

Headquarters Air Combat Command

Air Force RPA in Multi-Domain Operations



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This Briefing is:
UNCLASSIFIED

Contemporary RPA History



- **RQ/MQ-1** 2x AGM-114 SIGINT ELINT IMINT 30 hour endurance
 - 1996 the RQ-1 flew into combat over the Balkans from Hungary
 - 18 Sep 01 it started flying with the AGM-114 Hellfire missiles
 - 2003 crews flew it via satellites in a process called Remote Split Ops
 - Retired in Mar 18, never receiving IOC in 2+ Million flight hours
- **MQ-9** 4x AGM-114 2x 500 lb bombs SIGINT ELINT IMINT SAR 24 hour endurance
 - 2001 first flight
 - 2007 started flying combat over Iraq and Afghanistan
 - 2014 IOC, 2+ Million flight hours in Mar 19, not FOC yet
- **RQ/EQ-4** SIGINT ELINT IMINT SAR Comm Relay 34 hour endurance
 - 1998 first flight, supporting combat since 2001
- **RQ-170** Not released
 - 2005 Squadron activated
 - Provides strategic options via penetrating capability

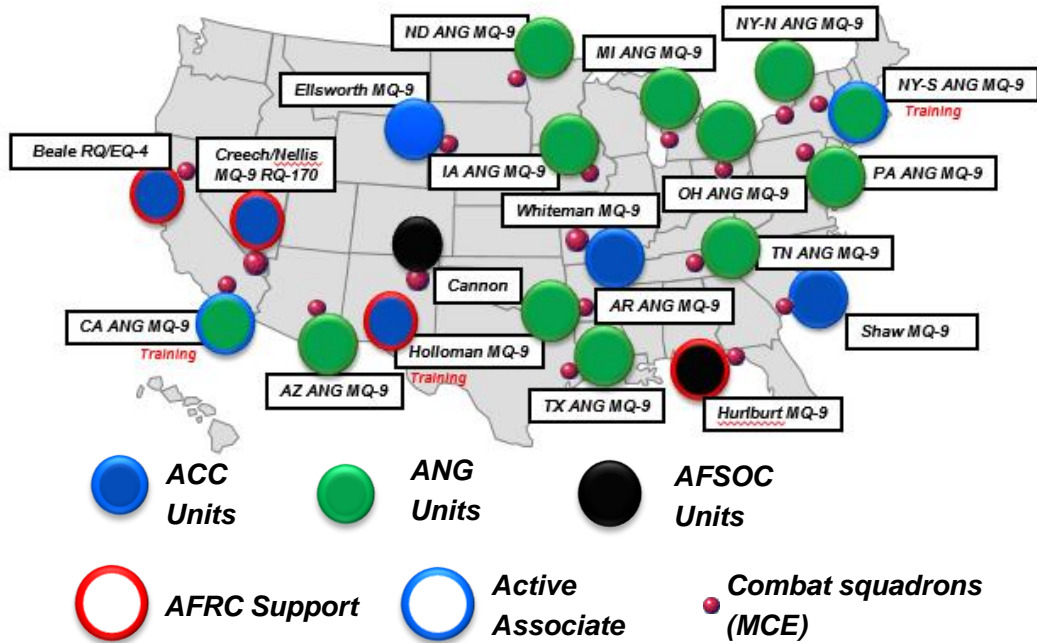


"We have just won a war with a lot of heroes flying around in planes. The next war may be fought by airplanes with no men in them at all... It will be different from anything the world has ever seen."

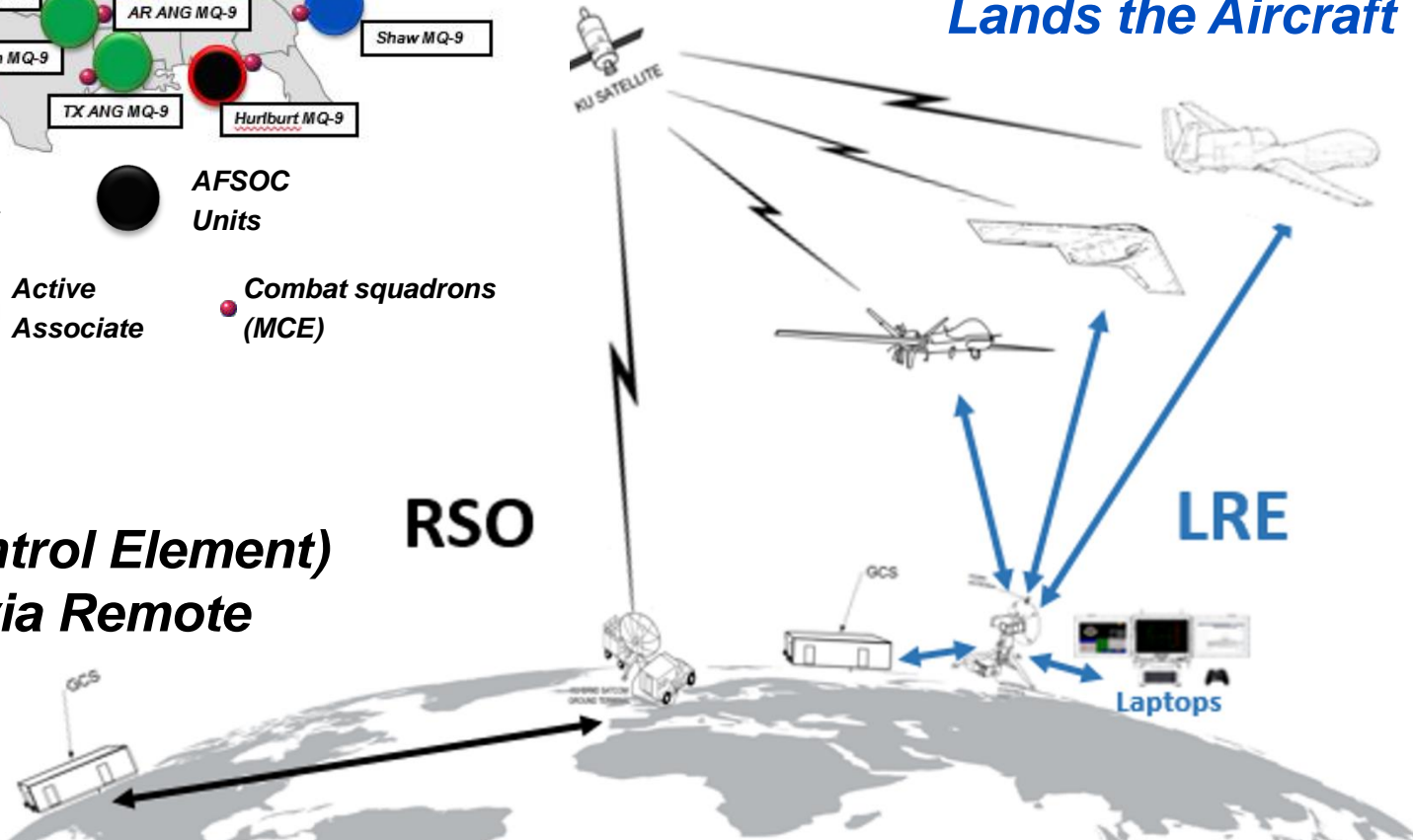
Gen. Henry H. Arnold, U.S. Army Air Forces commander 1945



How RPA Fly & Fight Today



LRE Takes Off and Lands the Aircraft



MCE (Mission Control Element) flies the Mission via Remote Split Ops (RSO)

RPA flight controls are vulnerable, transit the EM spectrum and cyber networks



Lessons Learned

- **Having the entire Kill-Chain on a single platform has changed the game – F2T2EA**
- **Persistence is the key**
 - **Two MQ-1 CAPs were able to ID, sort and direct strike assets to completely destroy the Libyan military**
 - **These lessons were scaled up to defeat the Islamic State**
- **Penetrating is the key in a near peer fight**
- **Comms must be resilient in a near peer fight**
 - **Comprehensive infrastructure must be resilient**
- **Partnerships are vital**
 - **You must be able to modify the data stream**
 - **Open systems and open architecture, otherwise you cannot be flexible enough to become effective or adapt**

Remotely Operated Capes Provide Dynamic, Agile & Scalable Solutions



Future Vision



- **MQ-9 Sunsets in 2030**
 - Forecasted to retire mid-2030s

- **RQ-4**

- Upgrade all weather capes
 - Service life extension to 2030

- **RQ-170**

- Not released

- **Project MAVEN**

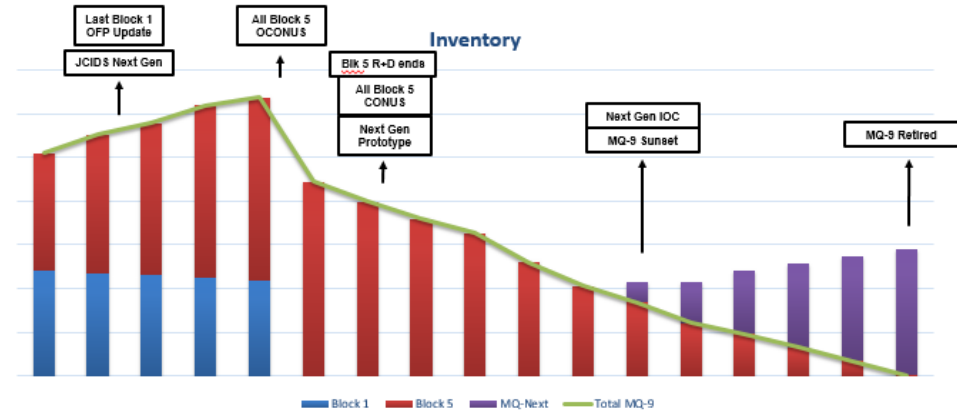
- AI/Machine learning that will replace the Sensor Operator and allow any SNIPER/LITNING/MTS to F2T2EA a target

- **Mesh Networks**

- Not a single node network, a smart “3D fishing net” network that automatically adapts when comm nodes are jammed/break/lose LOS

- **Onboard AI/Machine Learning Processors**

- Each node is a supercomputer that can stand alone or share processing

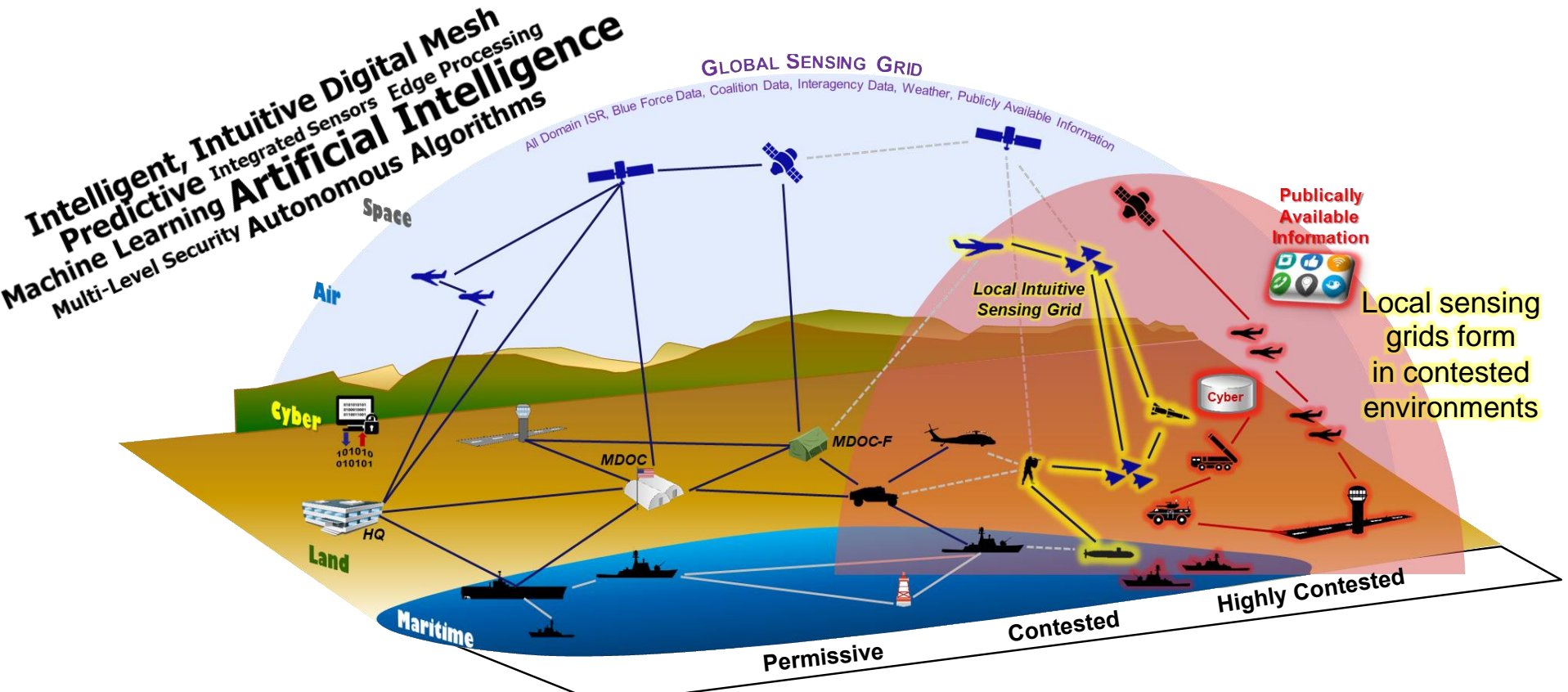


RPA's will Evolve From Man-In-The-Loop, to Man-On-The-Loop



Future of RPAs

Part of the assemblage of aircraft, sensors, platforms, people, devices, content, and services that delivers a holistic, accurate, predictive, and timely characterization of the operating environment to decision makers



Domain/Battlespace Awareness

← Indications and Warning Sensor-to-shooter linkages Indications and Warning →

Predictive analysis Autonomous sensing & response

Foundational Intelligence Target Development Continuous ops when disrupted or fractured Foundational Intelligence

Shape Phase 0
Deter Phase I
Seize the initiative Phase II
Dominate Phase III
Stabilize Phase IV
Enable Civil Authority Phase V