

# ***Headquarters U.S. Air Force***

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## **Air Force Unmanned Aerial System (UAS) Flight Plan 2009-2047**



**Lt Gen Dave Deptula  
Deputy Chief of Staff, Intelligence,  
Surveillance and Reconnaissance**

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# AF ISR Transformation

- New challenges, new adversaries mandate new role for ISR
  - Collectively necessitated AF ISR Transformation
  - Expanded role and reach of AF ISR
  - Requires changing the culture regarding ISR
- Approach:
  - ORGANIZATION: *Organize AF ISR as a holistic AF-wide enterprise to optimize presentation of ISR capabilities to service, joint, & national users*
  - PERSONNEL: *Develop ISR career paths to build viable “bench” of AF ISR senior leaders to meet 21<sup>st</sup> Century demands*
  - CAPABILITY: *Plan, guide, and orchestrate AF/ISR from a capability-based perspective as a consolidated functional area*

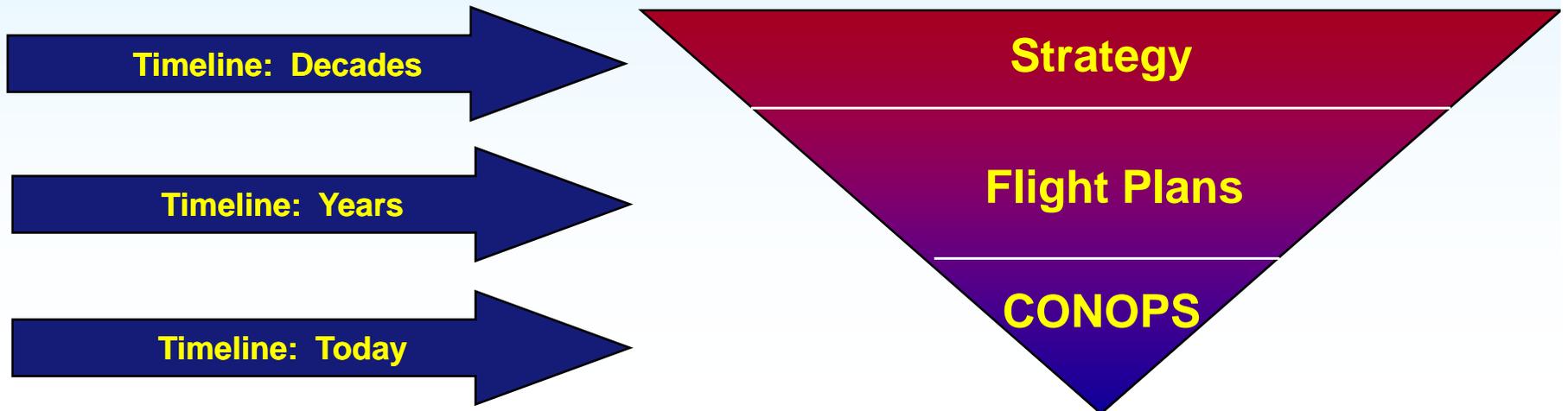
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# Codifying AF ISR for the 21<sup>st</sup> Century

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- 1) AF ISR Strategy: AF ISR's long-range plan that provides overall guidance and philosophy
- 2) AF ISR Flight Plan: Identifies options to resource the AF ISR strategy
- 3) AF UAS Flight Plan: Action plan to guide AF UAS development
- 4) ISR CONOPs: Describes how we envision integrating and optimizing ISR day-to-day operations



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# *What do UAS's Bring to Operations?*

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- **Persistence—ability to loiter over a target for long time periods for ISR and/or opportunity to strike enemy target**
- **Undetected penetration / operation**
- **Operation in dangerous environments**
- **Can be operated remotely, so fewer personnel in combat zones—projects power without projecting vulnerability**
- **Integrates “find, fix, finish” sensor and shooter capabilities on one platform**



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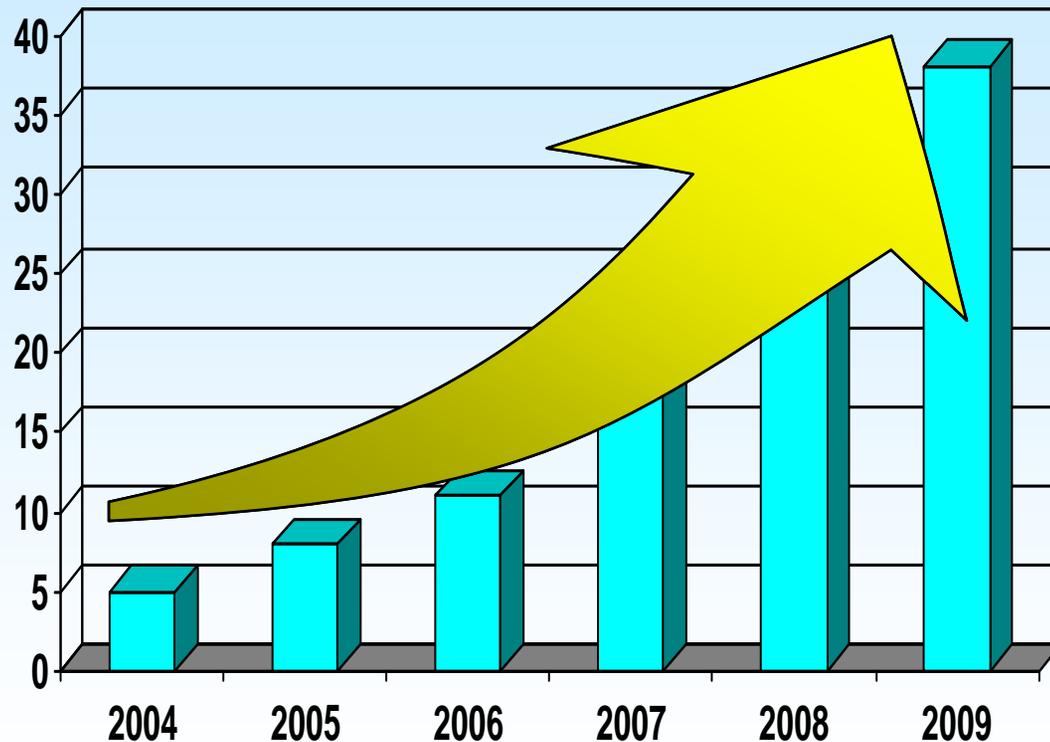


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# Result: High Demand Asset

## Growth in Air Force medium-altitude MQ-1 Predator and MQ-9 Reaper Combat Air Patrols

- 2004 = 5
- 2005 = 8
- 2006 = 11
- 2007 = 18
- 2008 = 33
- 2009 = 38



**660% Increase in 6 years!**

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# USAF UAS Vision: What We Believe

...A Joint approach to:

**Get the most out of UAS to increase joint warfighting capability, while promoting service interdependency and the wisest use of tax dollars**

Requires:

- Optimal Joint Concept of Operations (CONOPS)
- Airspace Control Resulting in Safe/Effective UAS Operations
- Air Defense Architecture to Achieve Security w/o Fratricide
- Increased Acquisition Effectiveness, Efficiency, Standardization



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# ***AF UAS Flight Plan: Vision for the future***

## **An Air Force with...**

- **Unmanned aircraft that are fully integrated with manned aircraft across the full range of military operations**
- **UAS that use automated control and modular “plug-and-play” payloads to maximize combat capability, flexibility and efficiency**
- **Joint UAS solutions and teaming**
- **An informed industry and academia – knowing where we are going and what technologies to invest in**

***Capabilities-based Air Force UAS vision thru 2047:  
Defines DOTMLPF way forward***

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## **AF UAS Flight Plan 2009-2047**



**Colonel Eric Mathewson  
AF UAS Task Force**

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# Assumptions

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- **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**



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# Autonomy



## 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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# Autonomy – Multi-Aircraft Control Potential Manpower Savings

**2011**  
(Current system)

- 50 CAPs
    - 50 MQ-9 CAPs
    - + 7 a/c in constant transit
  - 10 pilots per CAP
    - 500 pilots required
    - + 70 pilots to transit a/c
- 570 Total Pilots**



**2012**  
(MAC)

- 50 CAPs
  - 50 MQ-9 CAPs
  - 2 CAPs per MAC GCS
  - 1 transit per MAC GCS
- 5 pilots per CAP
  - 250 Pilots required
  - + 0 to transit aircraft

**250 Total Pilots**

**56% Manpower Savings**



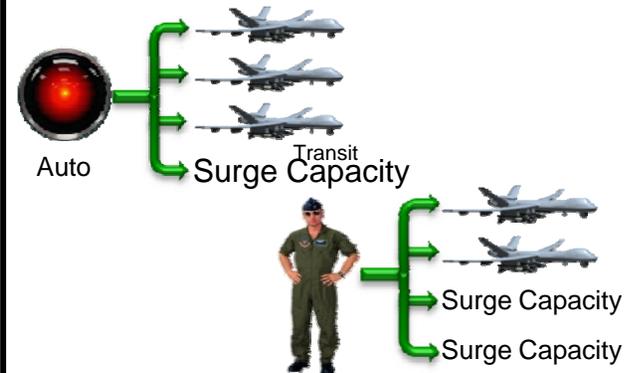
**MAC = 1 pilot can fly up to 4 a/c**

**TBD**  
(MAC + 50% auto)

- 50 CAPs
  - 50 MQ-9 CAPs on orbit
- 25 CAPs automated
- 25 CAPs in MAC (5 pilots/CAP)
  - 125 pilots required
  - + 25 auto-msn monitor pilots
  - + 0 to transit aircraft

**150 Total Pilots**

**64% Manpower Savings**





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# Modularity

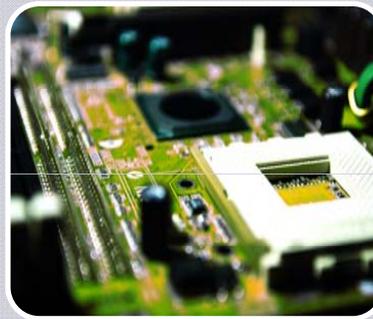
## Effective



### B-52

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

## Affordable



### PCs

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

## Flexible



### C-130

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

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# AMC-X CONCEPT CAPABILITIES STUDY



**Common components, similar shape, and same production line**

*Enabling the “Global” in “Global Vigilance, Reach and Power!”*



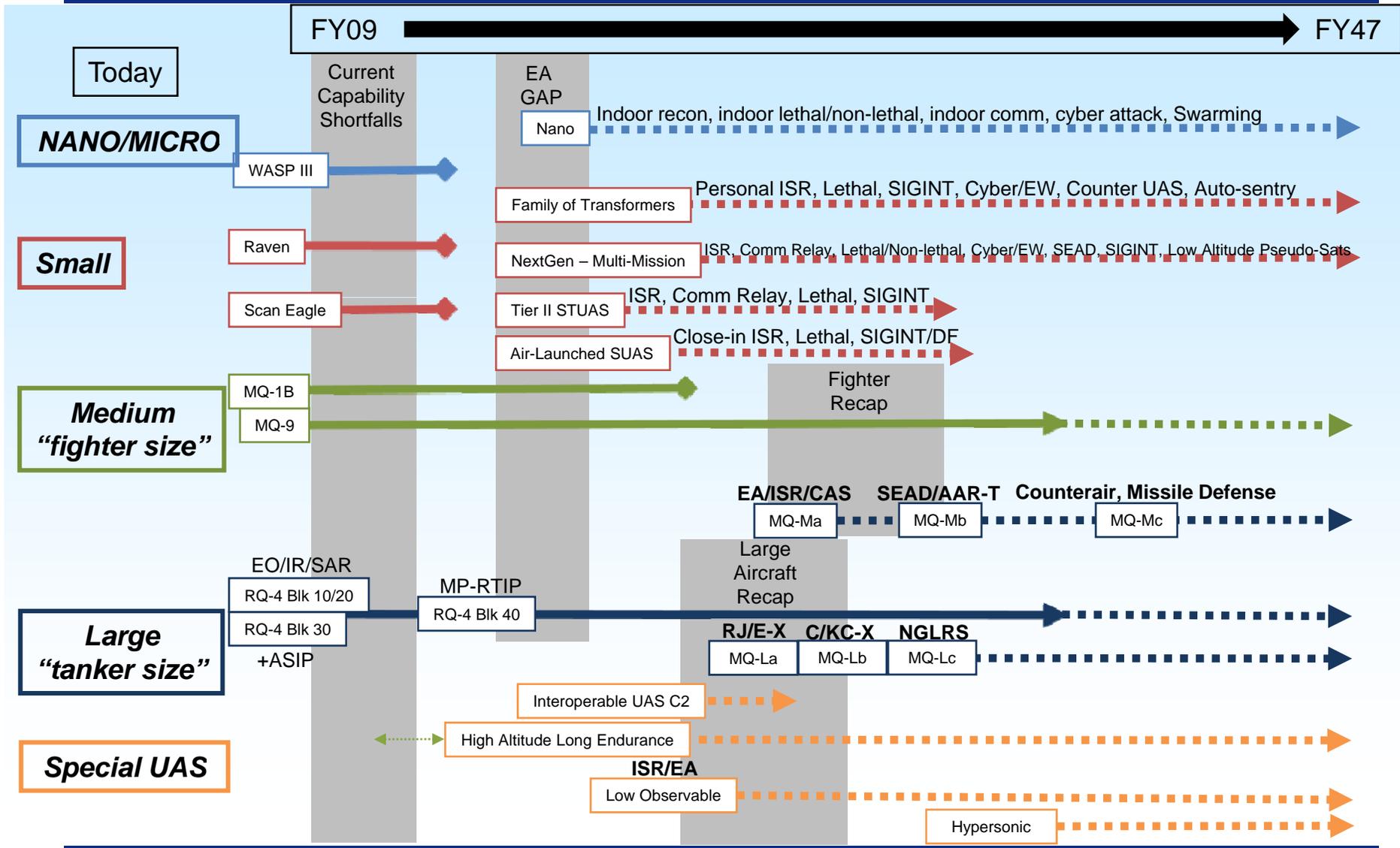
# *How do we get there?*

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- **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**

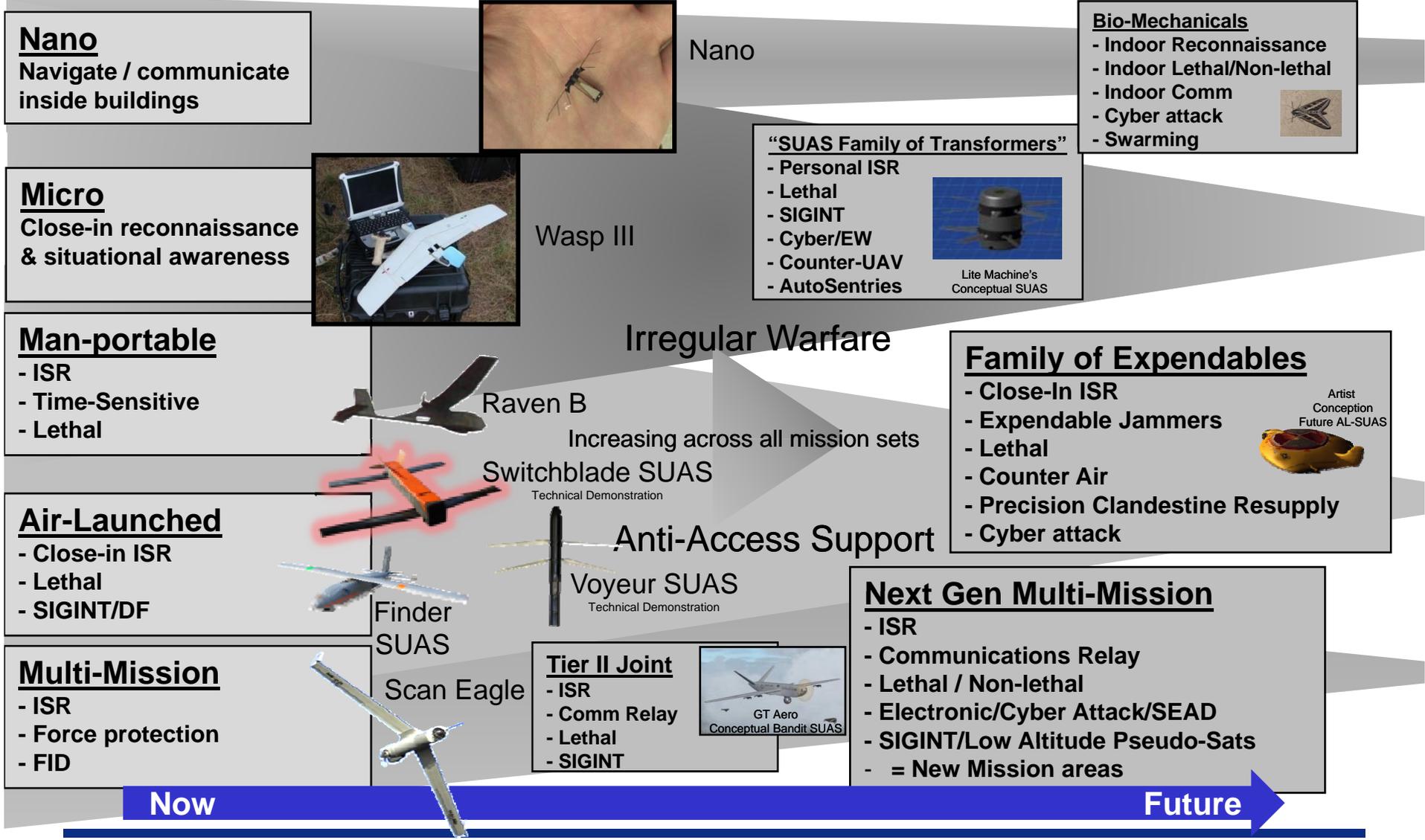


# AF UAS Flight Plan: Mission sets for UAS



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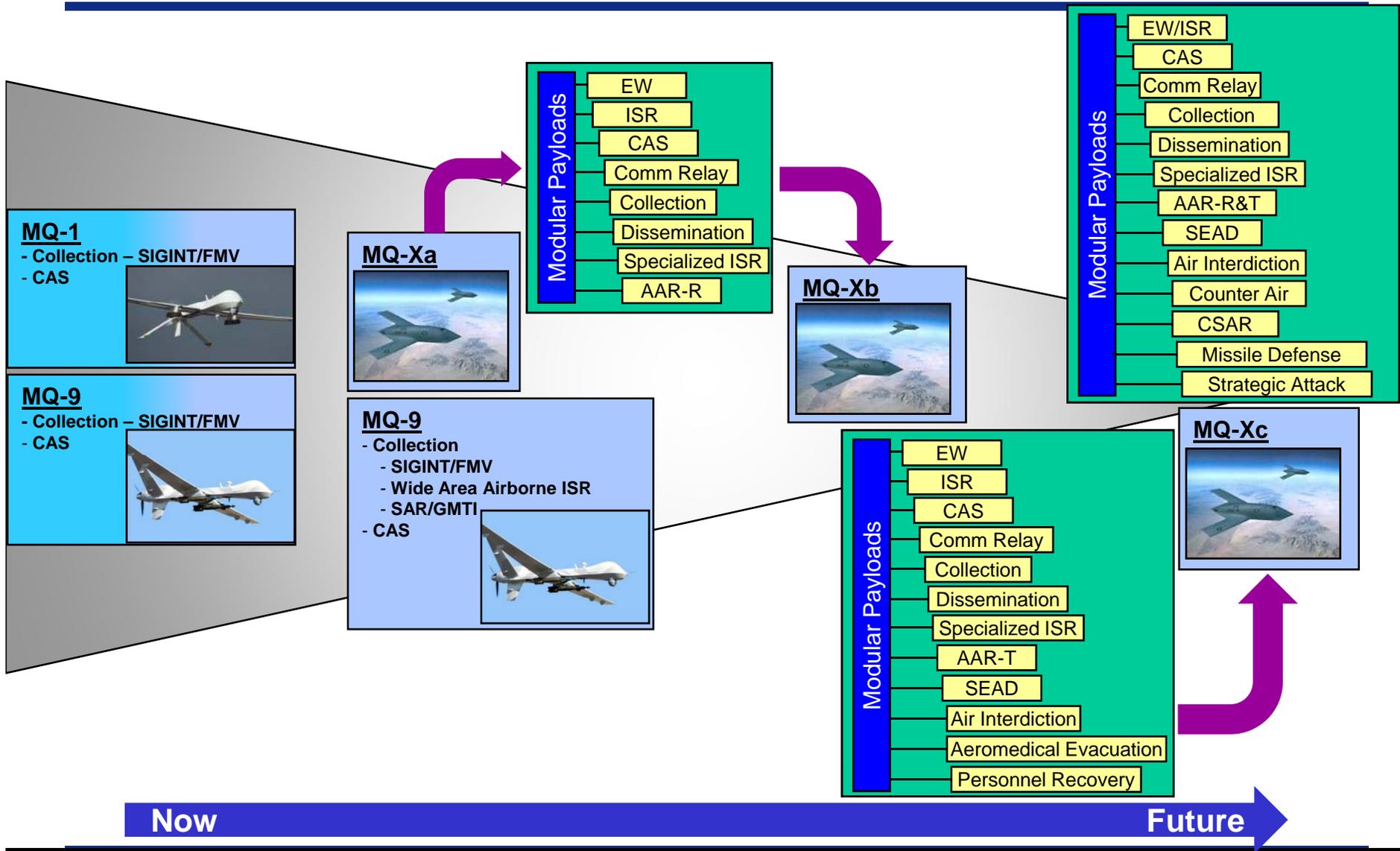
# SUAS "Family of Systems"





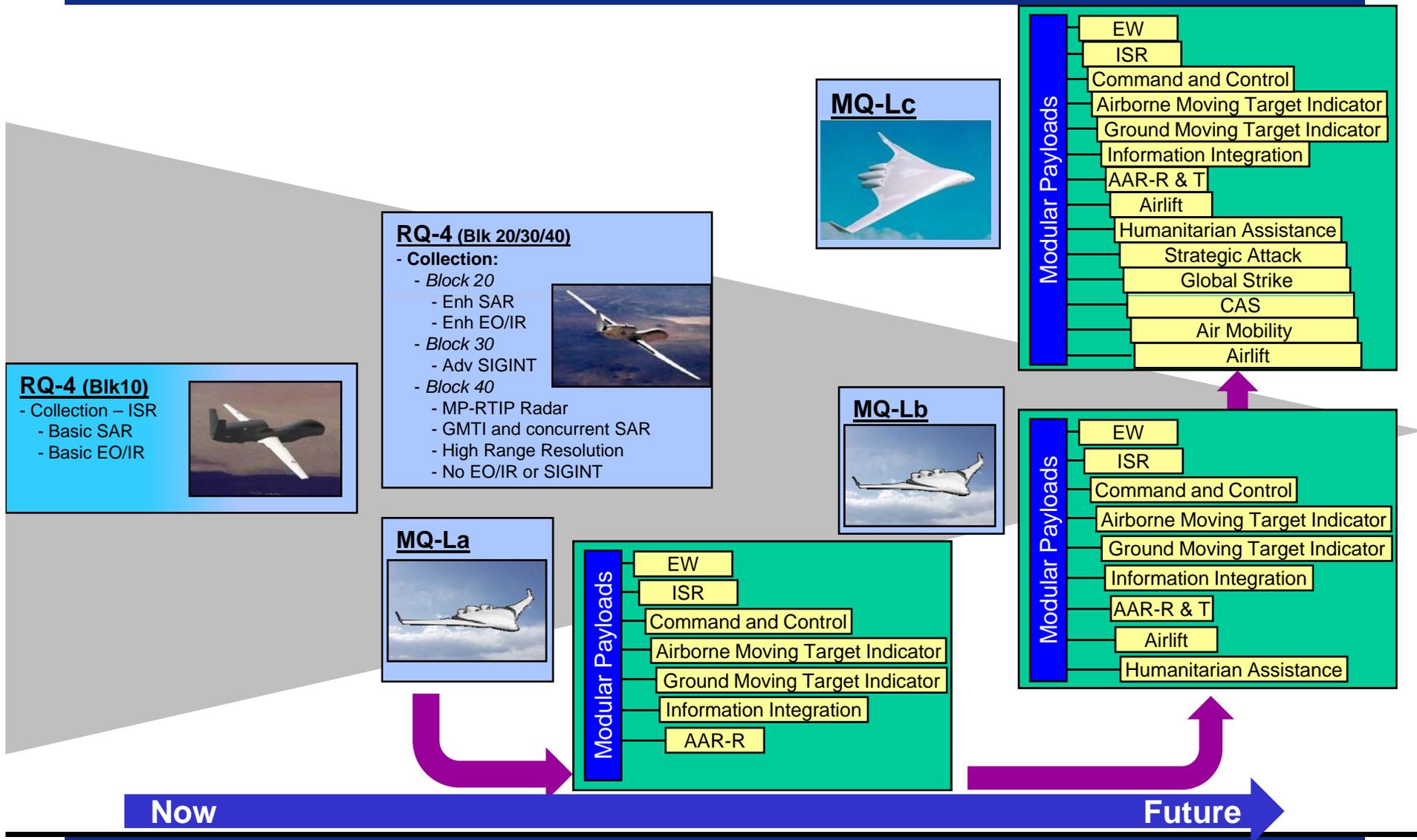
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# Medium "System"



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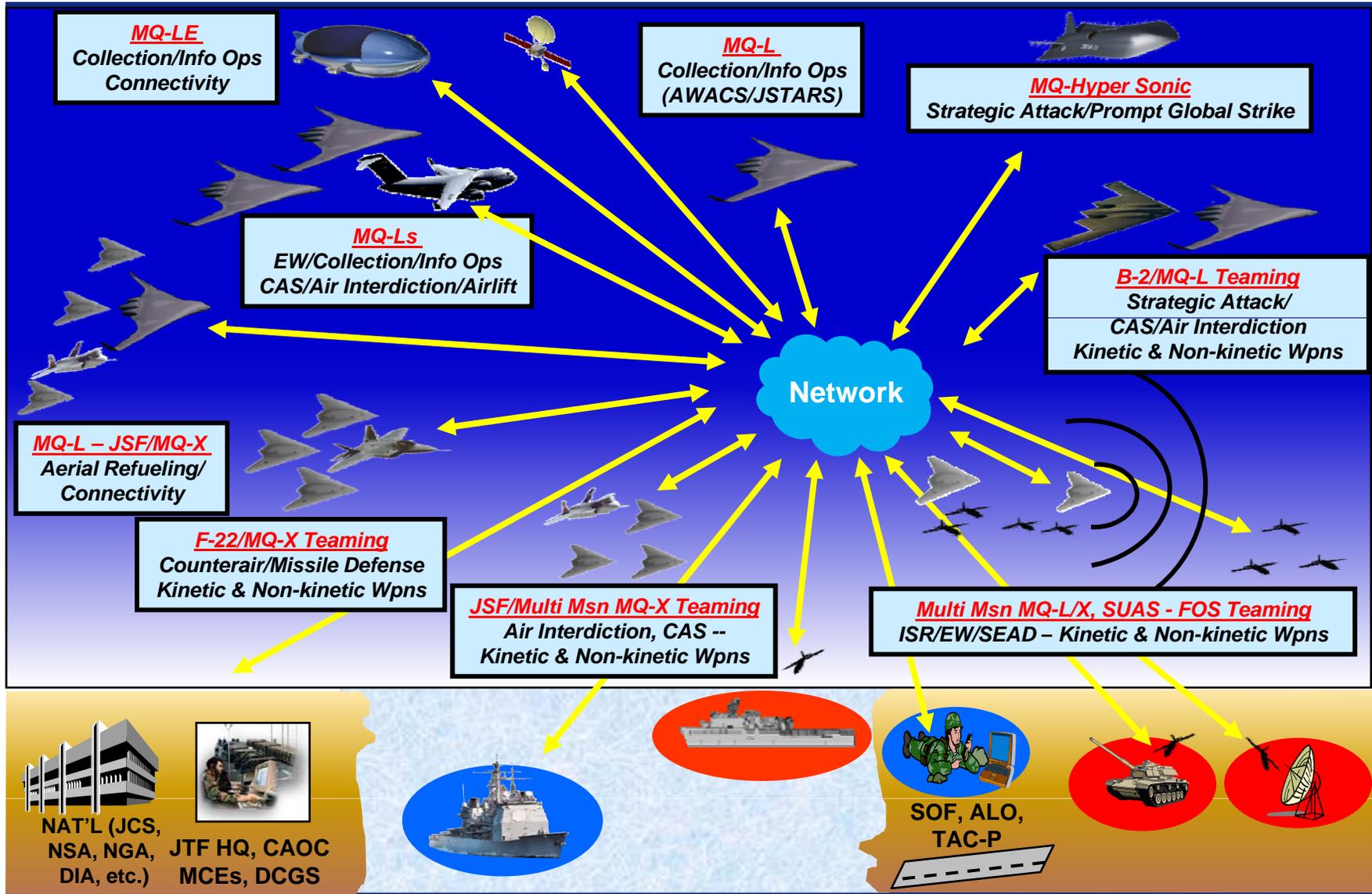
# Large "System"





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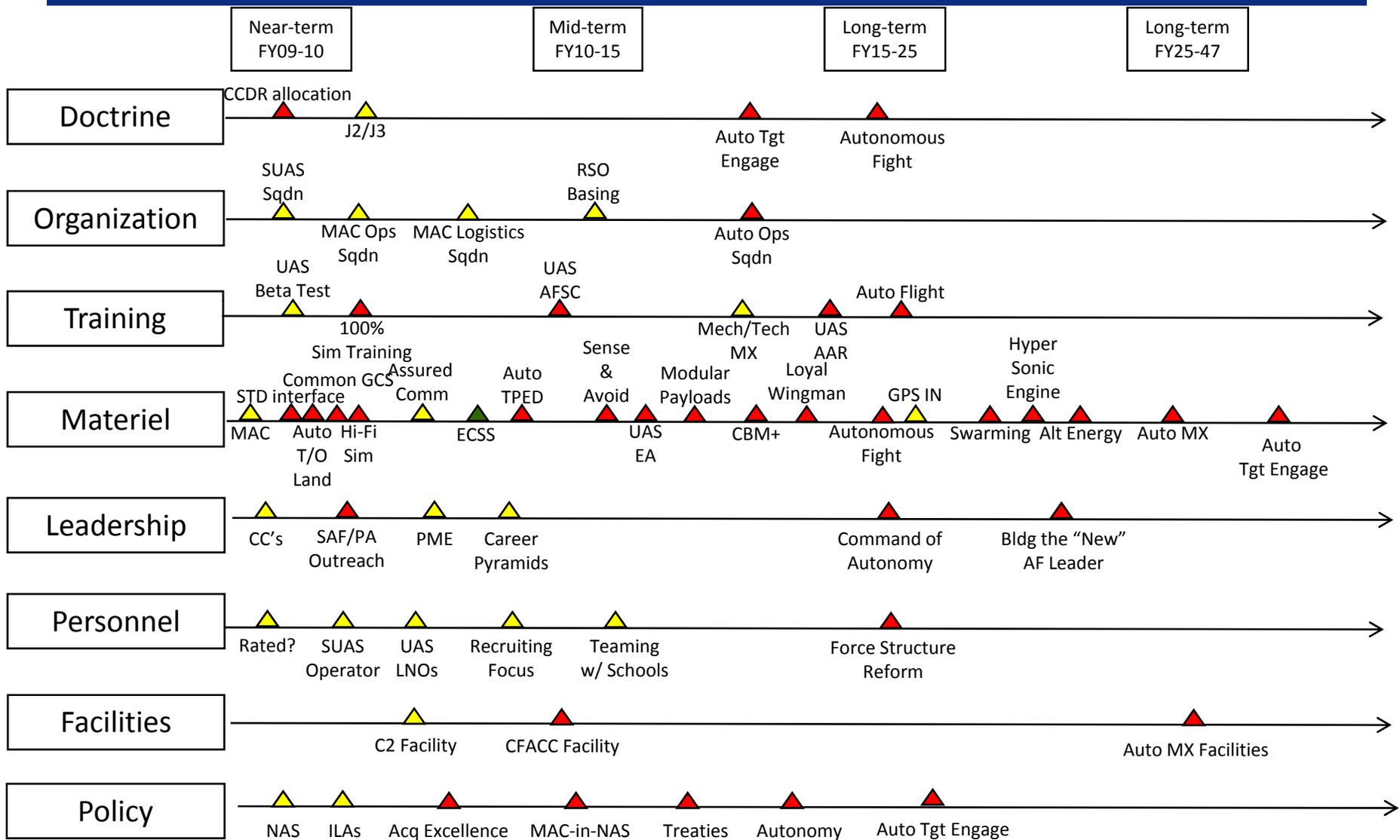
# Connectivity and Teaming Future



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# Action Synchronization



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# ***AF UAS Flight Plan Vision***

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- **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, tailorable, 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**

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## **AF UAS Flight Plan 2009-2047**



**Colonel Eric Mathewson  
AF UAS Task Force**

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# BACK UPS

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# USAF UAS Vision: Definitions

## Theater-Capable UAS

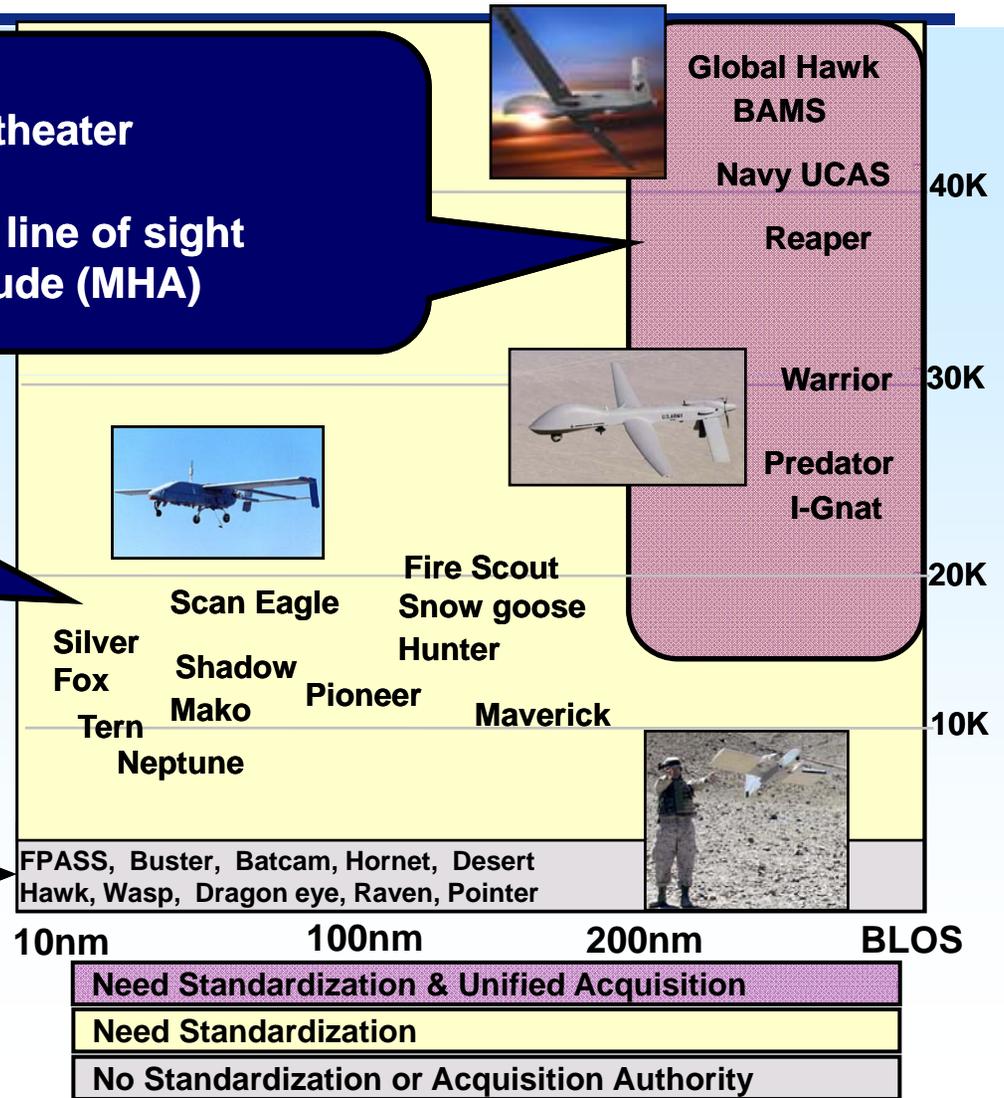
- Can operate across theater
- Long range UAS
- Can operate beyond line of sight
- Medium & High Altitude (MHA)

## 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)



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# ***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**

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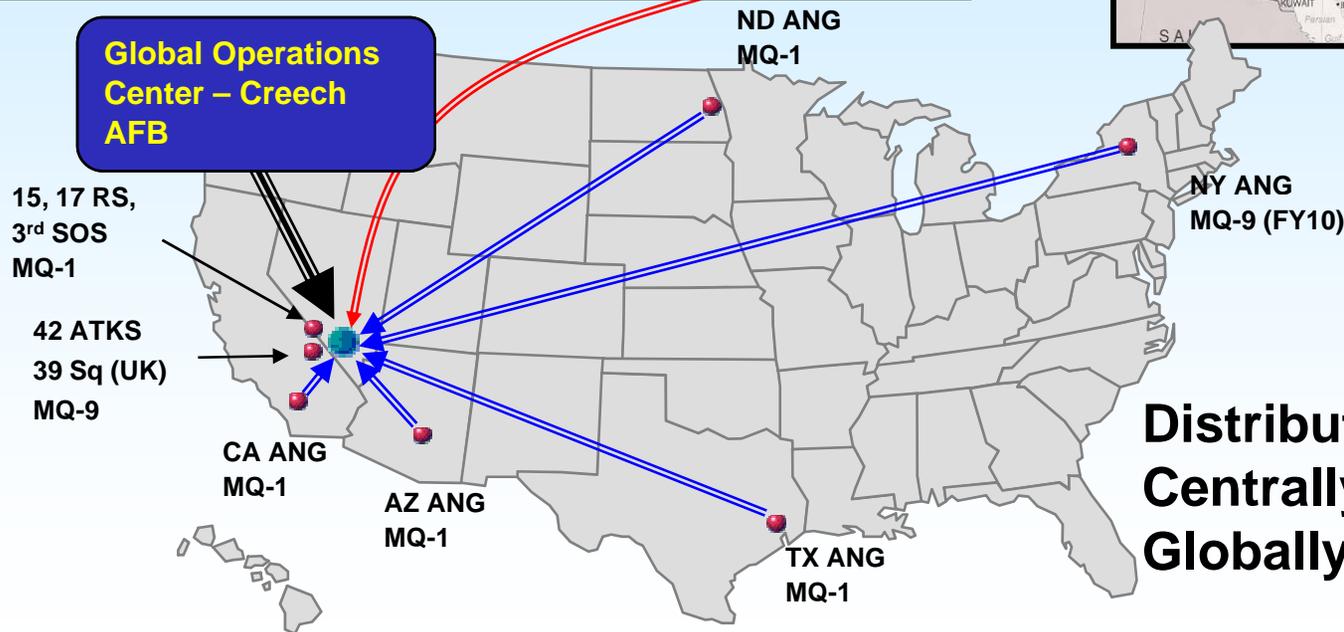
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# USAF UAS Vision: Remote Split Operations

**Total Force Operations**  
 Active Duty, Reserve, National Guard,  
 Special Operations, United Kingdom  
 6 - Stateside operations centers  
 5 - Launch and recovery units in theater

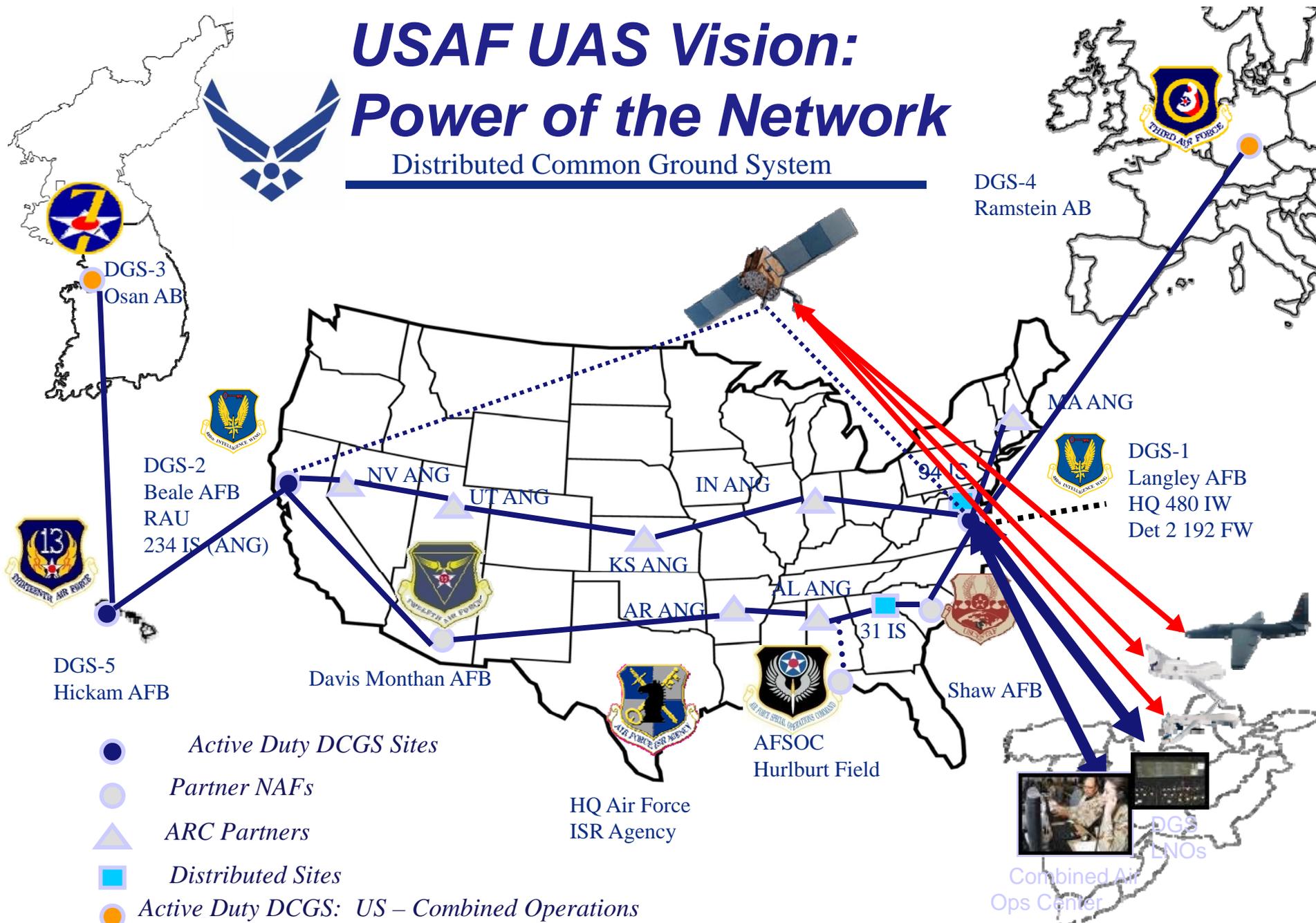


**Distributed Operations  
Centrally Coordinated  
Globally Applied**

**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

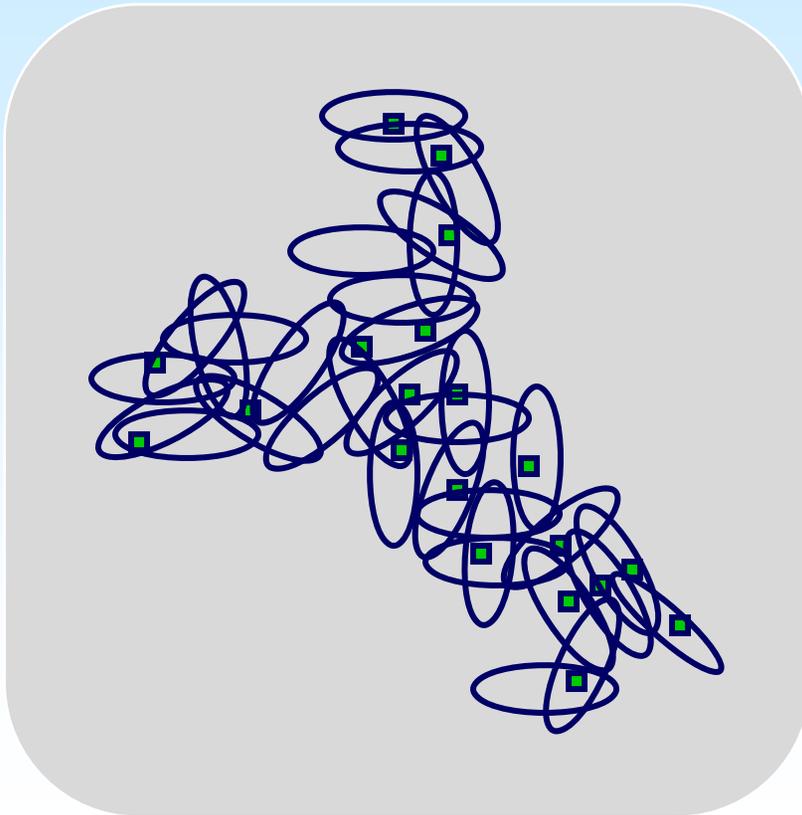
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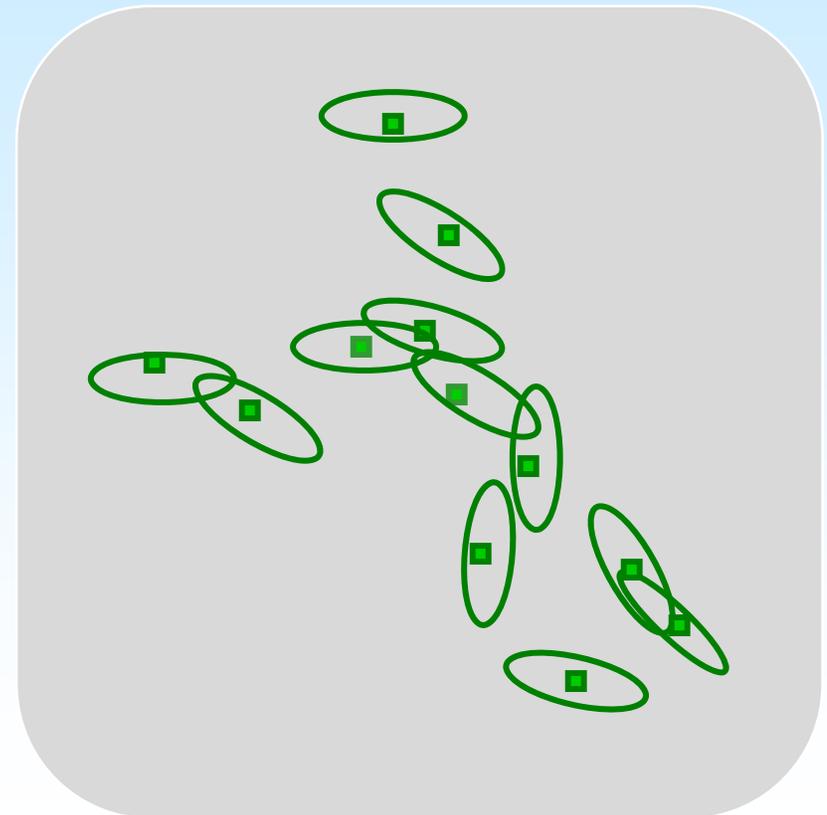
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# *The Importance of CONOPs:* *132 UAVs Supporting 4 Divisions*

**Remote Split-Ops Concept**  
**= 34 CAPs**



**Organic Concept**  
**= 12 CAPs**



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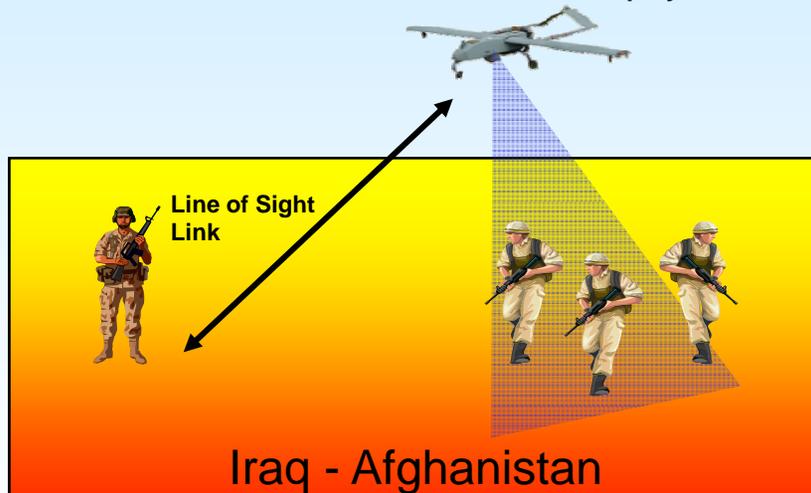


# Shadow RSO Demonstration

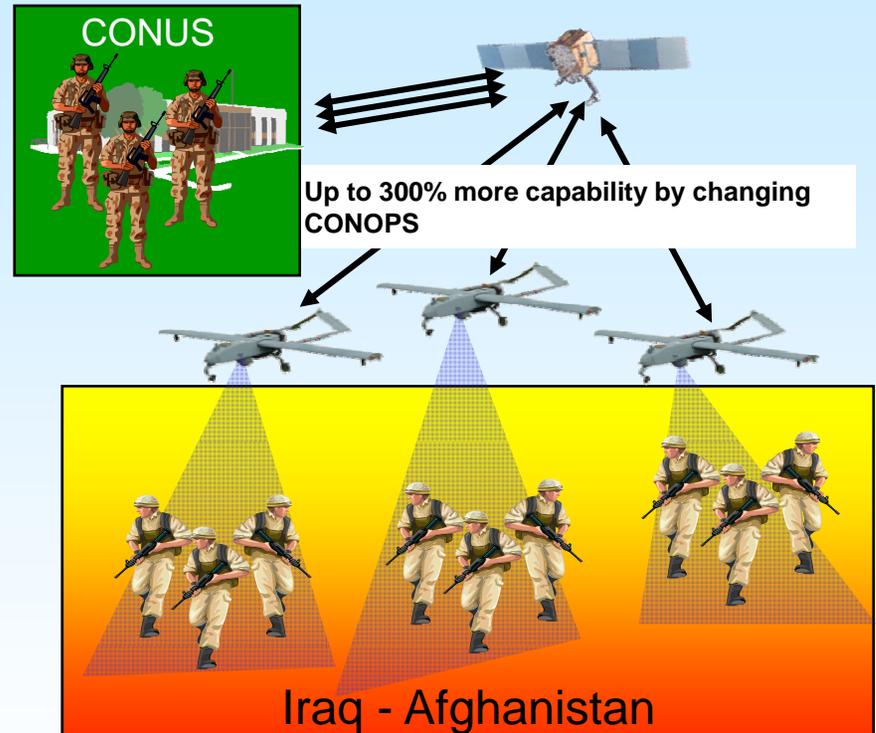
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## Organic Assignment

30-40% of available Shadows employed...



## Remote Split Ops (RSO)



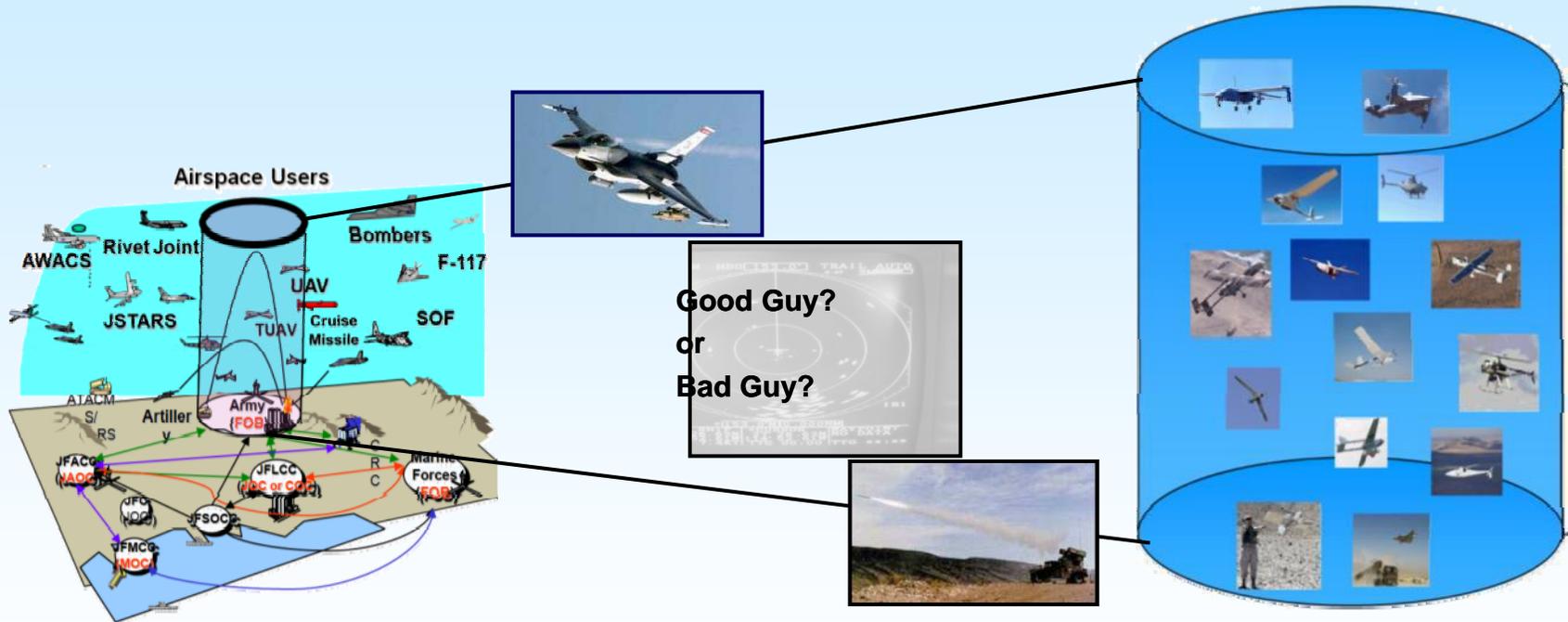
- Air Force funded joint Army/ AF demo for RSO Shadow ops conducted on 26 June 2008
- Shadow launched from China Lake, CA....controlled from Ft. Belvoir, VA...2500NM away
- Potential for RSO applied by Army to enable significant increase of FMV capability with fewer troops in the AOR



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# USAF UAS Vision: Joint Airspace Control and Defense

**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**



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# ***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



**Air Force  
Predator**



**Army  
Warrior**



**Air Force  
Global Hawk**



**Navy  
BAMS\***

## **Single Acquisition Authority:**

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

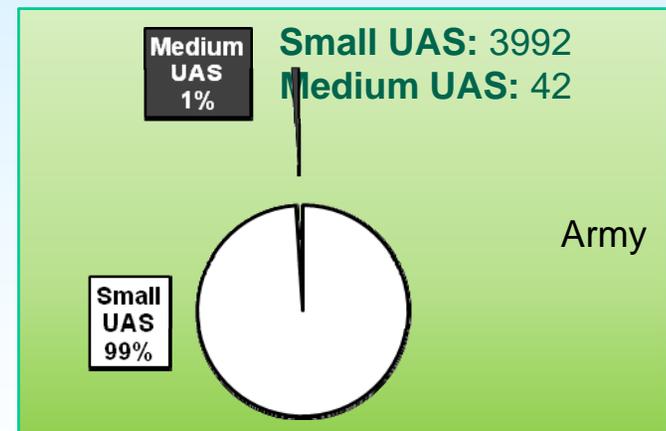
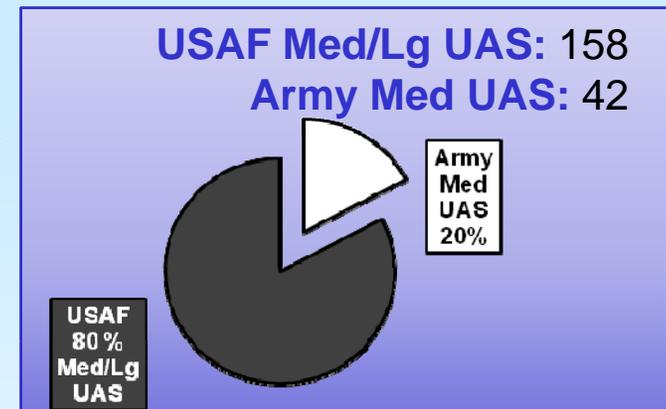
**We can't afford multiple UAS program offices, independent training, logistics and maintenance operations, plus multiple support facilities and procurement contracts**



# Perspectives on UAS Operators

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- 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

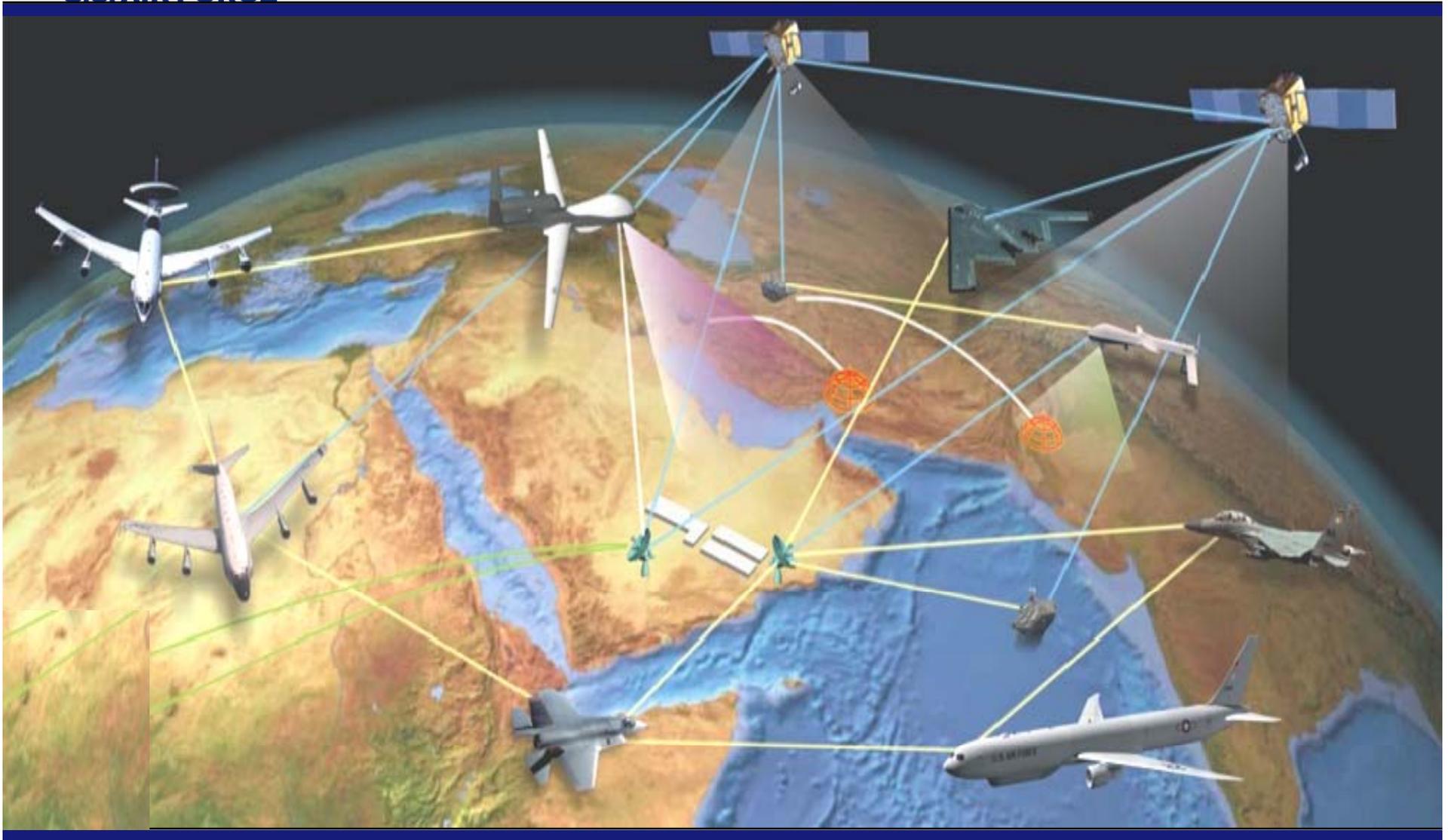


**Increased Demand, Limited Rated Inventory, Current FAA/ICAO Regulations, and Training Commensurate With Implications of Employment—Require New Approach**



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# *Air Force ISR Surge*

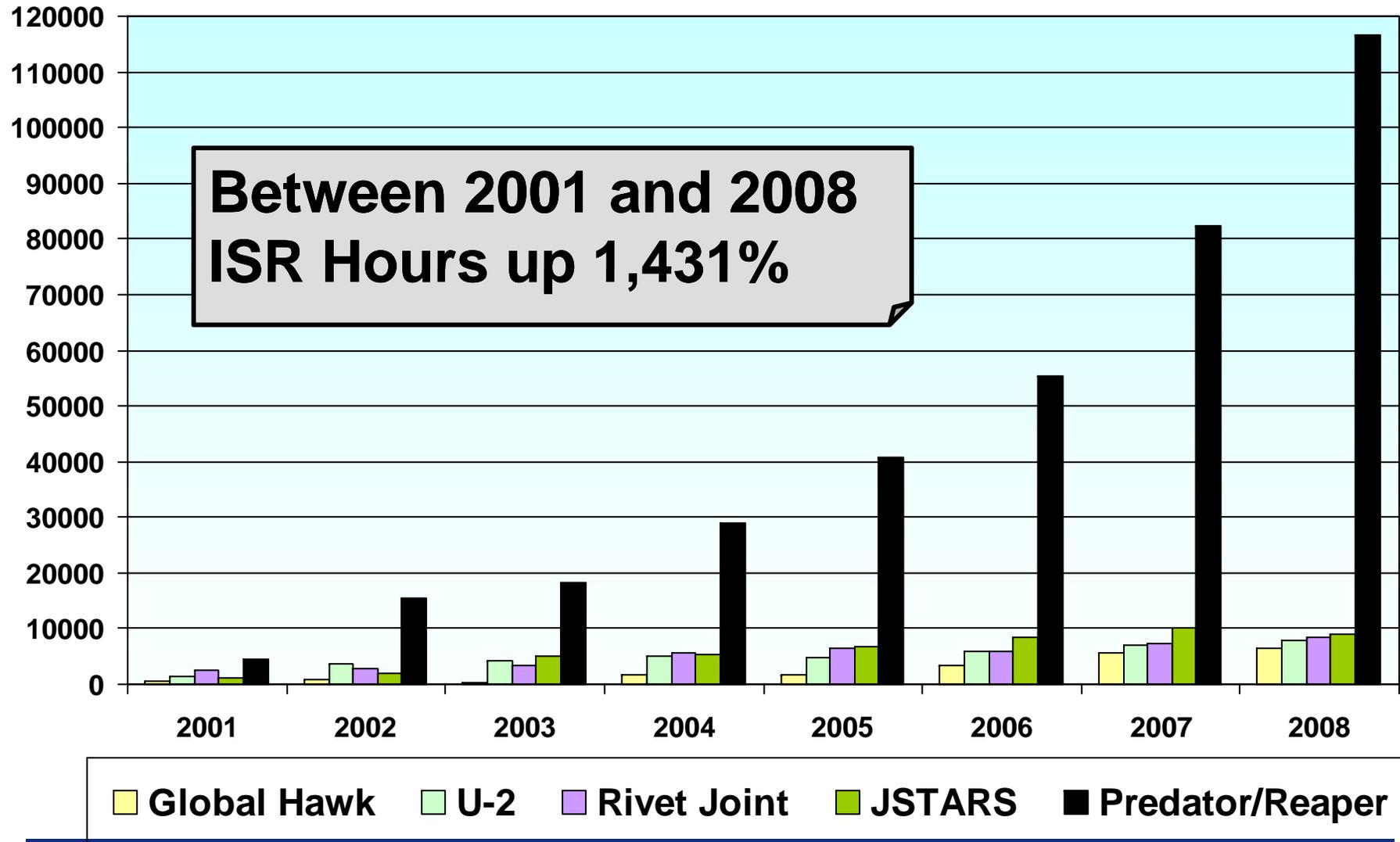


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# CENTCOM ISR Coverage

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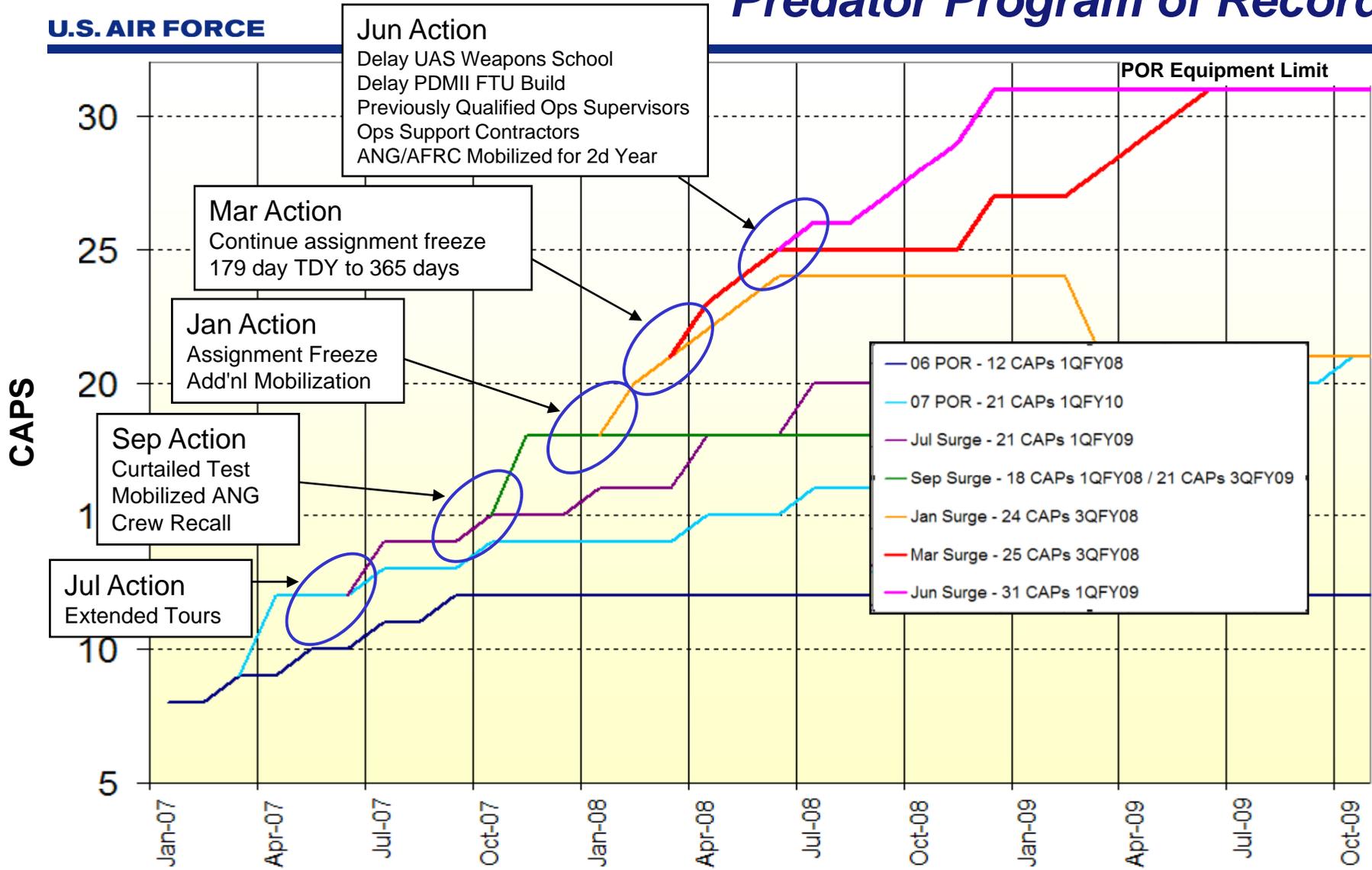


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# AF ISR "Surge" Predator Program of Record

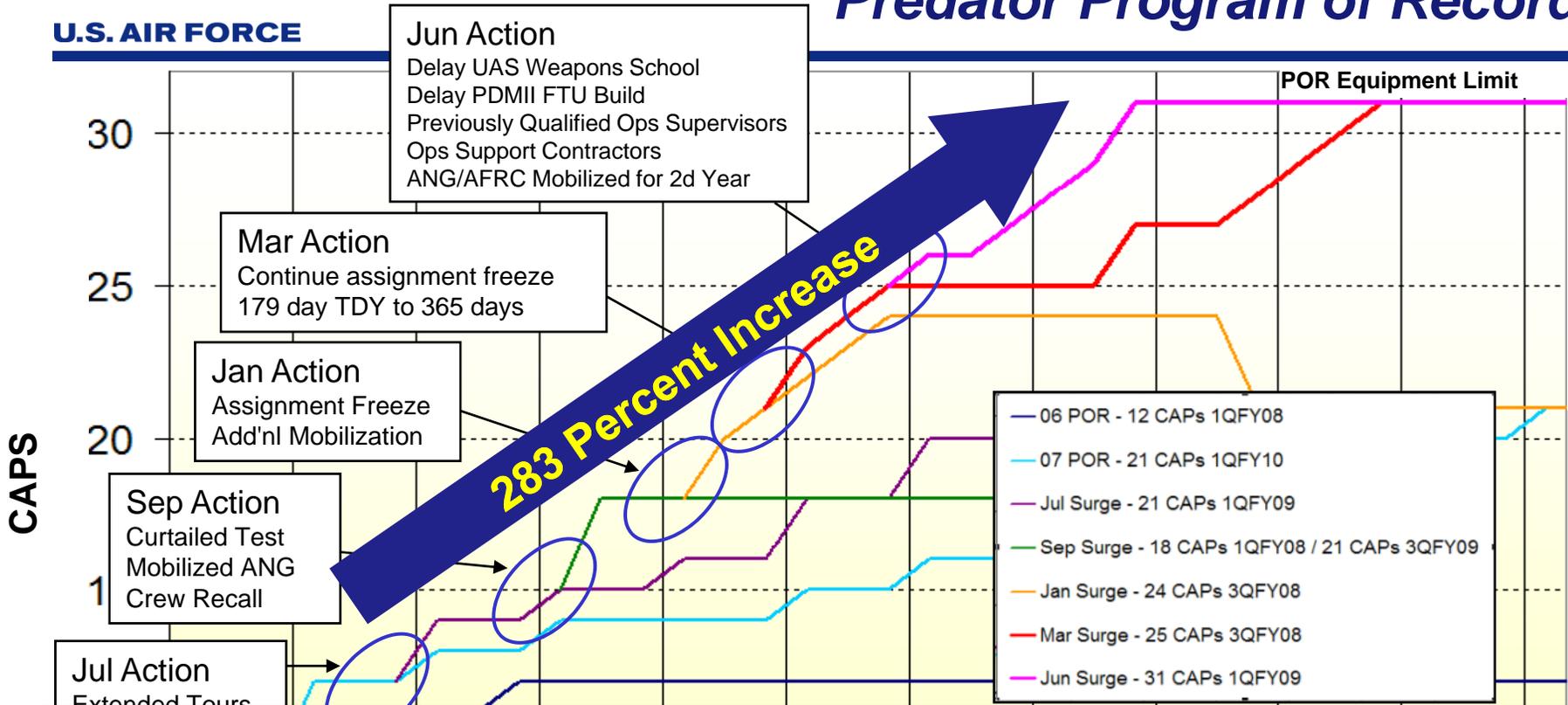
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# AF ISR "Surge" Predator Program of Record



**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...**

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# *Way Ahead to Meet Increasing Demand*

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- **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**

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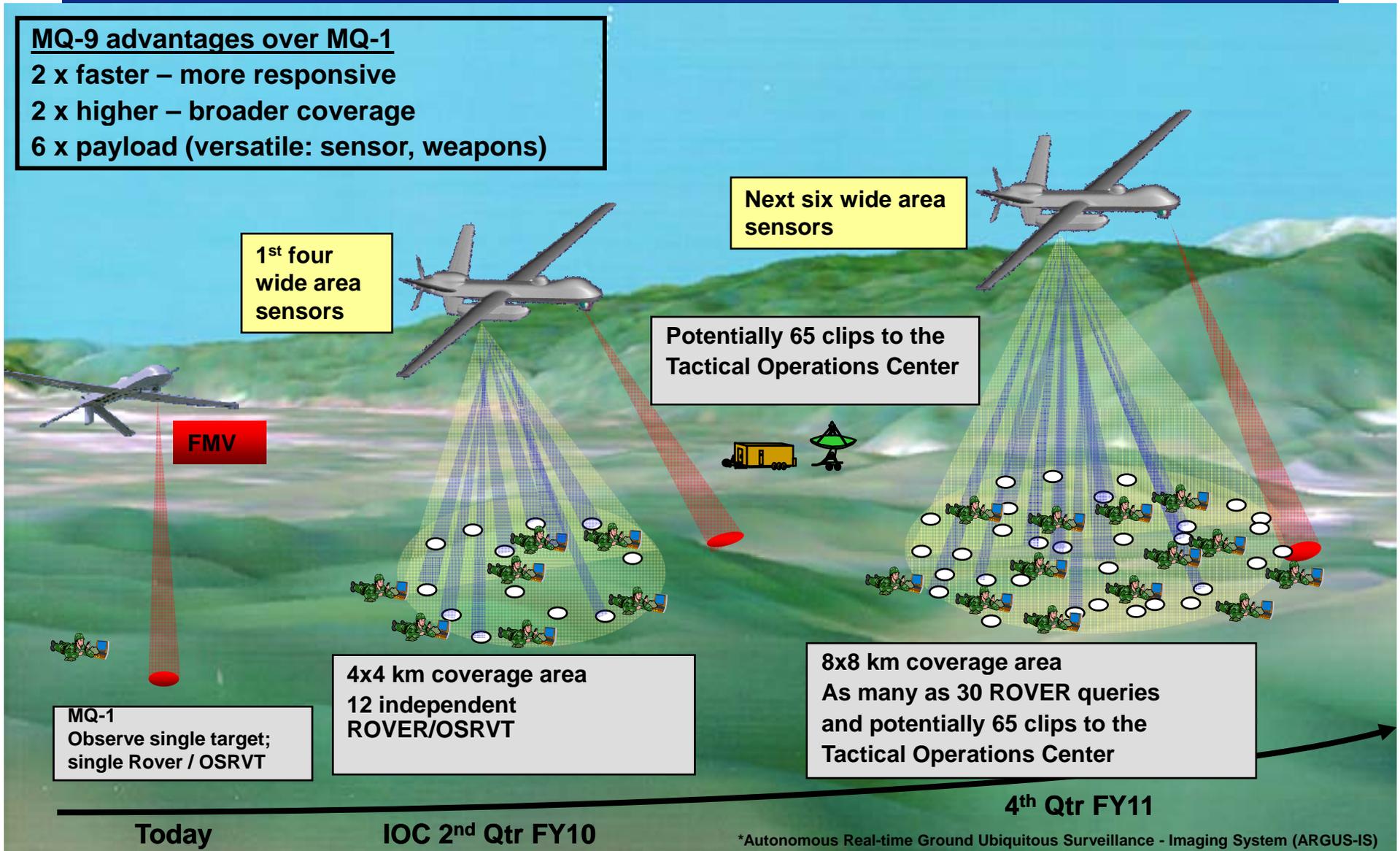


# Increasing Capabilities Wide Area Airborne Surveillance (WAAS)

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## MQ-9 advantages over MQ-1

- 2 x faster – more responsive
- 2 x higher – broader coverage
- 6 x payload (versatile: sensor, weapons)

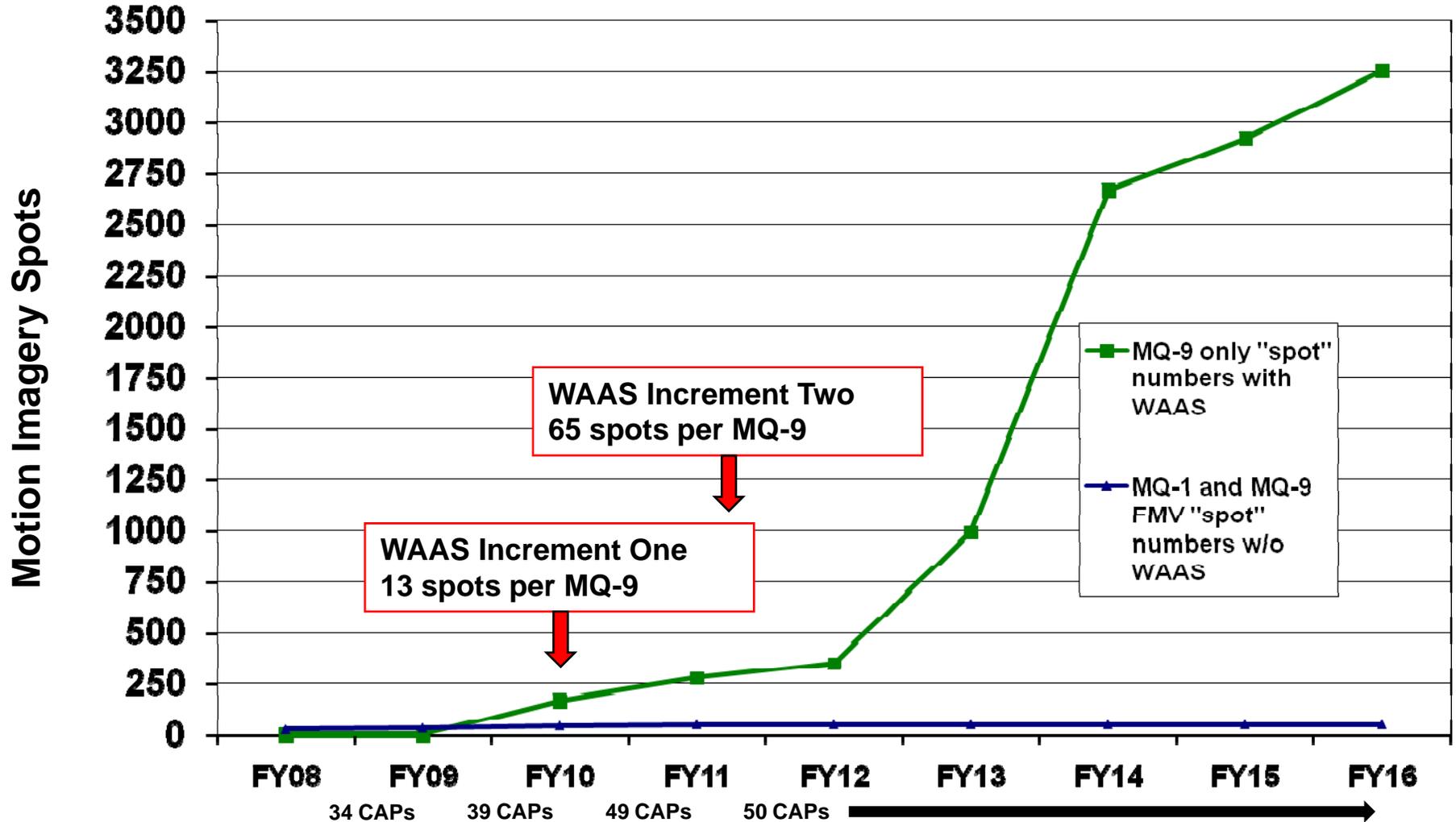


\*Autonomous Real-time Ground Ubiquitous Surveillance - Imaging System (ARGUS-IS)



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# Potential Growth of Video Effect (Result of MQ-1 to MQ-9 Shift w/WAAS)



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# USAF UAS Vision: Joint Employment

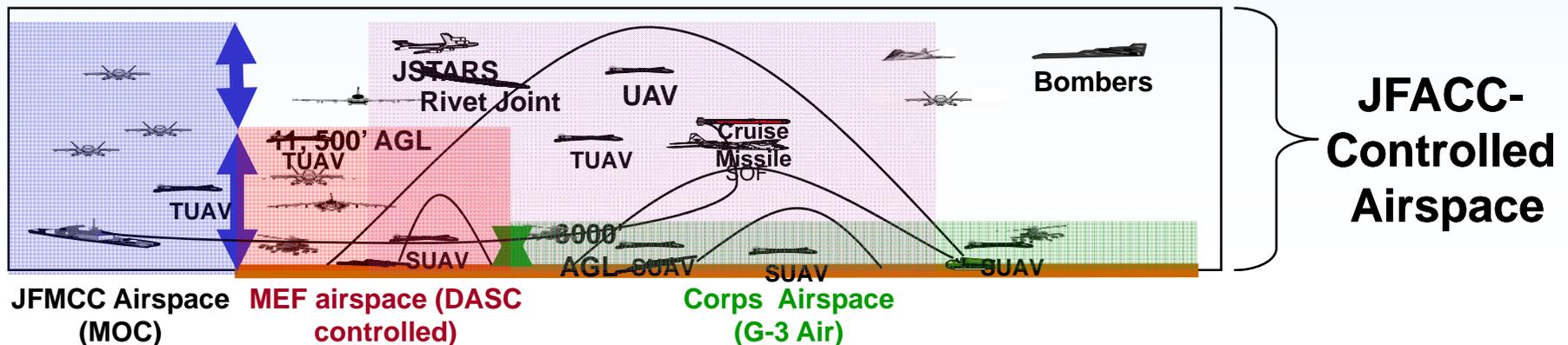
- Organizing air ops by individual service components creates seams
- So Joint Doctrine established a joint functional component for air operations: to integrate airspace, air defense, and effects from the air in accordance with the Joint Force Commander's priorities

## 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)



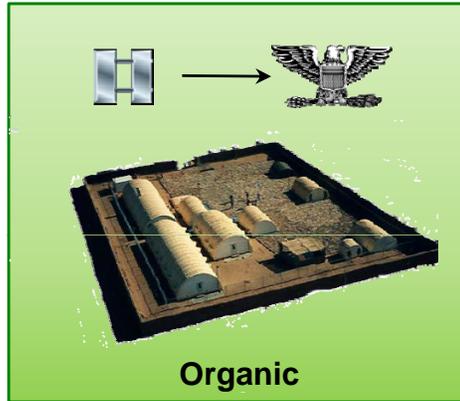
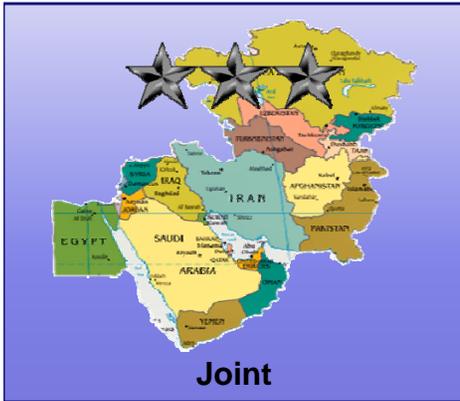


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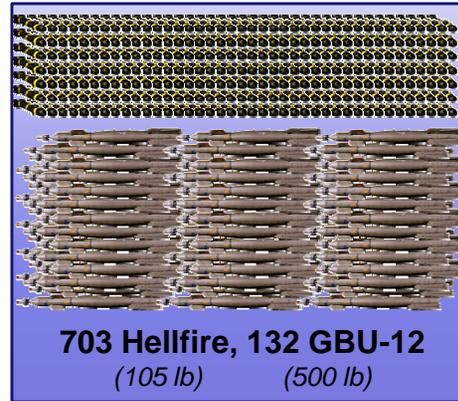
# Service Distinctions

Air Force: blue/left Army: green/right

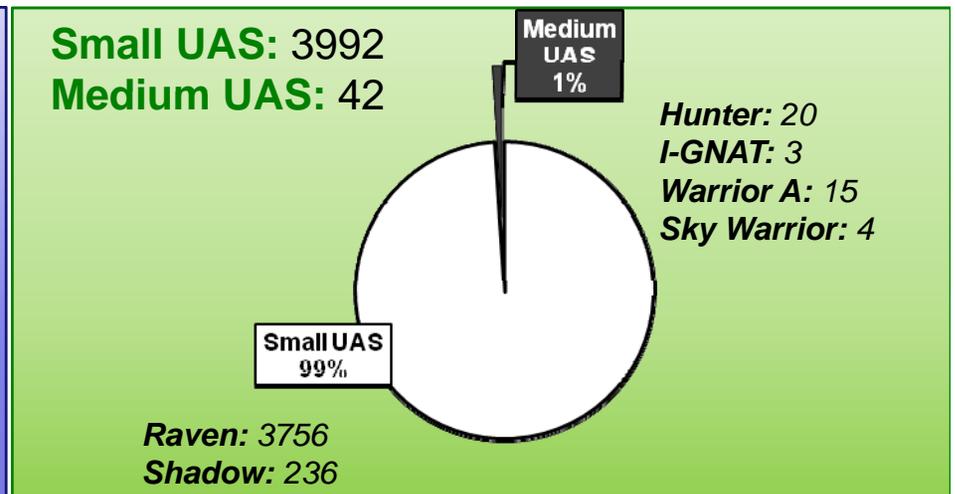
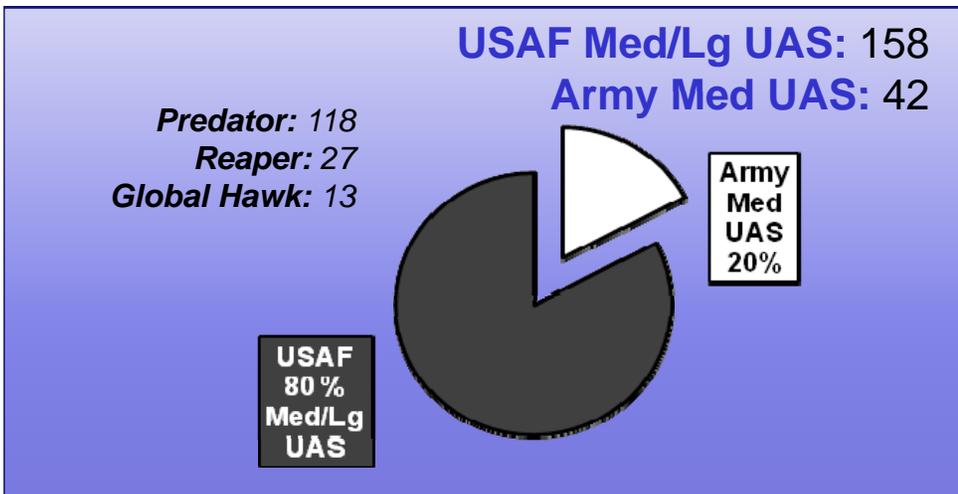
## C2 / Employment



## Weapons Used in Combat to Date



## Composition of Inventory



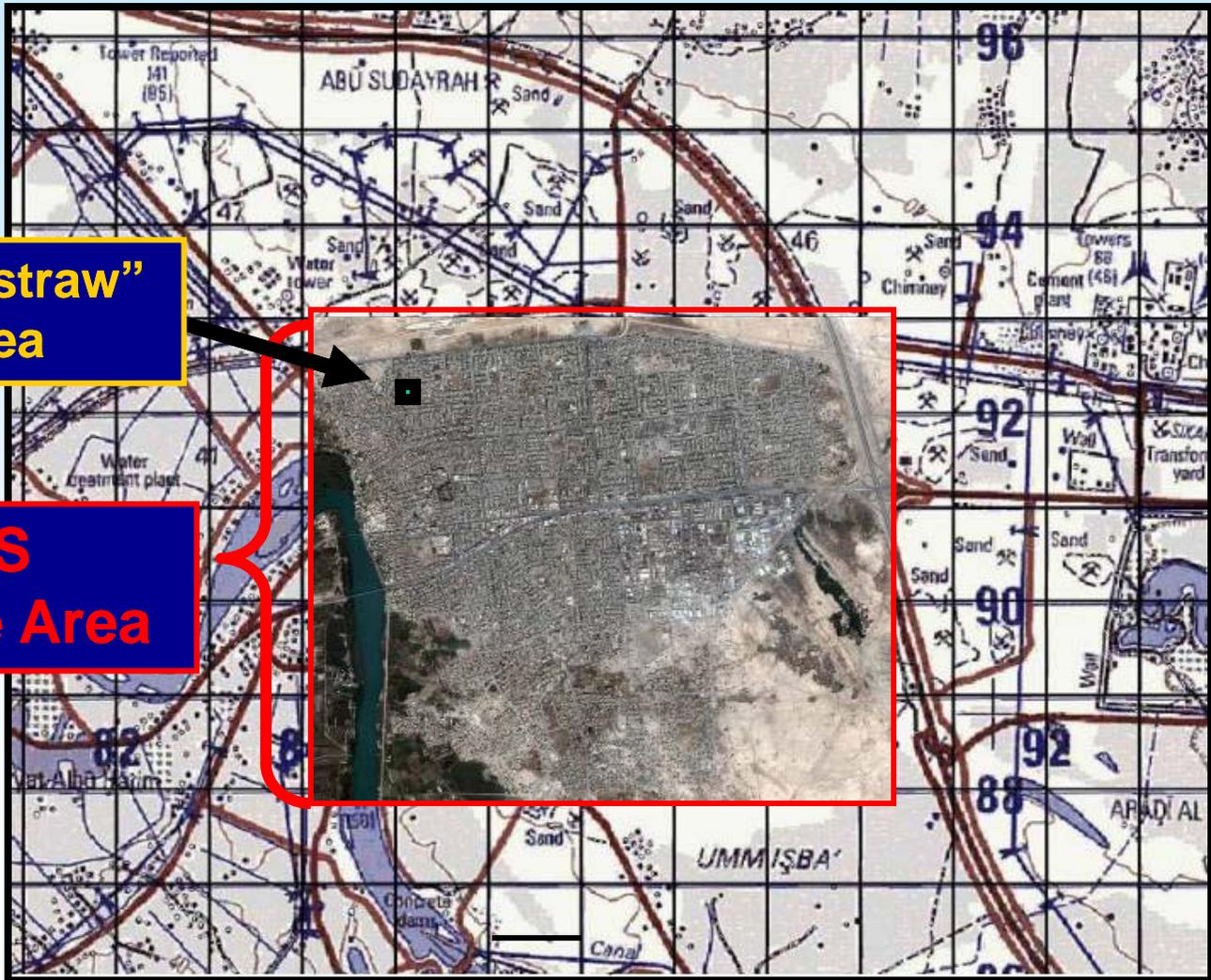


# Wide Area vs. Standard Coverage

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**Predator "Soda straw" coverage area**

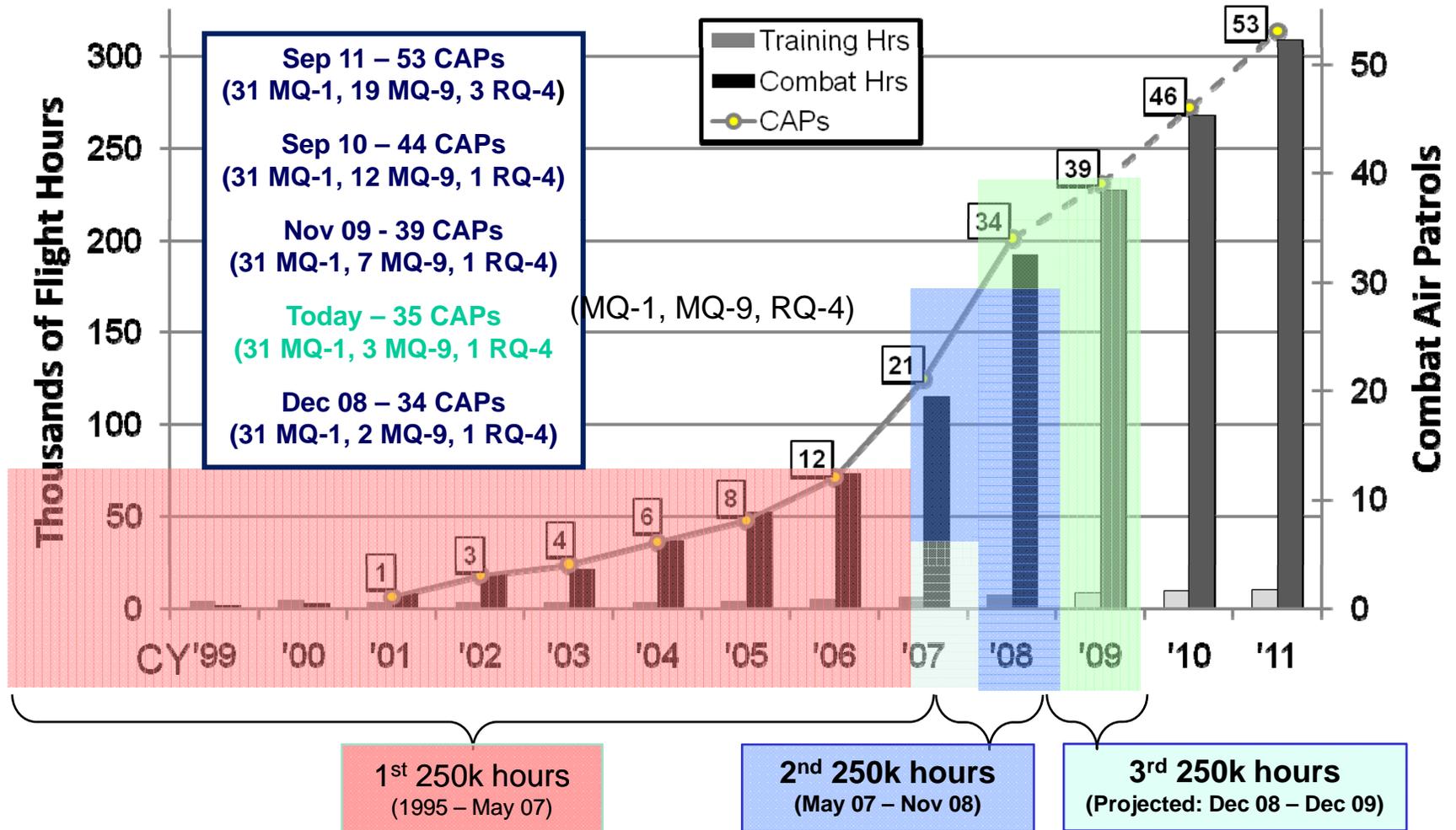
**WAAS Coverage Area**





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# USAF UAS Vision: Continued UAS CAP Growth



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# *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”***

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