Headquarters U.S. Air Force

Integrity - Service - Excellence

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 21st Century demands***
  - **CAPABILITY:** ***Plan, guide, and orchestrate AF/ISR from a capability-based perspective as a consolidated functional area***

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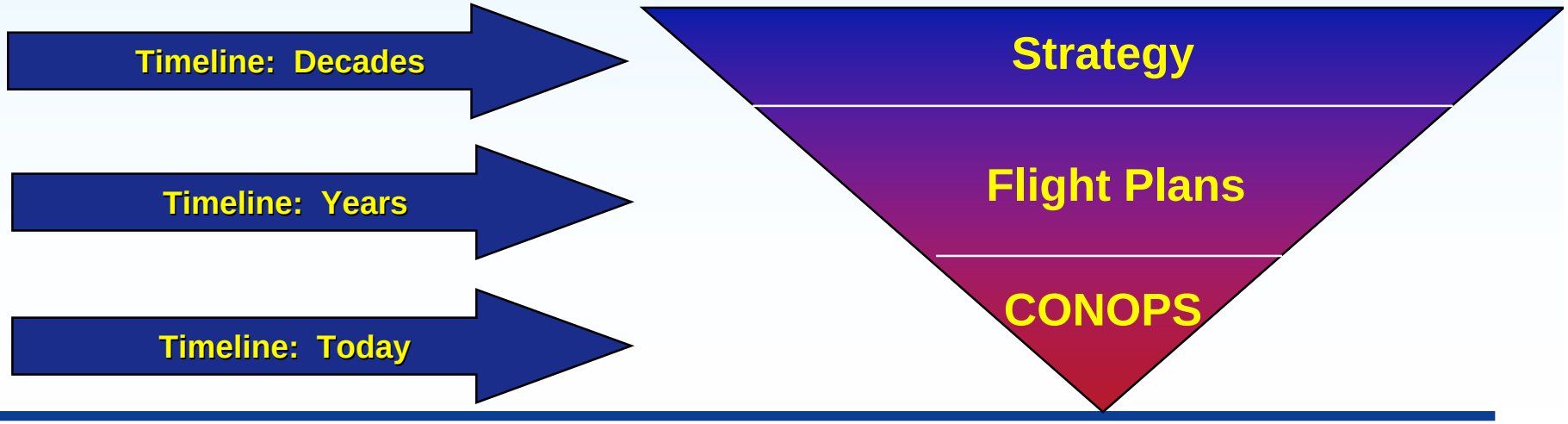
Codifying AF ISR for the 21st Century

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?

- 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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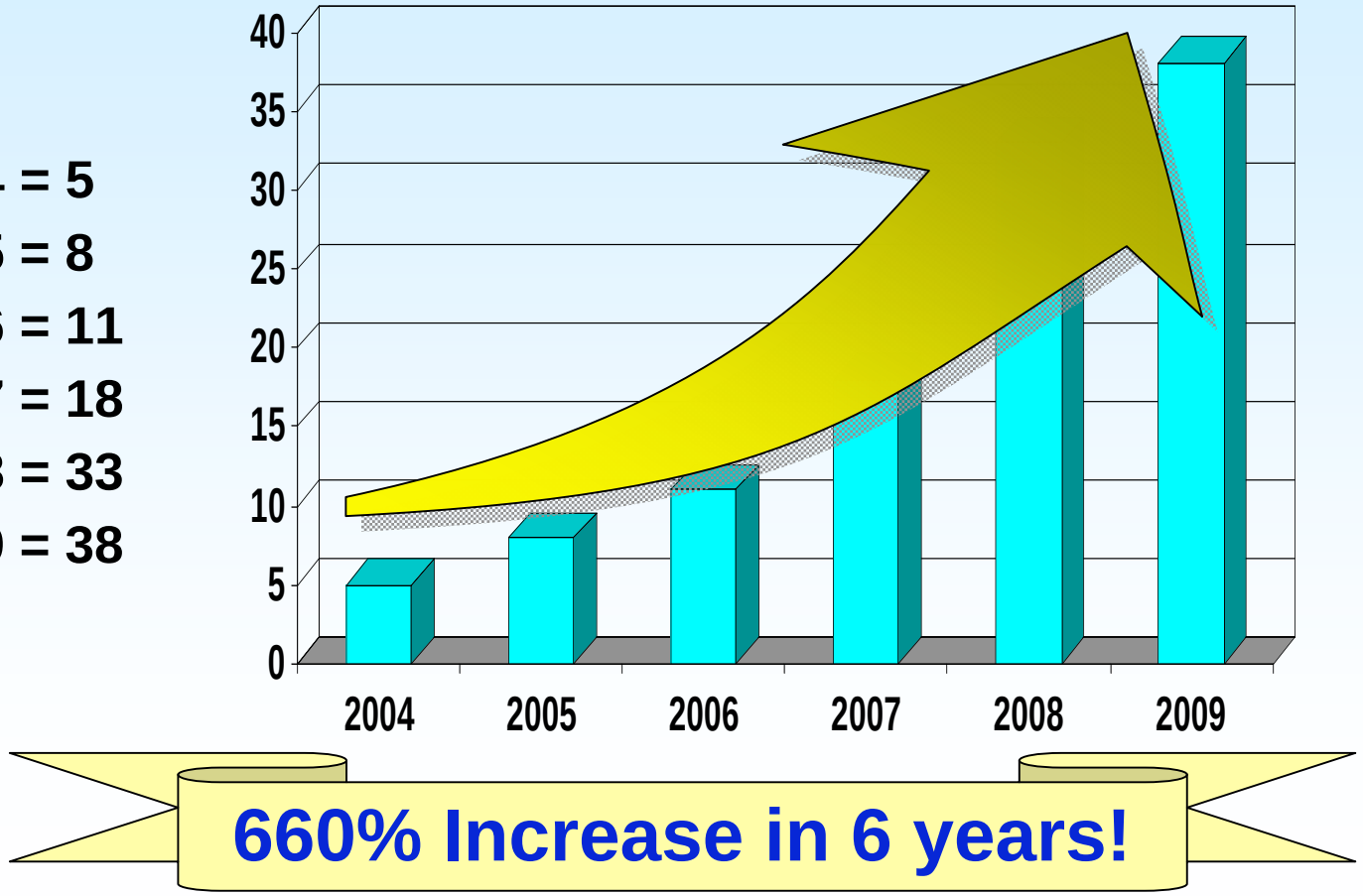
Result: High Demand Asset

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



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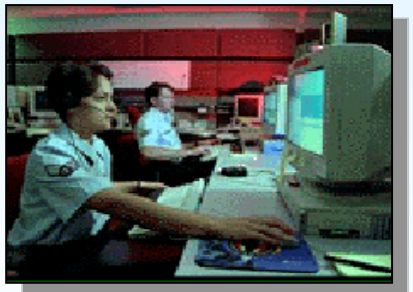
USAF UAS Vision: What We Believe

…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

- 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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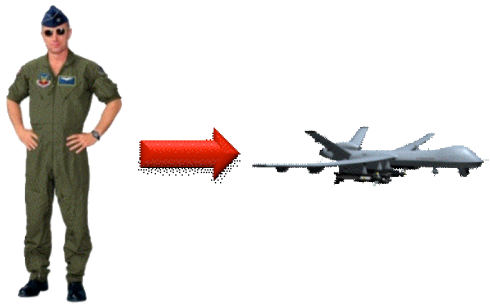
Autonomy – Multi-Aircraft Control Potential Manpower Savings

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

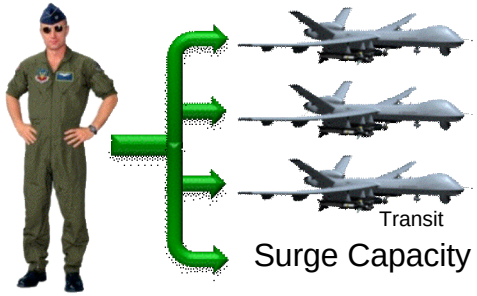


2012
(MAC)

- 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



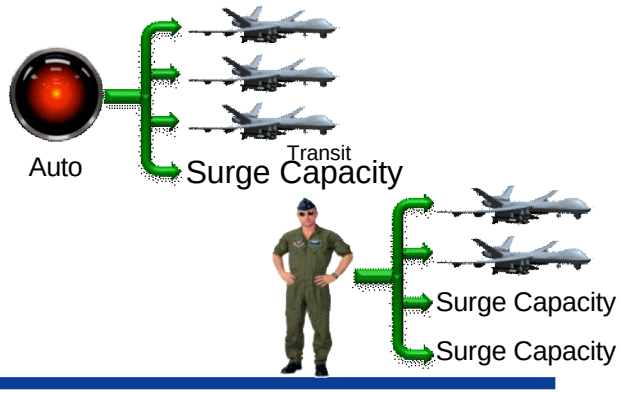
MAC = 1 pilot can fly up to 4 a/c

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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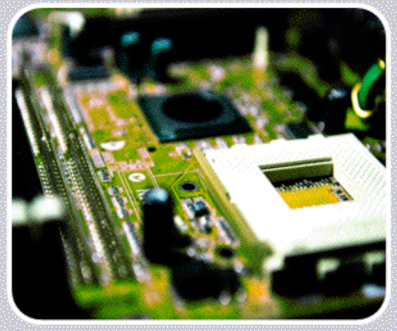
Modularity

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 vender competition
- Drives down price, improves quality, allows for tailorability
- $399 PCs are reality

Flexible

C-130

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

AMC-X CONCEPT CAPABILITIES STUDY

Common components, similar shape, and same production line

Enabling the "Global" in "Global Vigilance, Reach and Power!"

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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

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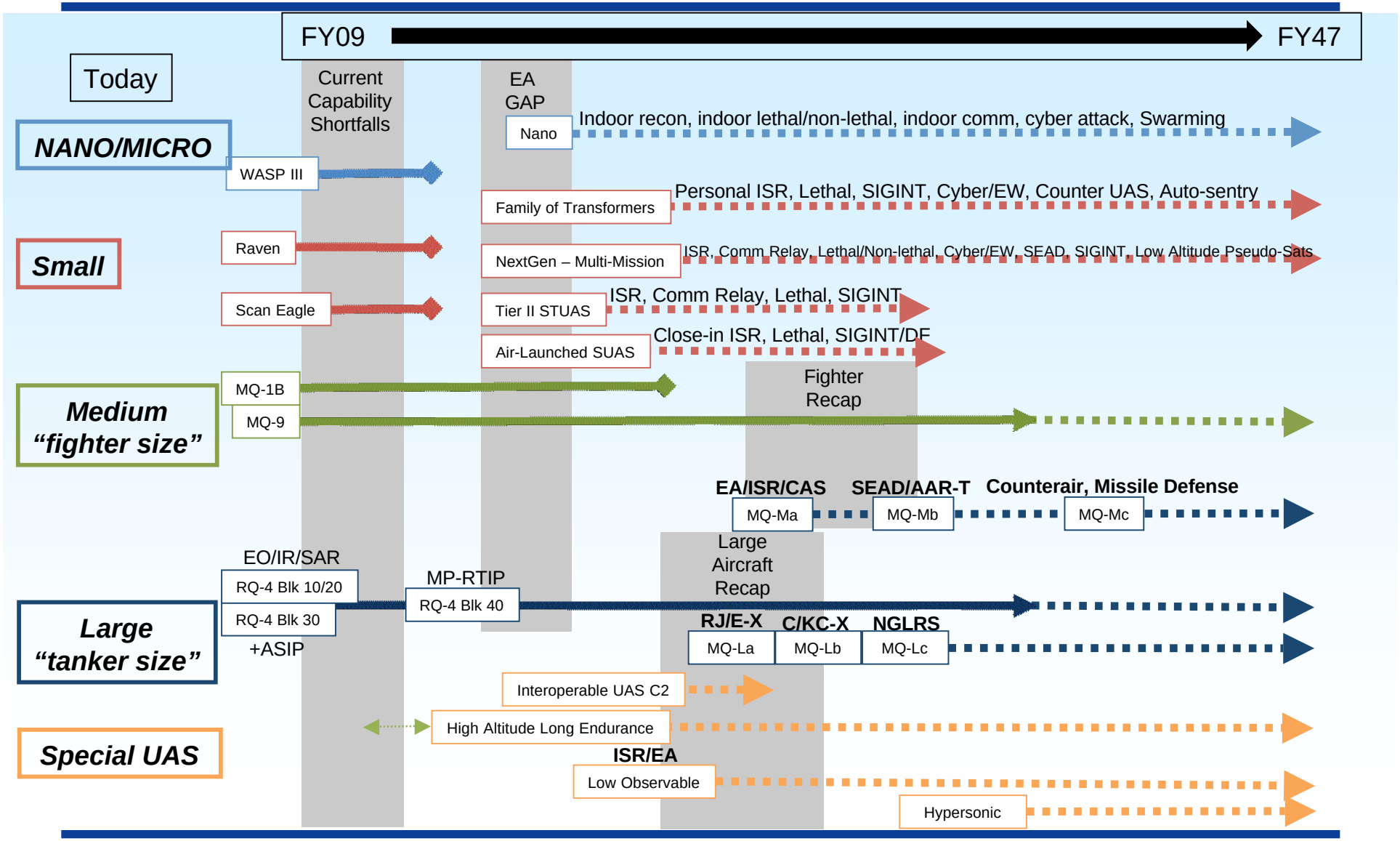
AF UAS Flight Plan:
Mission sets for UAS



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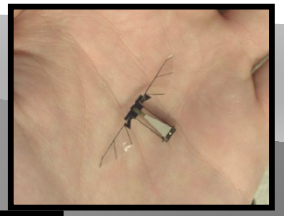
SUAS "Family of Systems"

Nano
Navigate / communicate inside buildings



Nano

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

Micro
Close-in reconnaissance & situational awareness

Wasp III

"SUAS Family of Transformers"
- Personal ISR
  - Lethal
  - SIGINT
  - Cyber/EW
  - Counter-UAV
  - AutoSentries

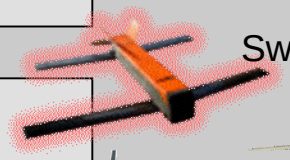
Lite Machine's Conceptual SUAS

Irregular Warfare

Man-portable
- ISR
- Time-Sensitive
- Lethal

Raven B

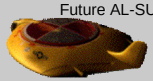
Increasing across all mission sets



Switchblade SUAS
Technical Demonstration

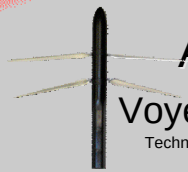
Family of Expendables
- Close-In ISR
- Expendable Jammers
- Lethal
- Counter Air
- Precision Clandestine Resupply
- Cyber attack

Artist Conception Future AL-SUAS



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

Finder SUAS



Anti-Access Support

Voyeur SUAS
Technical Demonstration

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

Multi-Mission
- ISR
- Force protection
- FID

Scan Eagle

Tier II Joint
- ISR
- Comm Relay
- Lethal
- SIGINT

GT Aero Conceptual Bandit SUAS

Now → Future

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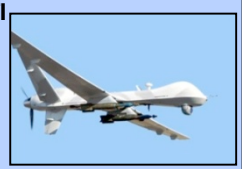
Medium "System"

MQ-1
- Collection – SIGINT/FMV
- CAS

MQ-9
- Collection – SIGINT/FMV
- CAS

MQ-Xa

MQ-9
- Collection
  - SIGINT/FMV
  - Wide Area Airborne ISR
  - SAR/GMTI
- CAS



Modular Payloads
- EW
- ISR
- CAS
- Comm Relay
- Collection
- Dissemination
- Specialized ISR
- AAR-R

MQ-Xb

Modular Payloads
- EW/ISR
- CAS
- Comm Relay
- Collection
- Dissemination
- Specialized ISR
- AAR-R&T
- SEAD
- Air Interdiction
- Counter Air
- CSAR
- Missile Defense
- Strategic Attack

MQ-Xc

Modular Payloads
- EW
- ISR
- CAS
- Comm Relay
- Collection
- Dissemination
- Specialized ISR
- AAR-T
- SEAD
- Air Interdiction
- Aeromedical Evacuation
- Personnel Recovery

Now → Future

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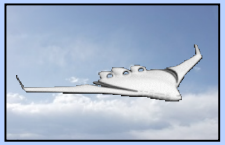
Large "System"

RQ-4 (Blk10)
- Collection – ISR
  - Basic SAR
  - Basic EO/IR

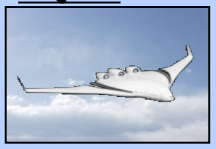
RQ-4 (Blk 20/30/40)
- **Collection:**
- *Block 20*
  - Enh SAR
  - Enh EO/IR
- *Block 30*
  - Adv SIGINT
- *Block 40*
  - MP-RTIP Radar
  - GMTI and concurrent SAR
  - High Range Resolution
  - No EO/IR or SIGINT

MQ-La



Modular Payloads
- EW
- ISR
- Command and Control
- Airborne Moving Target Indicator
- Ground Moving Target Indicator
- Information Integration
- AAR-R

MQ-Lb



Modular Payloads
- EW
- ISR
- Command and Control
- Airborne Moving Target Indicator
- Ground Moving Target Indicator
- Information Integration
- AAR-R & T
- Airlift
- Humanitarian Assistance

MQ-Lc

Modular Payloads
- EW
- ISR
- Command and Control
- Airborne Moving Target Indicator
- Ground Moving Target Indicator
- Information Integration
- AAR-R & T
- Airlift
- Humanitarian Assistance
- Strategic Attack
- Global Strike
- CAS
- Air Mobility
- Airlift

Now → Future

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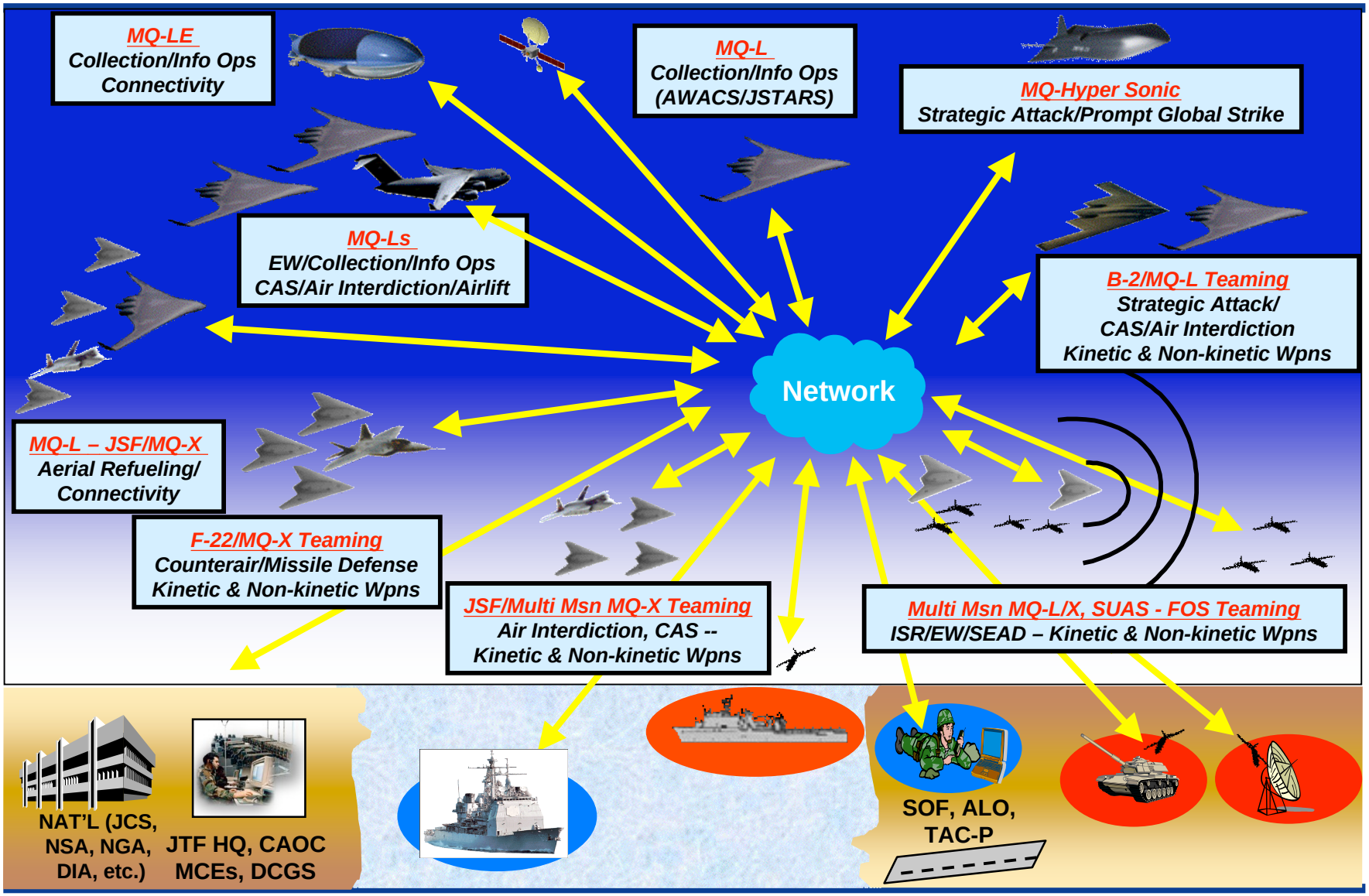
Connectivity and Teaming
Future



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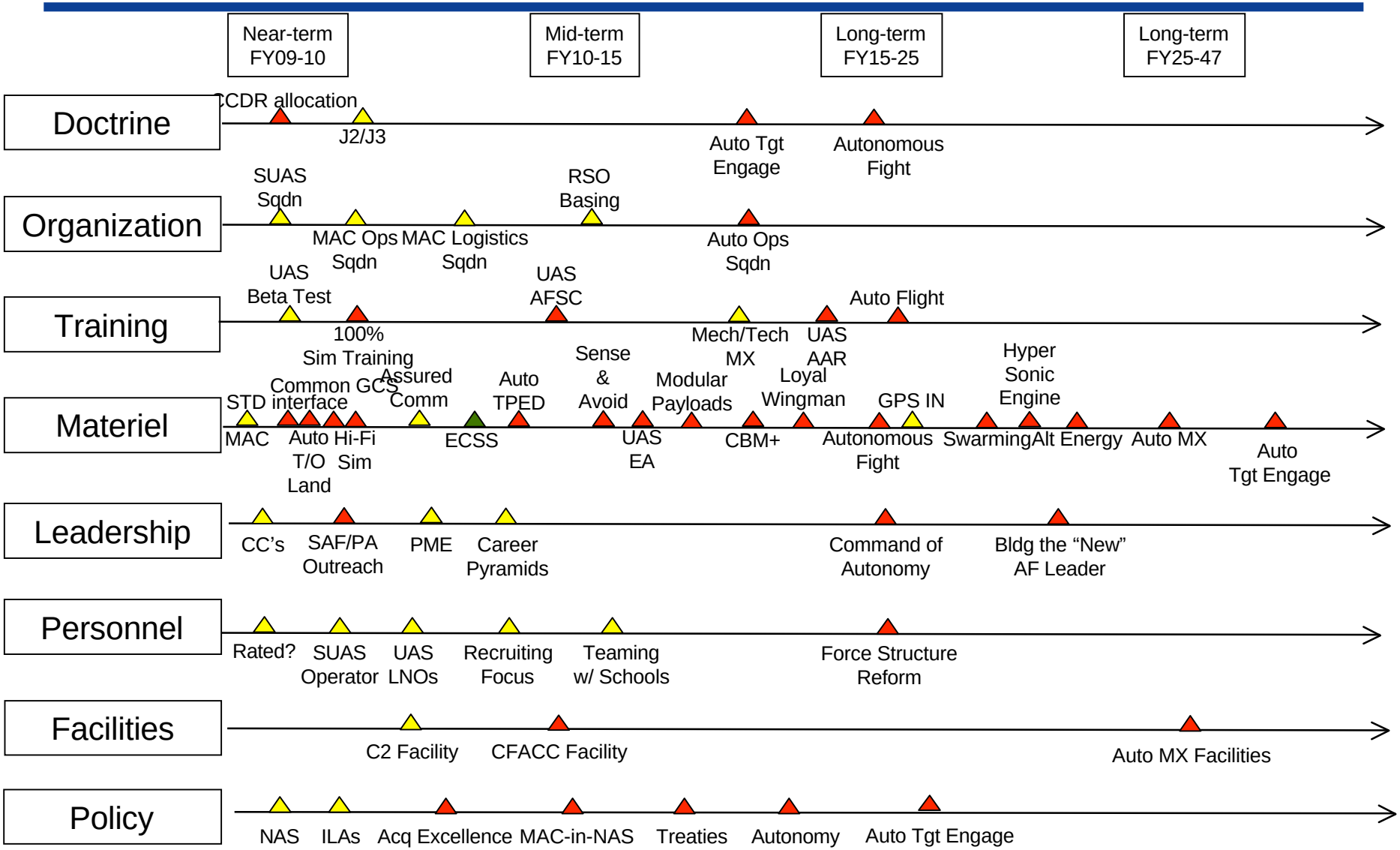
Action Synchronization



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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, 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

Headquarters U.S. Air Force

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AF UAS Flight Plan 2009-2047

Colonel Eric Mathewson
AF UAS Task Force

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