 1 CONUS based squadron would be FRS

## • Capability

- Seven bases offers coverage beyond that required for world-wide access
  - Modest additional capability
  - Increased redundancy, decreased risk
- 5 - 6 OCONUS
  - Provides maximum opportunity for interoperability with host nation(s)
- May be required for UAV with less mission endurance
  - In order to provide global coverage

## Notional Basing Alternatives



\* Open ocean commercial SATCOM coverage limited

## • Infrastructure

- 7 bases vice 5 or 3
- 5 - 6 are OCONUS
  - Increased commitment & reliance on host
- Leverage TSC infrastructure
- More personnel, infrastructure & cost



# Ship Capability Specifically Trained



- **Add “BAMS specific” billets**
  - CV, LHD, LHA, some CG
- **Benefits**
  - Billet(s) will likely draw from pool of “BAMS trained and experienced personnel”
    - Removes possibility of adding to ship’s workload requirement
  - Could be filled for deployment work-ups & deployment
  - Provides sea billets for BAMS community
    - Broadens experience
    - Helps promotion
- **Costs**
  - Adds end strength requirement
  - Number of billet requirements must be defined. Unlikely one will suffice
    - Maintenance and watch requirements
    - Equipment maintenance may be additive to ship’s workload when not deployed
  - Inefficient use of personnel when no BAMS OPS underway

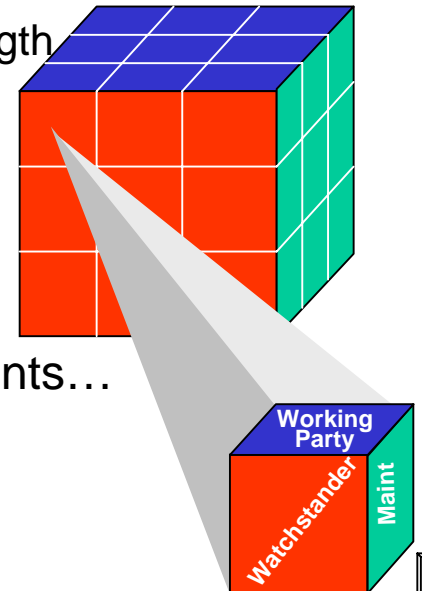




# Ship Capability Trained



- **Draw personnel from existing billet structure**
  - Flight ops and sensor employment should require average aptitude
  - Identify Officers/Sailors from embarked staff or crew
    - Collateral responsibility
    - Send to “Ship operator” and “BAMs Equipment” school house in IDTC
- **Benefits**
  - On larger ships, large pool to draw from
    - Likely to be low workload requirement
    - Could be efficient use of manpower, does not add to end strength requirements
  - Training and experience opportunity for crew
  - Could use tech reps
- **Costs**
  - Must consider Rubic’s cube nature of Manpower requirements...





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# BACKUPS & LINKS

**Initial Manpower ConOps Alternatives**



# Manpower High

Organization	Air Vehicle	Capability Package	Force Structure	OPS Support Concept	Maintenance Support Concept	Support Concept	Community Ownership	TSC Capability	Number of Bases	Ship Capability
Squadron	Global Hawk-like	Multi-INT	MMA POR	Contractor	Contractor	O to D	MPR	MSN & Data Exploitation	3	Specific
Detachment (Deploy)	Unmanned Manned Aircraft	RF EO/IR	MMA Reduced POR	Mix	Mix	3 Level	UAV Community	MSN & Support	5	Trained
Detachment (PCS)	Predator-like	Active or Passive	IOC	NAVY	NAVY	Partial O to D	Other	L & R	7	None

- “Manpower High” refers to highest Manpower requirement
- Could equate to highest level of capability and flexibility
  - Potentially the least operational risk
  - But...may also be greatest programmatic risk





# Manpower Low

Organization	Air Vehicle	Capability Package	Force Structure	OPS Support Concept	Maintenance Support Concept	Support Concept	Community Ownership	TSC Capability	Number of Bases	Ship Capability
Squadron	Global Hawk-like	Multi-INT	MMA POR	Contractor	Contractor	O to D	MPR	MSN & Data Exploitation	3	Specific
Detachment (Deploy)	Unmanned Manned Aircraft	RF EO/IR	MMA Reduced POR	Mix	Mix	3 Level	UAV Community	MSN & Support	5	Trained
Detachment (PCS)	Predator-like	Active or Passive	IOC	NAVY	NAVY	Partial O to D	Other	L & R	7	None

- “Manpower Low” refers to lowest Manpower requirement
- Could also equate to lowest level of capability and flexibility
  - Potentially the greatest operational risk
  - But...may be the least programmatic risk





# Middle Ground

Organization	Air Vehicle	Capability Package	Force Structure	OPS Support Concept	Maintenance Support Concept	Support Concept	Community Ownership	TSC Capability	Number of Bases	Ship Capability
Squadron	<b>Global Hawk-like</b>	<b>Multi-INT</b>	MMA POR	Contractor	Contractor	<b>O to D</b>	<b>MPR</b>	MSN & Data Exploitation	3	Specific
Detachment (Deploy)	Unmanned Manned Aircraft	RF EO/IR	<b>MMA Reduced POR</b>	<b>Mix</b>	<b>Mix</b>	3 Level	UAV Community	<b>MSN &amp; Support</b>	<b>5</b>	<b>Trained</b>
<b>Detachment (PCS)</b>	Predator-like	Active or Passive	IOC	NAVY	NAVY	Partial O to D	Other	L & R	7	None

- “Middle Ground” refers to the alternative that seemed to lie between High and Low Manpower requirements
- Takes into account cost, cost avoidance and operational risk





# UAV Centric



Organization	Air Vehicle	Capability Package	Force Structure	OPS Support Concept	Maintenance Support Concept	Support Concept	Community Ownership	TSC Capability	Number of Bases	Ship Capability
Squadron	Global Hawk-like	Multi-INT	MMA POR	Contractor	Contractor	O to D	MPR	MSN & Data Exploitation	3	Specific
Detachment (Deploy)	Unmanned Manned Aircraft	RF EO/IR	MMA Reduced POR	Mix	Mix	3 Level	UAV Community	MSN & Support	5	Trained
Detachment (PCS)	Predator-like	Active or Passive	IOC	NAVY	NAVY	Partial O to D	Other	L & R	7	None

- “UAV Centric” refers to most acceptable alternative from a UAV community perspective





# Transformational

Organization	Air Vehicle	Capability Package	Force Structure	OPS Support Concept	Maintenance Support Concept	Support Concept	Community Ownership	TSC Capability	Number of Bases	Ship Capability
Squadron	<b>Global Hawk-like</b>	<b>Multi-INT</b>	MMA POR	Contractor	<b>Contractor</b>	<b>O to D</b>	<b>MPR</b>	MSN & Data Exploitation	<b>3</b>	Specific
Detachment (Deploy)	Unmanned Manned Aircraft	RF EO/IR	<b>MMA Reduced POR</b>	<b>Mix</b>	Mix	3 Level	UAV Community	<b>MSN &amp; Support</b>	5	<b>Trained</b>
<b>Detachment (PCS)</b>	Predator-like	Active or Passive	IOC	NAVY	NAVY	Partial O to D	Other	L & R	7	None

- **“Transformational” refers to alternative that appeared to support DoD Transformation concept**

- For example...

- Minimum use of uniformed personnel
- Greatest use of contractors - outsource
- Synergistic use of force structure - MPR personnel supporting BAMS operations
- May require deployment or “Surge” operations to cover crises
- Acceptable risk for normal peacetime operations

