AF UAS Flight Plan
2009-2047

Colonel Eric Mathewson
AF UAS Task Force
Assumptions

- Manned and unmanned systems must be integrated to increase capability across the full range of military operations for the Joint Force
- UAS compelling where the human is a limitation to mission success
- Automation is key to increasing effects, while potentially reducing cost, forward footprint and risk
- The desired effect is a product of the “integrated system” (payload, network, and PED); and less the particular platform (truck)
- Modular systems with standardized interfaces enhance adaptability, sustainability and reduce cost
- Robust, agile, redundant C2 enables supervisory control (“man on the loop”)
- DOTMLPF-P solutions are linked and must be synchronized
**Conventional Harbor**

- 4 operators per crane
- Manpower-centric system
  - Legacy system
  - Manpower dependant
  - Manual Operation

**“Multi-Crane Control”**

- 1 operator per 6 cranes
- 24x increase in efficiency
- Tech-centric system
  - Multi-crane Control
  - Automation (cranes and AGV)
    - DGPS
    - Algorithms

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**Integrity - Service - Excellence**
**Autonomy – Multi-Aircraft Control**

**Potential Manpower Savings**

<table>
<thead>
<tr>
<th>Year</th>
<th>Configuration</th>
<th>Pilots Required</th>
<th>Pilots Transiting</th>
<th>Idle Pilots</th>
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<tr>
<td>2011</td>
<td>50 CAPs</td>
<td>500</td>
<td>+ 70</td>
<td>570 Total</td>
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<tr>
<td></td>
<td>50 MQ-9 CAPs</td>
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<td>+ 7 a/c in constant transit</td>
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<td>10 pilots per CAP</td>
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<td>500 pilots required</td>
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<td>+ 70 pilots to transit a/c</td>
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<td></td>
<td><strong>570 Total Pilots</strong></td>
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<tr>
<td>2012</td>
<td>MAC</td>
<td>250</td>
<td>+ 0</td>
<td><strong>150 Total</strong></td>
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<td>50 CAPs</td>
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<td>50 MQ-9 CAPs</td>
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<td>2 CAPs per MAC GCS</td>
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<td>1 transit per MAC GCS</td>
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<td></td>
<td>5 pilots per CAP</td>
<td>250</td>
<td>+ 0</td>
<td><strong>150 Total</strong></td>
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<td></td>
<td>250 Pilots required</td>
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<td></td>
<td>+ 0 to transit aircraft</td>
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<td><strong>56% Manpower Savings</strong></td>
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<tr>
<td>TBD</td>
<td>MAC + 50% auto</td>
<td>125</td>
<td>+ 25</td>
<td><strong>150 Total</strong></td>
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<td>50 CAPs</td>
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<td>50 MQ-9 CAPs</td>
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<td>25 CAPs automated</td>
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<td>25 CAPs in MAC (5 pilots/CAP)</td>
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<tr>
<td></td>
<td>125 pilots required</td>
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<td>+ 25 auto-msn monitor pilots</td>
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<td>+ 0 to transit aircraft</td>
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<td><strong>64% Manpower Savings</strong></td>
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</table>

**MAC = 1 pilot can fly up to 4 a/c**

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**Integrity - Service - Excellence**
Modularity

Effective
- Standard Interfaces
- Variable / Tailorable armament set
- JFC Mission Flexibility
  - Conventional/nuclear
  - Stand-off strike, CAS

Affordable
- Standard interface/bus
- Swappable components
- Promotes vendor competition
- Drives down price, improves quality, allows for tailorability
- $399 PCs are reality

Flexible
- One platform/truck
- Supports multiple missions
- Swappable modules

B-52

C-130

Integrity - Service - Excellence
AMC-X CONCEPT CAPABILITIES STUDY

Common platforms, common R&D

Notional Examples

- Mobility
- Long Range Strike
- Air Refueler

Enabling the “Global” in “Global Vigilance, Reach and Power!”
How do we get there?

- **Methodology**
  - Identified where we are today
  - Examined future scenarios and desired capabilities
  - From that future perspective identified actions to get there from today
  - Matched compelling requirements to UAS capabilities aligned with AF Core Functions
  - Identified and sequenced actions addressing not only materiel solutions, but also the doctrine, organization, training, facilities and policy
AF UAS Flight Plan:  
Mission sets for UAS

Today

NANO/MICRO

- WASP III

Small

- Raven
- Scan Eagle

Medium

“fighter size”

- MQ-1B
- MQ-9

Large

“tanker size”

- EO/IR/SAR
- RQ-4 Blk 10/20
- RQ-4 Blk 30
+ASIP

Special UAS

- Interoperable UAS C2
- High Altitude Long Endurance
- ISR/EA
- Low Observable
- Hypersonic

Current Capability Shortfalls

EF GAP

Nano

Family of Transformers

NextGen – Multi-Mission

Tier II STUAS

Air-Launched SUAS

Indoor recon, indoor lethal/non-lethal, indoor comm, cyber attack, Swarming

Personal ISR, Lethal, SIGINT, Cyber/EW, Counter UAS, Auto-sentry

ISR, Comm Relay, Lethal/Non-lethal, Cyber/EW, SEAD, SIGINT, Low Altitude Pseudo-Sets

Close-in ISR, Lethal, SIGINT/DF

Fighter Recap

EA/ISR/CAS

SEAD/AAR-T

Counterair, Missile Defense

Large Aircraft Recap

Interoperable UAS C2

High Altitude Long Endurance

ISR/EA

Low Observable

Hypersonic

Integrity - Service - Excellence
SUAS “Family of Systems”

**Nano**
- Navigate / communicate inside buildings

**Micro**
- Close-in reconnaissance & situational awareness

**Man-portable**
- ISR
- Time-Sensitive
- Lethal

**Air-Launched**
- Close-in ISR
- Lethal
- SIGINT/DF

**Multi-Mission**
- ISR
- Force protection
- FID

**Bio-Mechanicals**
- Indoor Reconnaissance
- Indoor Lethal/Non-lethal
- Indoor Comm
- Cyber attack
- Swarming

**“SUAS Family of Transformers”**
- Personal ISR
- Lethal
- SIGINT
- Cyber/EW
- Counter-UAV
- AutoSentries

**Irregular Warfare**
- Increasing across all mission sets

**Anti-Access Support**
- Swarming

**Family of Expendables**
- Close-In ISR
- Expendable Jammers
- Lethal
- Counter Air
- Precision Clandestine Resupply
- Cyber attack

**Next Gen Multi-Mission**
- ISR
- Communications Relay
- Lethal / Non-lethal
- Electronic/Cyber Attack/SEAD
- SIGINT/Low Altitude Pseudo-Sats
- = New Mission areas

**Now**

**Future**

*Integrity - Service - Excellence*
Large “System”
Connectivity and Teaming

Future

MQ-LE
Collection/Info Ops
Connectivity

MQ-L
Collection/Info Ops
(AWACS/JSTARS)

MQ-Hyper Sonic
Strategic Attack/Prompt Global Strike

MQ-Ls
EW/Collection/Info Ops
CAS/Air Interdiction/Airlift

B-2/MQ-L Teaming
Strategic Attack/
CAS/Air Interdiction
Kinetic & Non-kinetic Wpns

MQ-L – JSF/MQ-X
Aerial Refueling/
Connectivity

F-22/MQ-X Teaming
Counterair/Missile Defense
Kinetic & Non-kinetic Wpns

JSF/Multi Msn MQ-X Teaming
Air Interdiction, CAS --
Kinetic & Non-kinetic Wpns

Multi Msn MQ-L/X, SUAS - FOS Teaming
ISR/EW/SEAD – Kinetic & Non-kinetic Wpns

NAT'L (JCS, NSA, NGA, DIA, etc.)

JTF HQ, CAOC MCEs, DCGS

SOF, ALO, TAC-P

Integrity - Service - Excellence
Action Synchronization

**Doctrine**
- Near-term FY09-10
  - CCDR allocation
  - J2/J3
- Mid-term FY10-15
  - SUAS Sqn
  - MAC Ops Sqn
  - MAC Logistics Sqn
  - RSO Basing
- Long-term FY15-25
  - Auto Tgt Engage
  - Autonomous Fight
- Long-term FY25-47
  - Autonomous Fight

**Organization**
- SUAS Sdn
  - MAC Ops Sqn
  - MAC Logistics Sqn
  - Auto Ops Sqn
  - Auto Flight

**Training**
- UAS Beta Test
- Auto T/O
  - Hi-Fi Sim
  - Common GCS
  - Assured Comm
  - Auto TPD
  - Sense & Avoid
  - Modular Payloads
  - Autonomous Fight
  - Forwarded
  - Training
  - Hyper Sonic Engine

**Materiel**
- MAC
  - Auto Hi-Fi Sim
  - ECSS
  - CBM+
  - Autonomous Fight
  - Auto MX
  - Auto Tgt Engage

**Leadership**
- CC’s
  - SAF/PA Outreach
  - PME
  - Career Pyramids
  - Command of Autonomy
  - Bldg the “New” AF Leader

**Personnel**
- Rated?
  - SUAS Operator
  - UAS LNOs
  - Recruiting Focus
  - Teaming w/ Schools
  - Force Structure Reform

**Facilities**
- C2 Facility
- CFACC Facility

**Policy**
- NAS
  - ILAs
  - Acq Excellence
  - MAC-in-NAS
  - Treaties
  - Autonomy
  - Auto Tgt Engage

*Integrity - Service - Excellence*
AF UAS Flight Plan Vision

- An Air Force where unmanned aircraft systems are considered as viable alternatives to traditionally manned platforms.

- An Air Force that harnesses increasingly automated, modular and sustainable systems resulting in a leaner, more adaptable, tailororable, and efficient force that maximizes combat capabilities to the Joint Force.

- An Air Force that teams with the other Services, our allies, academia and industry to capitalize on the unique unmanned aircraft attributes of persistence, connectivity, flexibility, autonomy, and efficiency.
BACK UPS
USAF UAS Vision: Definitions

**Theater-Capable UAS**
- Can operate across theater
- Long range UAS
- Can operate beyond line of sight
- Medium & High Altitude (MHA)

**Local-Effects UAS**
- Delivers local effects
- Short-range UAS
- Operates within line-of-sight

**Low-Altitude UAS**
- Operates in procedurally controlled airspace (below coordinating altitude)

**Need Standardization & Unified Acquisition**
- Need Standardization
- No Standardization or Acquisition Authority

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Integrity - Service - Excellence
USAF UAS Vision: Optimizing UAS Employment

- Theater-Capable UAS (low-density / high-demand resource)
  - Prioritized by Joint Force Commander (JFC)
  - Executed by JFC’s Joint Force Air Component Commander

- Local-Capable UAS (unlimited resource)
  - Prioritized by assigned unit commanders
  - Controlled by assigned unit commanders
  - IF flown in controlled airspace must be integrated into theater airspace plan

Treating theater-capable UAS as local-effects assets sub-optimizes the resources and combat effects available to the Joint Force Commander
**USAF UAS Vision:**

**Remote Split Operations**

**Total Force Operations**
Active Duty, Reserve, National Guard, Special Operations, United Kingdom

6 - Stateside operations centers
5 - Launch and recovery units in theater

**Global Operations Center – Creech AFB**

15, 17 RS,
3rd SOS
MQ-1

42 ATKS
39 Sq (UK)
MQ-9

**Distributed Operations**
Centrally Coordinated
Globally Applied

Over 1,000 personnel flying Combat Operations not in harms way;
Projecting Power without Projecting Vulnerability
USAF UAS Vision: Power of the Network
Distributed Common Ground System

Active Duty DCGS Sites
Partner NAFs
ARC Partners
Distributed Sites
Active Duty DCGS: US – Combined Operations

Integrity - Service - Excellence
The Importance of CONOPs:
132 UAVs Supporting 4 Divisions

Remote Split-Ops Concept
= 34 CAPs

Organic Concept
= 12 CAPs
Shadow RSO Demonstration

Organic Assignment

30-40% of available Shadows employed...

Line of Sight Link

Iraq - Afghanistan

Remote Split Ops (RSO)

CONUS

Up to 300% more capability by changing CONOPS

Iraq - Afghanistan

- Air Force funded joint Army/AF demo for RSO Shadow ops conducted on 26 June 2008
- Shadow launched from China Lake, CA...controlled from Ft. Belvoir, VA...2500NM away
- Potential for RSO applied by Army to enable significant increase of FMV capability with fewer troops in the AOR
Inability to rapidly ID & provide airspace clearance will result in failure to engage enemy forces...or fratricide

“So far we have been fortunate. What I worry about is the day I have a C-130 with a cargo load of soldiers, and a UAV comes right through the cockpit windshield.”

USCENTCOM CFACC
USAF UAS Vision: Standardization & Single Acquisition Authority

Standardization Delivers:
- Integrated capability
- Joint training & certification standards
- Shared information
- Common architectures
- Elimination of equipment seams
- Uniform DoD requirement to industry, interagency, and allies

Single Acquisition Authority:
- Reduces duplication
- Ensures commonality of investment
- Agile response to urgent needs
- Improved logistics & life cycle
- Fields systems faster

Air Force Predator
Army Warrior
Air Force Global Hawk
Navy BAMS*

We can’t afford multiple UAS program offices, independent training, logistics and maintenance operations, plus multiple support facilities and procurement contracts.
Perspectives on UAS Operators

Exploring alternatives to operate UAS to meet: increased UAS demand; rated management challenges; and appropriate levels of responsibility

- Current Beta Test for UAS Operators:
  -- Flight screening at Pueblo
  -- Instrument training at Randolph
  -- UAS fundamentals at Randolph
  -- Joint firepower course at Nellis
  -- FTU at Creech

- 100 SUPT grads / yr

- FAA, ICAO, and DOD, regulatory and safety requirements same for UAVs as manned aircraft

- Level of responsibility should dictate level of qualification in combat

Increased Demand, Limited Rated Inventory, Current FAA/ICAO Regulations, and Training Commensurate With Implications of Employment—Require New Approach
Between 2001 and 2008
ISR Hours up 1,431%
AF ISR “Surge”

Predator Program of Record

Jun Action
- Delay UAS Weapons School
- Delay PDMII FTU Build
- Previously Qualified Ops Supervisors
- Ops Support Contractors
- ANG/AFRC Mobilized for 2d Year

Mar Action
- Continue assignment freeze
- 179 day TDY to 365 days

Jan Action
- Assignment Freeze
- Add’nl Mobilization

Sep Action
- Curtained Test
- Mobilized ANG Crew Recall

Jul Action
- Extended Tours

I n t e g r i t y  -  S e r v i c e  -  E x c e l l e n c e
AF ISR “Surge”
Predator Program of Record

Jun Action
Delay UAS Weapons School
Delay PDMII FTU Build
Previously Qualified Ops Supervisors
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179 day TDY to 365 days

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Sep Action
Curtailed Test
Mobilized ANG
Crew Recall

Jul Action
Extended Tours

POR Equipment Limit

35 MQ-1/9 CAPs in-place 6 Months before planned 21 MQ-1 CAPs of DoD program of record...Over 280% growth in 18 months...

Integrity - Service - Excellence
Way Ahead to Meet Increasing Demand

- **AF Shifting to all MQ-9 procurement:**
  - 600% more payload capability
  - 250 knots vice 120 knots
  - Adjusted FY 08 and FY 09 Supplementals from MQ-1 to MQ-9
  - Will complete MQ-1 FY 08 and 09 procurement/shift to MQ-9 only in FY 10
  - Developing/fielding a new Wide Area Airborne Surveillance (WAAS) sensor
  - MQ-9 capable of carrying WAAS pod—MQ-1 not capable
    - Increases the effectiveness of individual CAPs by over 1,200% initially
    - Eventually increasing the effectiveness to over 6,000% from where we are today with the Predator MQ-1

MQ-9, with nearly twice the performance of the MQ-1 and nearly 10 times the external payload—matched up with Wide Area Airborne Surveillance system, will deliver 13 to eventually 60 times more capability than MQ-1 series UAS.
**Increasing Capabilities**

**Wide Area Airborne Surveillance (WAAS)**

**MQ-9 advantages over MQ-1**
- 2 x faster – more responsive
- 2 x higher – broader coverage
- 6 x payload (versatile: sensor, weapons)

**1st four wide area sensors**

**Next six wide area sensors**

**Potentially 65 clips to the Tactical Operations Center**

**4x4 km coverage area**
- As many as 30 ROVER queries
- and potentially 65 clips to the Tactical Operations Center

**8x8 km coverage area**

**Today**
- MQ-1
- Observe single target; single Rover / OSRVT

**IOC 2nd Qtr FY10**
- 4x4 km coverage area
- 12 independent ROVER/OSRVT

**4th Qtr FY11**
- 8x8 km coverage area
- As many as 30 ROVER queries
- and potentially 65 clips to the Tactical Operations Center

*Autonomous Real-time Ground Ubiquitous Surveillance - Imaging System (ARGUS-IS)*
Potential Growth of Video Effect
(Result of MQ-1 to MQ-9 Shift w/WAAS)

WAAS Increment One
13 spots per MQ-9

WAAS Increment Two
65 spots per MQ-9

MQ-9 only "spot" numbers with WAAS
MQ-1 and MQ-9 FMV "spot" numbers w/o WAAS

Motion Imagery Spots

FY08 FY09 FY10 FY11 FY12 FY13 FY14 FY15 FY16
34 CAPs 39 CAPs 49 CAPs 50 CAPs
USAF UAS Vision: Joint Employment

- Organizing air ops by individual service components creates seams
- So Joint Doctrine established a joint functional component for air operations: to integrate airspace, air defense, and effects from the air in accordance with the Joint Force Commander’s priorities

TODAY:

“We are confusing the joint battlespace doctrine. Air Component Commanders should coordinate all UAVs based on Combatant Commander situational war-fighting directives.”

“Primary control of these assets should be exercised by centralized Joint Air Component command and control.”

General Barry R. McCaffrey, USA (Ret)
Service Distinctions

Air Force: blue/left  Army: green/right

C2 / Employment

Joint

Organic

Weapons Used in Combat to Date

703 Hellfire, 132 GBU-12
(105 lb)  (500 lb)

* UAS strike is last resort for Army

*20 Hellfire shot in test

2 Viper Strike, 2 Hellfire
(55 lb)  (105 lb)

Composition of Inventory

USAF Med/Lg UAS: 158
Army Med UAS: 42

Predator: 118
Reaper: 27
Global Hawk: 13

USAF 80 % Med/Lg UAS

Army Med UAS 20%

Small UAS: 3992
Medium UAS: 42

Hunter: 20
I-GNAT: 3
Warrior A: 15
Sky Warrior: 4

Raven: 3756
Shadow: 236

Medium UAS 1%
Wide Area vs. Standard Coverage

Predator “Soda straw” coverage area

WAAS Coverage Area
USAF UAS Vision: Continued UAS CAP Growth

- Sep 11 – 53 CAPs (31 MQ-1, 19 MQ-9, 3 RQ-4)
- Sep 10 – 44 CAPs (31 MQ-1, 12 MQ-9, 1 RQ-4)
- Nov 09 - 39 CAPs (31 MQ-1, 7 MQ-9, 1 RQ-4)
- Today – 35 CAPs (31 MQ-1, 3 MQ-9, 1 RQ-4)
- Dec 08 – 34 CAPs (31 MQ-1, 2 MQ-9, 1 RQ-4)

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1st 250k hours (1995 – May 07)
2nd 250k hours (May 07 – Nov 08)
3rd 250k hours (Projected: Dec 08 – Dec 09)
Air, Space & Cyber Power are American Asymmetric Advantages

“Tanks And Armor Are Not a Big Deal...The Planes Are The Killers, I Can Handle Everything But The Jet Fighters”