Headquarters U.S. Air Force

Integrity - Service - Excellence

Air Force Safety Center
RPA Brief

U.S. AIR FORCE

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Overview

- Who We Are
- What We Do
- Future of RPAs

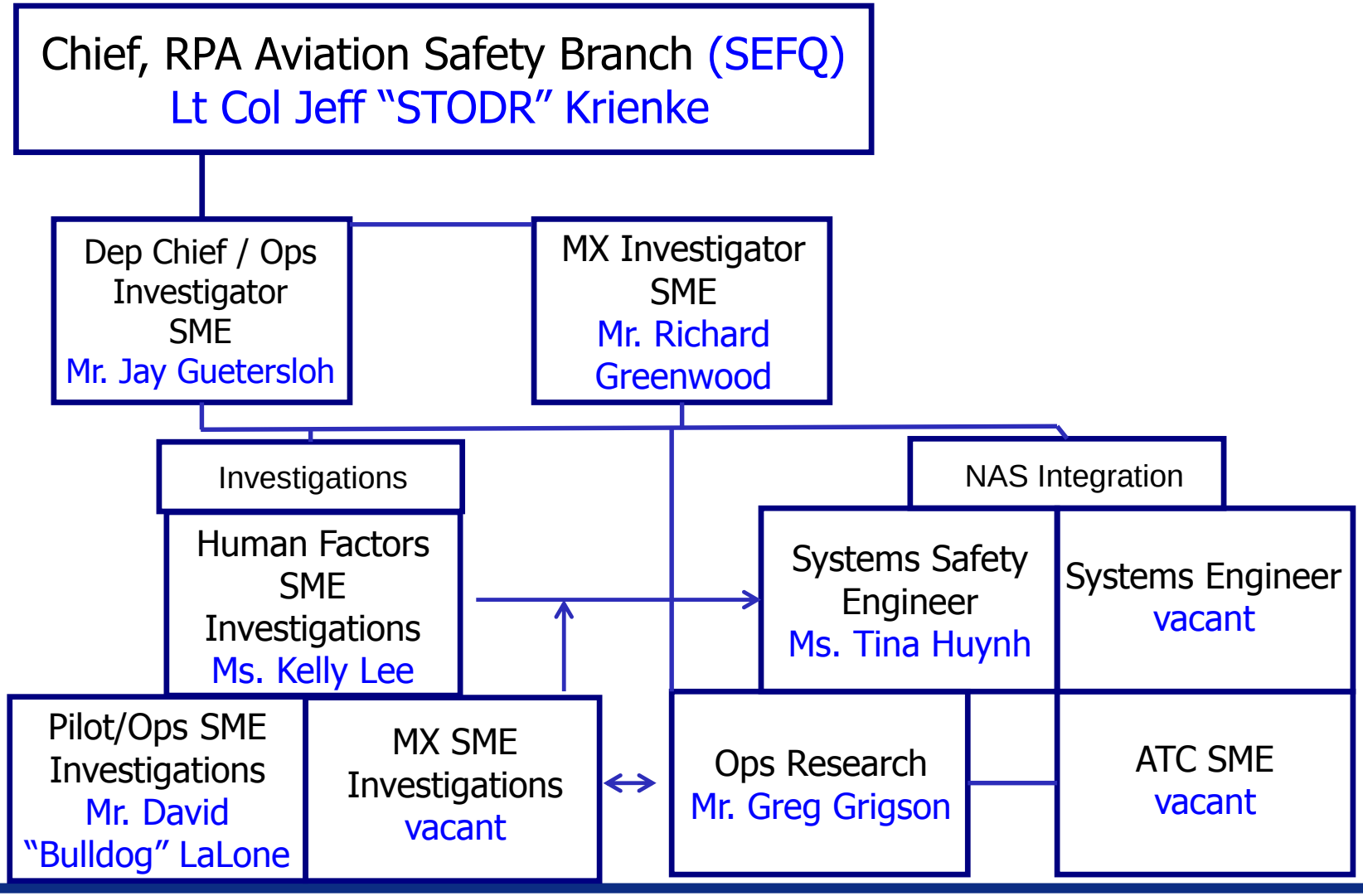
Aviation Safety Division Mission

Preserve warfighting capability through prevention of aviation mishaps, injuries and fatalities

Manned versus Unmanned Aviation

- **Manned**
  - Several decades of manned aerial warfare
  - Pilot in aircraft – sensory feedback available
  - Cockpit design is standardized
  - Crashing is unacceptable
  - Training to proficiency
  - National Airspace (NAS) integration
  - No datalink for control
- **Unmanned**
  - Approximately 15 years of unmanned aerial warfare
  - Pilot not in aircraft – sensory feedback unavailable
  - RPA "cockpit" design is not standardized
  - "Asset is expendable" culture
  - Training to qualification
  - Not fully integrated into the NAS
  - Rely on datalink

RPA Branch (SEFQ) Organizational Structure



Remotely Piloted Aircraft Branch (SEFQ)

- SEFQ Mission
  - Mishap Investigation
  - NAS Integration
- RPAs Tracked
  - MQ-1
  - MQ-9
  - RQ-4

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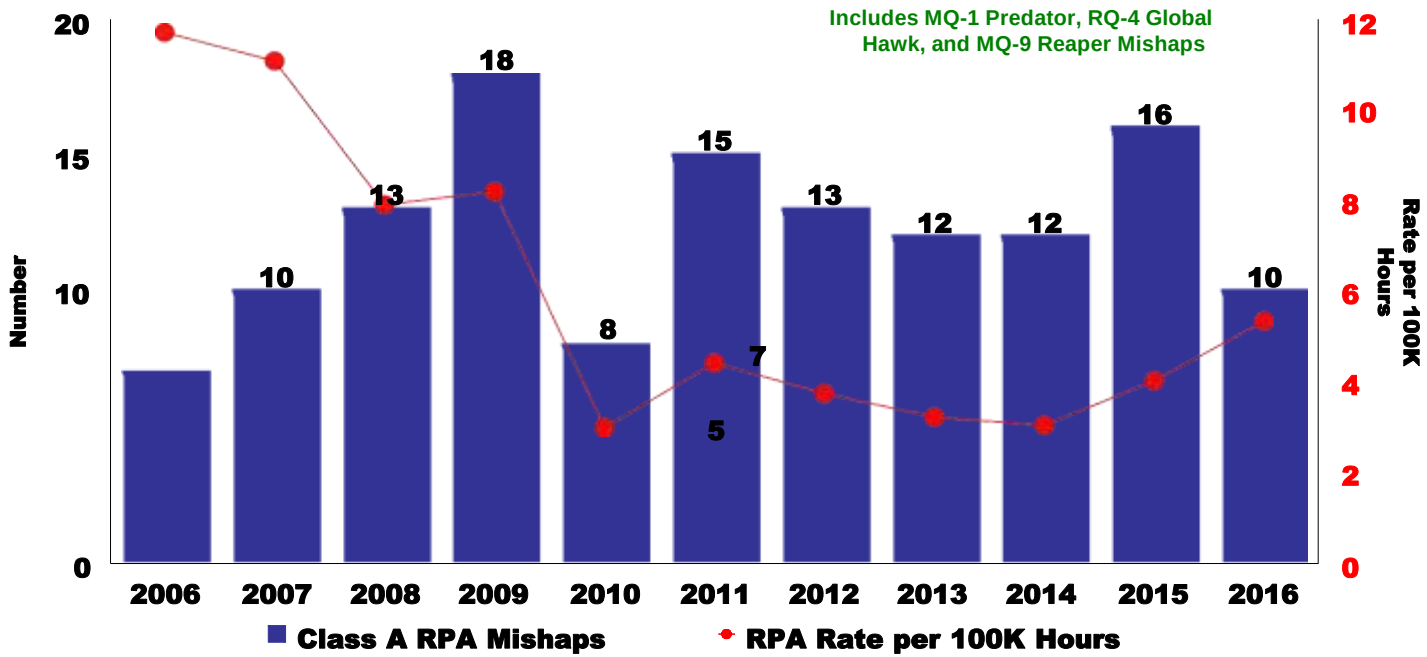
10-year Average

10-yr Average	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	10 Yr Totals
Q-1 mishap	5	7	10	13	7	12	9	9	8	6	86
Q-9 mishaps	2	1	3	4	1	2	4	3	4	10	34
RQ-4 mishaps	0	0	0	1	0	1	0	0	0	0	2
Total Mishaps	7	8	13	18	8	15	13	12	12	16	122
Q-1 hours	57,798	79,193	147,980	187,393	202,330	239,304	215,560	198,619	190,353.0	164,411	**1,682,941**
Q-9 hours	3,180	6,872	13,490	25,391	56,109	86,526	118,039	155,801	179,559.7	199,967	**844,935**
RQ-4 hours	3,214	5,631	7,894	7,274	8,322	13,232	13,520	17,542	24,164.3	32,885	**133,679**
Total RPA Hours	64,192	91,696	169,364	220,058	266,761	339,063	347,118	371,963	394,077	397,263	**2,661,554**
Total Annual RPA Rate	10.90	8.72	7.68	8.18	3.00	4.42	3.75	3.23	3.05	4.03	**4.58**
						10-YR AVERAGE MISHAPS/YEAR					**12.2**
Q-1 Rate	8.65	8.84	6.76	6.94	3.46	5.01	4.18	4.53	4.20	3.65	**5.11**
Q-9 Rate	62.89	14.55	22.24	15.75	1.78	2.31	3.39	1.93	2.23	5.00	**4.02**
RQ-4 Rate	0.00	0.00	0.00	13.75	0.00	7.56	0.00	0.00	0.00	0.00	**1.50**
							10-YR Q-1 AVERAGE NUMBER				**8.6**
							10-YR Q-9 AVERAGE NUMBER				**3.4**
							10-YR RQ-4 AVERAGE NUMBER				**0.2**

Class A RPA Mishaps FY15 (thru 30 Sep 15)

- **FY15**
  - **16 total Class A mishaps**
    - **6 MQ-1**
    - **10 MQ-9**
    - **0 RQ-4**
  - **Categories**
    - **2 Airfield Operations**
    - **1 Controlled Flight Into Terrain**
    - **2 Environment/ Weather**
    - **3 Powerplant Failure or Malfunction**
    - **8 System Failure or Malfunction (Non-Powerplant)**

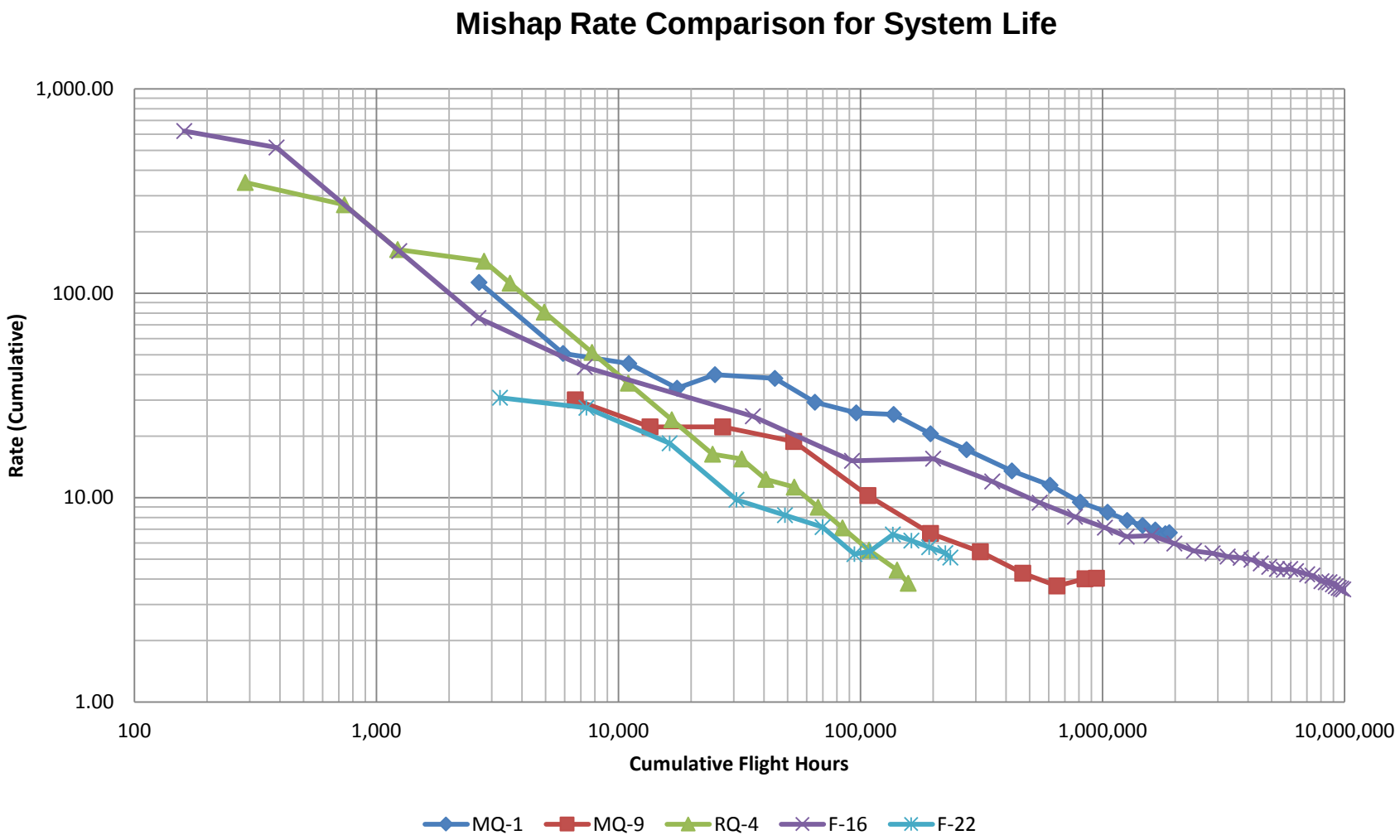
Class A RPA Mishaps FY16 (thru 7 Apr 16)



Last RPA Class A: 08-Mar-16 MQ-1B LOST LINK; NOT RECOVERED NO INJURIES

	FY16	FY15
Class A RPA Mishaps / Class A Rate to Date:	10 / 5.34	6 / 2.84
10-Year Avg (FY06-15) Class A Mishaps / Mishap Rate:	*12.4 / 4.68*	

Class A Rate Comparison



HF Review RPA

Class A Mishaps (FY15)

In FY15, Human Factors were CAUSAL in 10 of the 16 RPA mishaps

- **5 mishaps casual at the person level**
- **4 mishaps causal at the org level**
- **1 mishap causal at both person level and org level**

HFACS coded against the mishaps were:

Mishap Level:

7 Organizational Level

0 (Zero) Supervision Level

Person Level:

7 Preconditions

8 Acts

(note: multiple HFACS can be coded against mishaps)

Challenges of RPA

- Motivation
  - MQ-1: Advanced Concept Technology Demonstrator
  - MQ-9: Internal Research and Development
  - Board Composition – No on-site AFSEC Rep
- Multiple Interim Safety Boards (ISBs)
  - 2-3 ISBs
  - Gather and Preserve Evidence
- Multiple MAJCOMS
  - ACC
  - AFSOC
  - ANG/AFRC
- Recommendations
  - Prioritization
  - Funding

National Airspace System Integration

National Airspace System (NAS) Integration

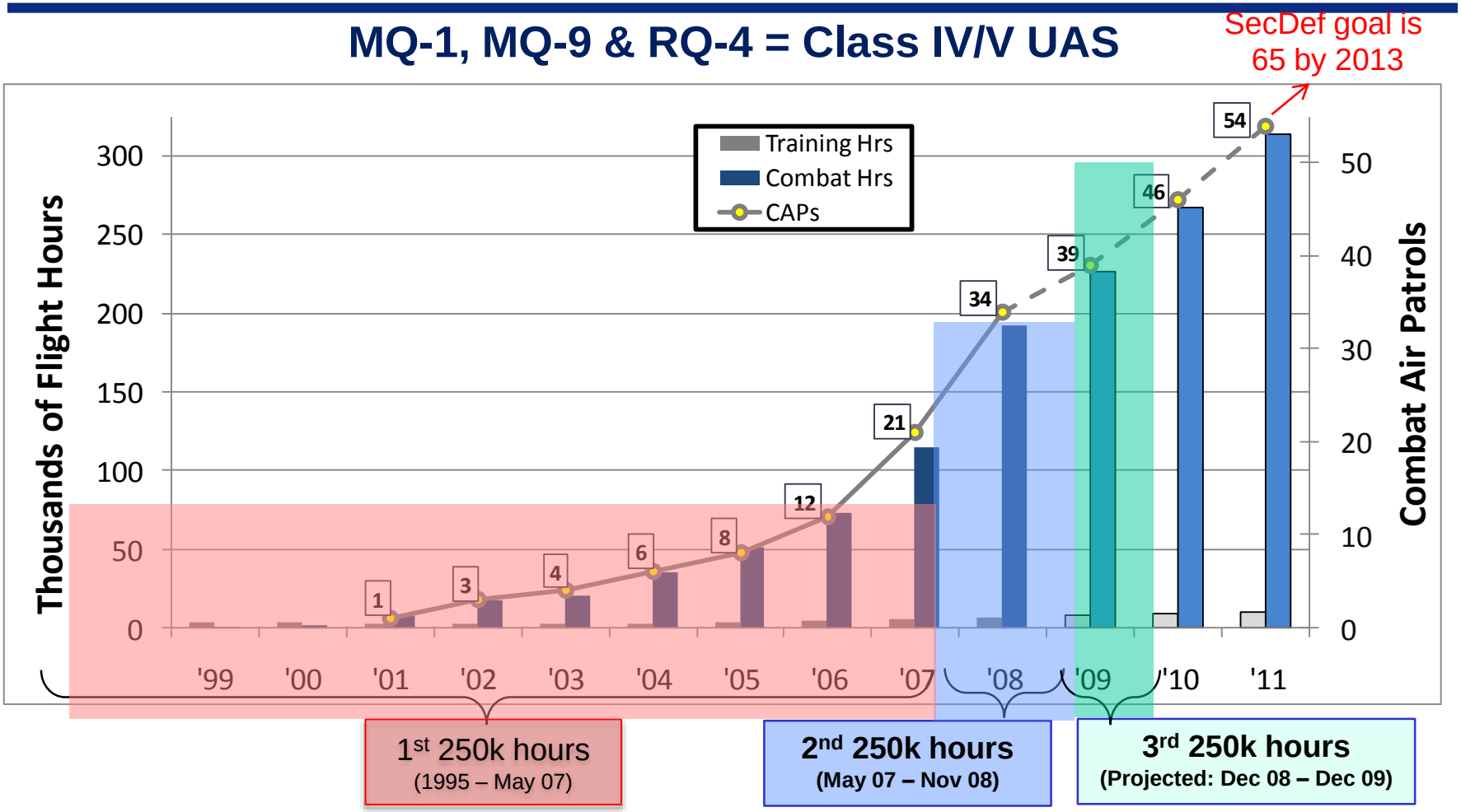
- **FAA #1 Issue – See/Sense and Avoid**
- **FAR 91.113**
  - **"Regardless of whether an operation is conducted under instrument flight rules or visual flight rules, vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft."**
  - **FAA determined that RPAs do not satisfy this requirement**
  - **FAA requires Certificate of Authorization (COA) to operate RPAs in the NAS**
- **AFSEC working with NASA, industry experts, FAA, and DoD components to find solutions using best technology to integrate in the NAS**
- **AFSEC assisting MAJCOMs in conducting risk assessments and safety assessment analysis**

GBSAA Continuing Effort

- **NAS Integration is a DoD/Air Force focus**
- **HAF/A3O (Funding for FY16)**
  - **ANG efforts include Handcock Field and Ohio**
  - **US Army developed solution slated for USAF at Handcock Fld**
- **AFSEC/RPA Branch**
  - **Supporting HAF/A3O / safety assessment and advisory role**
  - **Providing safety, ATC, data/research and human factors analysis**
  - **Supporting systems and safety engineering**
  - ***Supporting and providing advice regarding the GBSAA safety case for Syracuse, Palmdale and Ohio***
- ***Future sites: Beale and Grand Forks***

Challenges of RPA

MQ-1, MQ-9 & RQ-4 = Class IV/V UAS



22 Oct 13 >2M Flight Hours. The RPA program began in the mid-1990s. It took 16 years for the community to reach 1 million hours and a mere two and a half years to double that.

What the Safety Is Center Doing

- The Air Force has processes in place to assist in the effort to reduce mishaps, identify human factors issues, and make recommendations for improvements: Mishap Investigations
- Generate operational & strategic RPA safety policy
- Board Support
- System Safety Groups
- Trend Analysis
- AFSAS Development
- Cross Talk with other Services and Governmental Agencies
- NAS Integration

Summary

- Who We Are
- What We Do
- Future of RPAs

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QUESTIONS?