

412th Test Wing

Task Order

Edwards Air Force Base, CA



TMAS-2 Industry Day
2 April 2019

Mike Seelos
Dr. Paul Waters
John Theologidy
Hugo J. Via

U.S. AIR FORCE



412 Test Wing Task Order

U.S. AIR FORCE

- **412 TW Mission and Organization Overview**
 - **Major Task Element Requirements**
 - **412 Test Engineering Group (TENG)**
 - **412 Electronic Warfare Group (EWG)**
 - **412 Test Management Division (TMD)**
 - **412 Civil Engineering Group (CEG)**
 - **Questions**
-

412th TW Mission

*“World Class Test and Evaluation
for the Warfighter”*





The 412th Test Wing (TW)

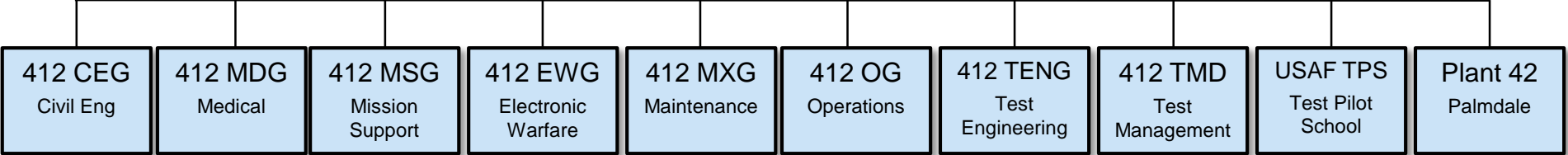
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412 TW
Test Wing




412 CPTS
Comptroller
Squadron

WSA
Wing Staff
Agencies

Groups / Divisions



Combined Test Forces (CTFs)

						
Joint Strike Fighter 461 FLTS	Raptor 411 FLTS	Global Power Bomber 419 FLTS	Global Power Fighter 416 FLTS	Global Reach 418 FLTS	Global Vigilance 452 FLTS	Emerging Technologies
						
F-35	F-22A	B-1, B-2, B-52, C-12	F-16, F-15SA	C-17, C-5, C-130, KC-46, KC-135	Global Hawk	sUAS, AI, Autonomous



A&AS for the 412 TW

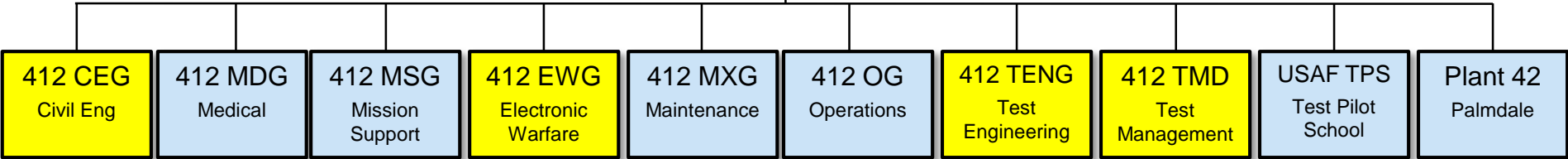
U.S. AIR FORCE

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Test Engineering Group Task Element



**Dr. Paul Waters
2 April 2019**

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412th TENG Overview

- **412 TW Core Competencies**
- **Mission**
- **Organization**
- **Squadrons**
- **General Nature of Work & Current Support**



412 TW Core Competencies

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Execution of the 412 TW T&E Mission Requires Core Competencies in:

- **Operations**
- **Maintenance**
- **Engineering**
- **Project Management**



412th TENG Mission

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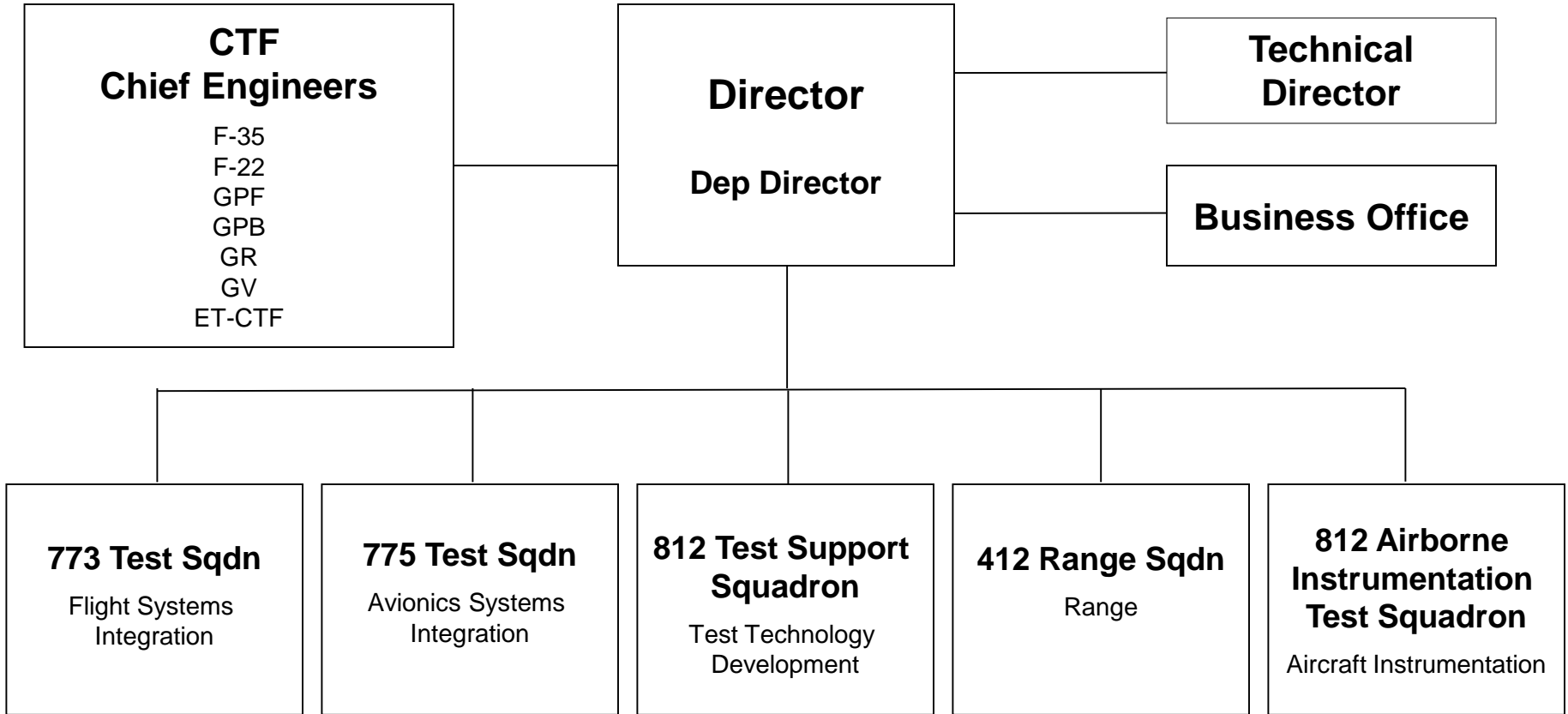
Manage T&E Engineering Core Competency in Airframe-Propulsion-Avionics (APA), Range, Instrumentation

- **Provide test and evaluation (T&E) engineering expertise**
 - Manage T&E engineering resources (Home Office / Matrix Personnel)
 - Provide career guidance, mentoring, education and training for engineers, mathematicians, and scientists
- **Plan, conduct, analyze, and report test results**
- **Define requirements for and assist in the development of T&E infrastructure (systems engineering process)**
- **Operate and maintain the Edwards Flight Test Range**
- **Provide airborne instrumentation systems and technical expertise**



412th TENG Leadership

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773rd & 775th Test Squadrons

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- **Intellectual capital**
 - Assigned to various Combined Test Forces
- **Technical & safety planning**
 - Define objectives and test methodology; Identify and mitigate test risk
- **Conduct tests from mission control room**
- **Review data, evaluate system performance**
- **Report conclusions and recommendations (~100 reports/yr)**

773 TS

- **Flying Qualities & Performance**
- **Subsystems & Aerial Refueling**
- **All Weather and In-flight Icing**
- **Human Factors**
- **Parachutes/Aerial Delivery**
- **Propulsion**
- **Reliability & Maintainability**
- **Structures**

775 TS

- **Integrated Avionics**
- **Communications**
- **Navigation, Guidance & Control**
- **C4ISR**
- **Tactical Data Links**
- **EO/IR**
- **Radar**
- **Weapons Integration**



812 TSS, 412 RANS, and 812 AITS

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812th Test Support Squadron

- **Post Test Processing**
 - Data Center (Ops and Dev)
 - T&E Specific S/W Development
- **Acquisition Project Management**
- **Statistical Office**
- **Engineering Development Office**
- **Technical Library**

812 Airborne Instrumentation Sq

- **T-2 Modifications**
 - Design & Prototype
 - Fabrication & Installation
- **Operations**
 - Test aircraft
 - Support fleet (GSF)



412th Range Squadron

- **Ridley Mission Control Center**
- **Telemetry Systems, Mission Control Rooms**
- **Precision Impact Range Area (PIRA)**
 - Gunnery, bombing, photo and infrared (IR) resolution targets, target vehicles
- **Time-Space-Positioning Information (TSPI)**



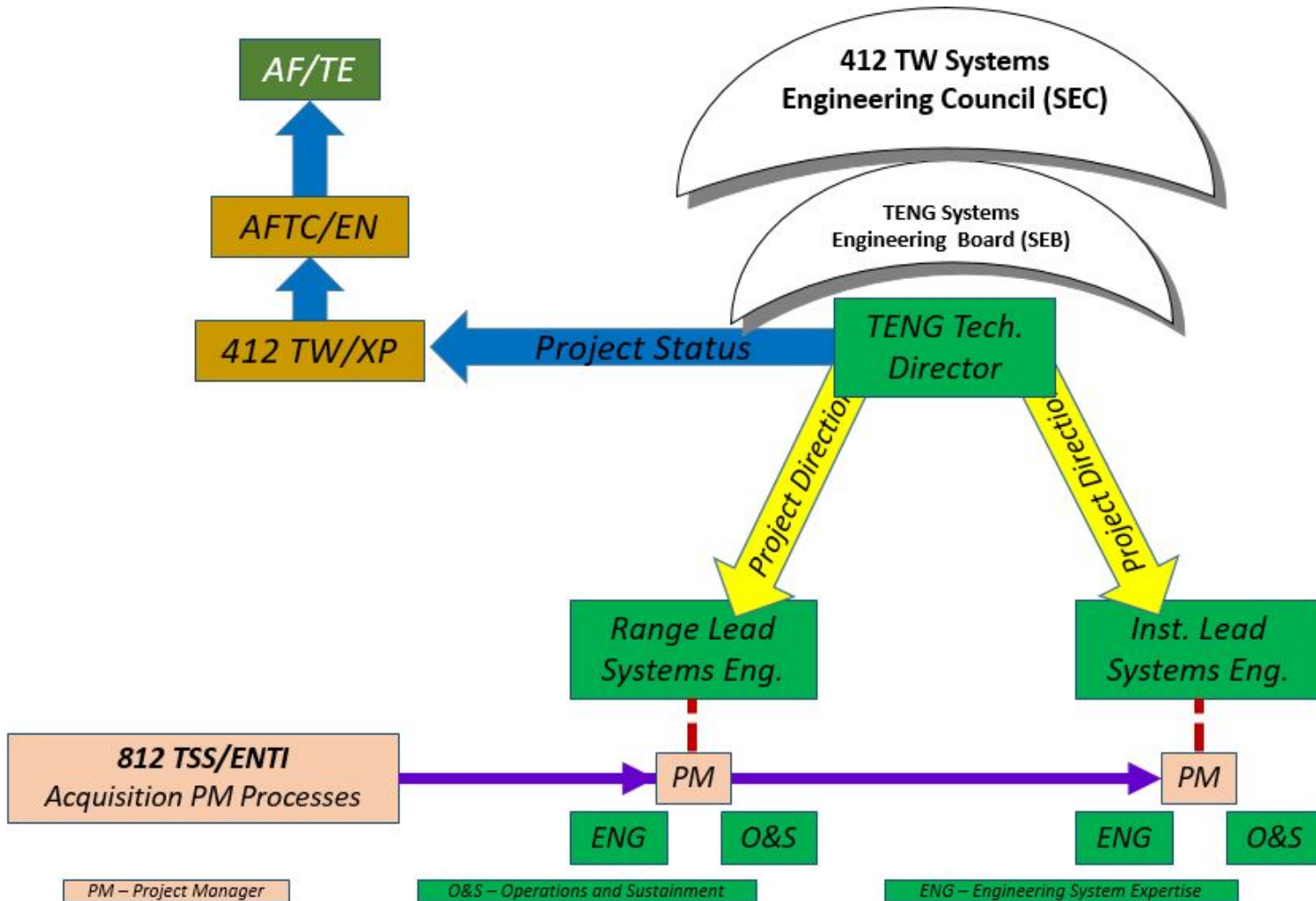


- **CTFs are the operational organizations under 412th OG**
 - Global Power Bomber – 419th
 - Global Power Fighter – 416th
 - Global Reach (Cargo) – 418th
 - Global Vigilance (UAV) – 452nd
 - F-22 – 411th
 - F-35 – 461st
 - Emerging Technologies (ET-CTF)
- **CTF's Leadership**
 - Squadron Commander – OG
 - Deputy Director / Director of Projects – TMD
 - Chief Engineer – TENG
 - Supporting Engineers are matrixed to CTFs



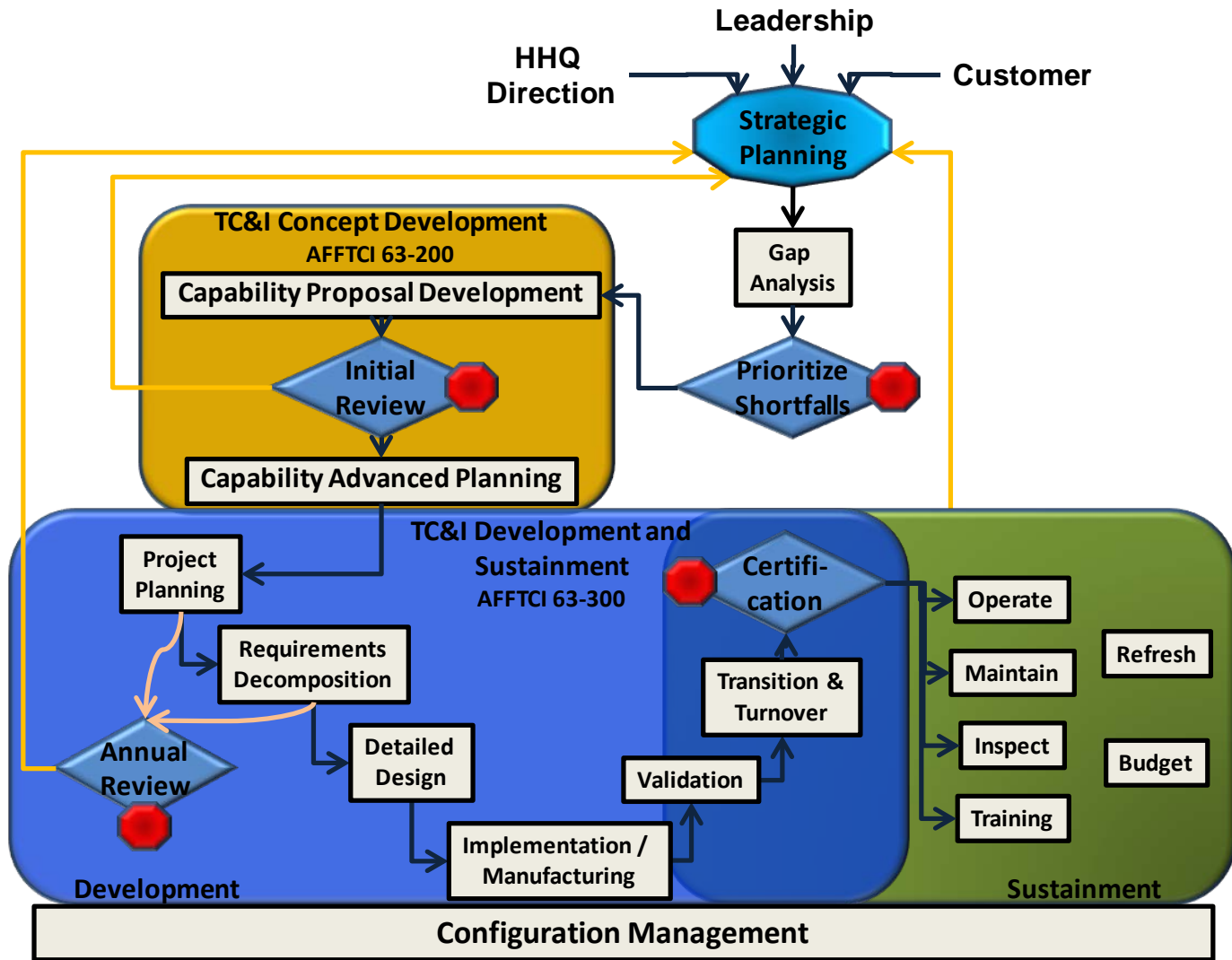
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Acquisition Project Management Role





Systems Engineering Process





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General Nature of Work

Flight and Ground Test Support

- **Test and Safety Planning, Test Handbooks**
 - **Special Studies**
- **Ongoing Disciplines (Potential)**
 - Flying Qualities & Performance, Subsystems & Aerial Refueling, All Weather and In-flight Icing, Human Factors, Parachutes/Aerial Delivery, Propulsion, Reliability & Maintainability, Structures
 - Integrated Avionics, Communications, Navigation, Guidance & Control, C4ISR, Datalinks, EO/IR, Radar, Weapons Integration
- **Emerging Technologies**
 - UAVs, Network Centric Warfare, Cyber, Airborne **Information Assurance**, Directed Energy, Hypersonics



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General Nature of Work Systems Engineering Support

- **Technical support in the development of T&E infrastructure (Range, Instrumentation, Data Analysis)**
- **Provide specialized technical expertise to support the requirements development, specification and other management documentation.**
 - Perform technical analyses to include analyses of alternatives, risk analyses and other technical analyses
 - Support verification and validation of the newly developed system/capability
 - Support certification of system capabilities to include verification and validation, network certification, and airworthiness certifications



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Relationship with JTECH-II Contract

- **AFTC Advisory and Assistance Support (A&AS) Contract is TMAS**
 - Mandatory Use Contract across AFTC
 - **412 TW Operations and Maintenance Contract is JTECH-II**
 - Supports 412 TW, NTTR, UTTR, and Navy Ranges
 - Provides Operations, Maintenance, and Sustainment support for 412 TW Systems supporting T&E
 - Provides Systems Engineering Support as part of the Sustainment requirements
 - **TMAS and JTECH-II have no conflicting interests due to direct government management of all projects**
-



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TENG Summary

- **TENG has a varied and evolving workload spanning a wide range of technical disciplines in support of a wide range of customers**
- **TENG utilizes TMAS support to address specialized expertise shortfalls primarily for infrastructure development**



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412th Test Engineering Group

Questions?

Electronic Warfare Group Task Element



**John Theologidy
2 April 2019**

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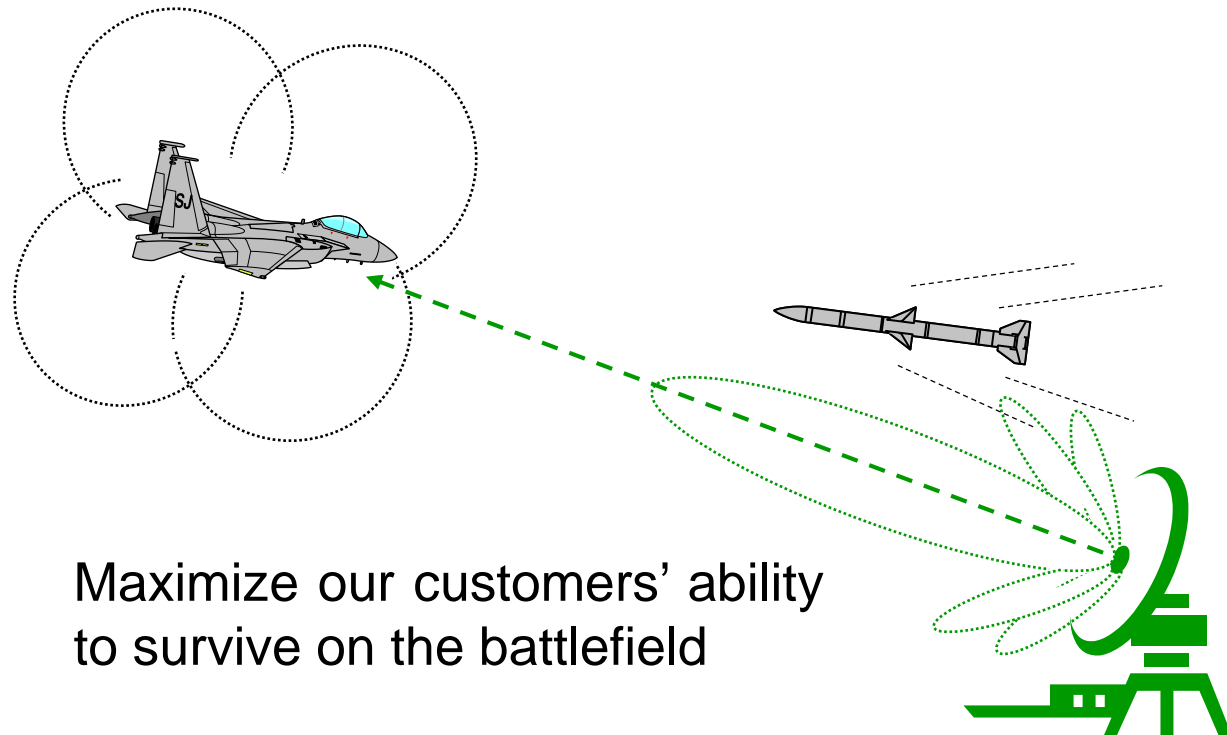
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412 EWG Mission

Provide our nation and its allies expertise and credible capabilities to perform survivability Test and Evaluation (T&E) ensuring our continued world-wide air dominance



The testing of Electronic Warfare systems



Maximize our customers' ability to survive on the battlefield



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412 EWG T&E

Multi-Spectral Virtual EW Battlespace...

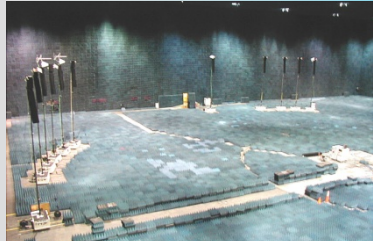
Manned Flight Simulators



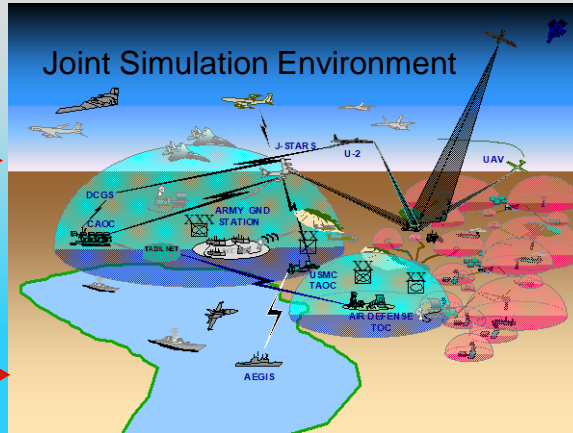
DIADS -C²



ADTRA



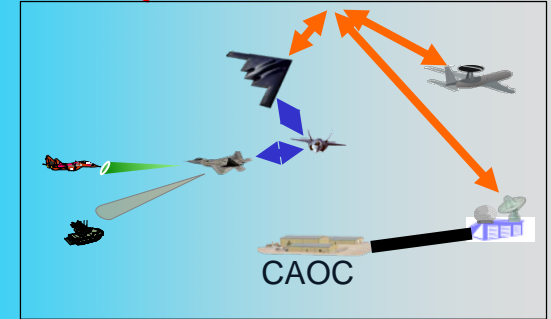
EW Threat Simulators



Radar Targets-ARES



NCW



BAF



Open-Air Range



Real World Tests Prior to Combat



Overall 412 EWG Task Element Requirements

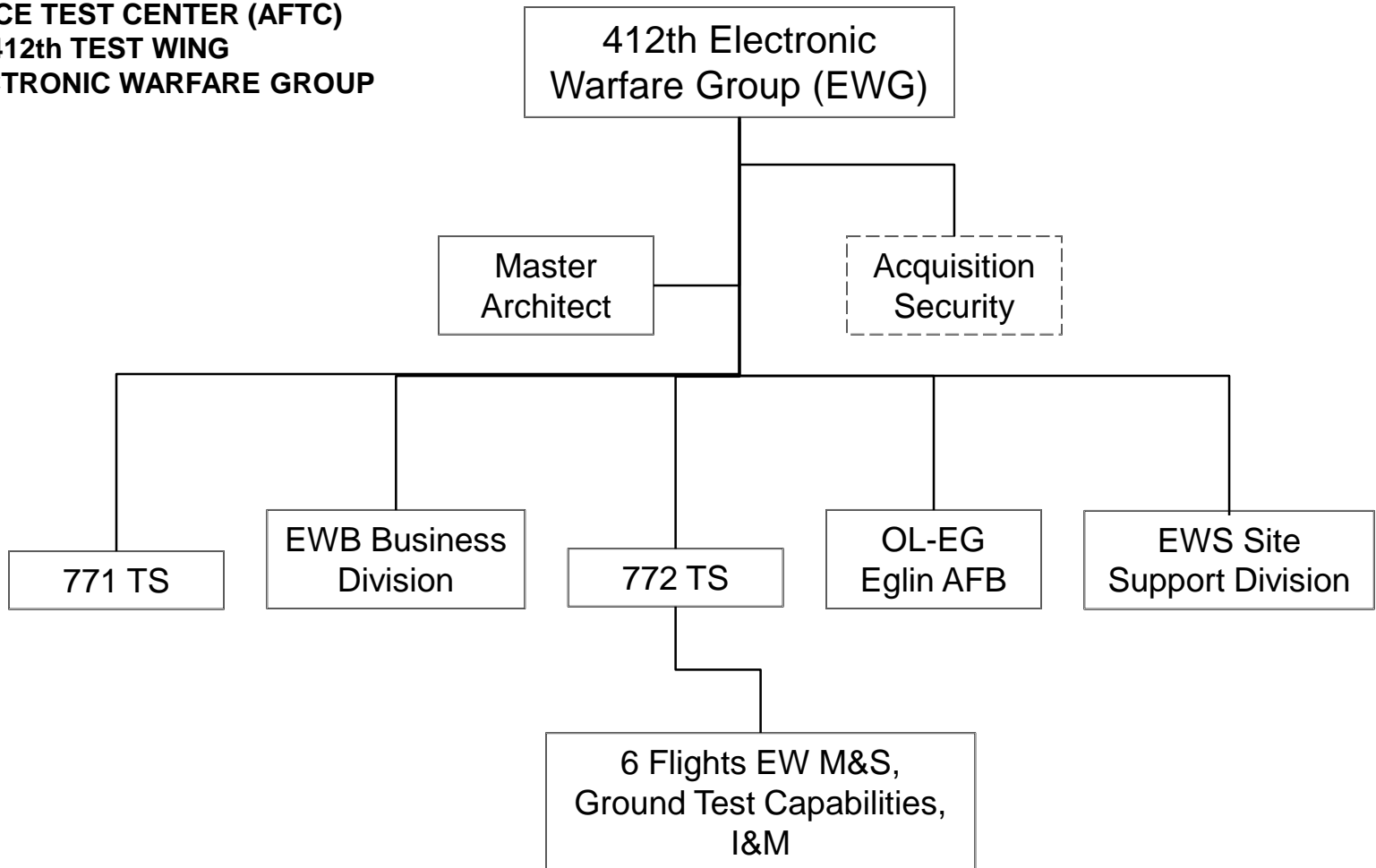
- **Systems Engineering and Technical Assistance (SE/TA)**
 - Expert advice and assistance required to support ground and flight test and related activities
 - Security-cleared personnel are available to provide continuous, uninterrupted support to the mission
 - T&E experienced workforce familiar with AFTC processes and procedures
 - **Systems Engineering/Test Capability Planning / Investment / Development at the AFTC units and supported organizations**
 - AFTC EW range and infrastructure modernization program support
 - Support the integration of new or modified equipment and systems with existing capabilities
 - **Test Mission Support at the AFTC and supported organizations**
 - **Information Technology, Information Assurance, and Financial Management Support at the AFTC and supported organizations**
-



412 EWG Organization

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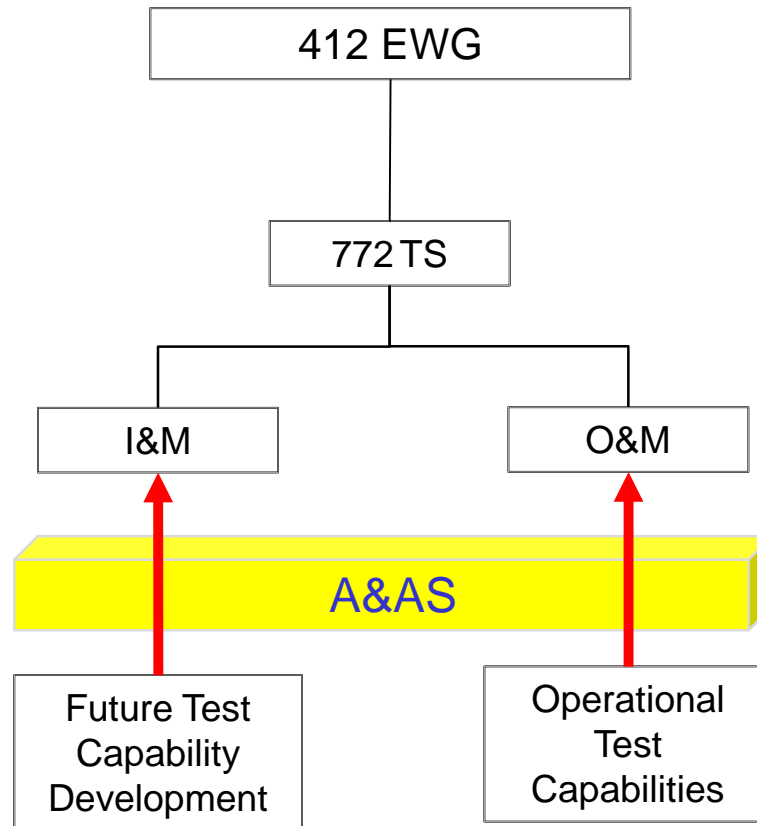
AIR FORCE MATERIEL COMMAND (AFMC)
AIR FORCE TEST CENTER (AFTC)
412th TEST WING
412th ELECTRONIC WARFARE GROUP





412 EWG Organization--Mission Execution

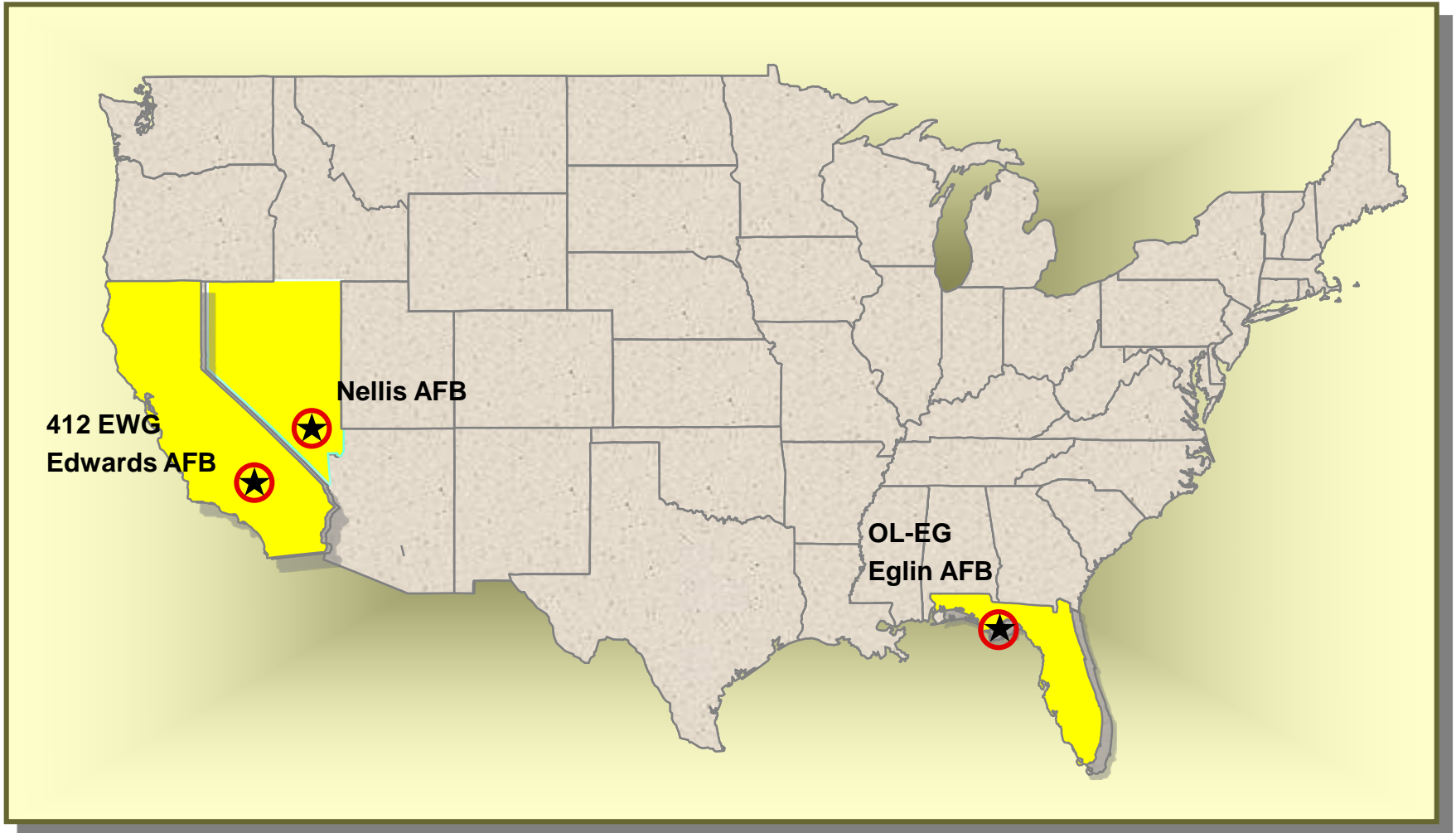
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412 EWG Locations

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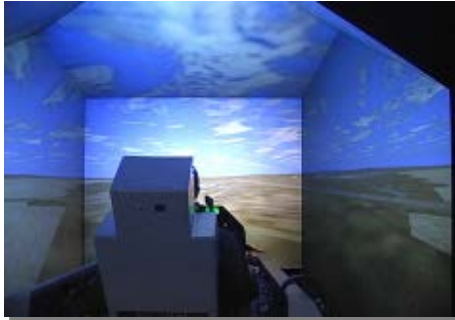




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412 EWG

EW Test & Evaluation (T&E) Facilities



TEMs

Test & Evaluation,
Modeling and Simulation
Digital Simulation



EW Threat Simulators

Hardware-In-The-Loop



IFAST

Integrated Facility for
Avionic Systems Test
Systems Integration Lab



BAF

Benfield Anechoic Facility
Installed Systems Test Facility

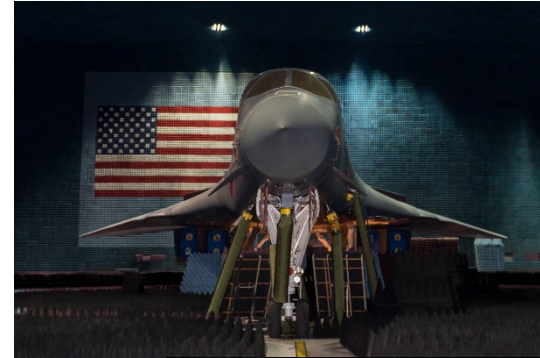


412 EWG Facilities

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Benefield Anechoic Chamber

- GPS (pass through or simulation)
- EW Threat Simulation
- Comm, Nav, IFF (CNI)
- Antenna Patterns
- EMI/EMC
- Secure test environment for sensitive signals (SAP, SCI, war reserve modes)
- Credible “pedigree”
- Instrumentation





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412 EWG Major Task Element Requirements

- **Systems engineering (SE)**
 - Strategic planning and program management support
 - Support Master Architect and Projects Development Division to plan, manage and execute T&E investment programs to develop test infrastructure via the Center's SE process; support EWG SEB process
 - Participate in Systems Engineering Team (SET) to provide assessments and recommendations on several programs
 - **Requirements definition on existing/new capability developments**
 - Interfaces with users, customers and other developers
 - Develop specs, acquisition & management documentation
 - **Developmental engineering**
 - Translate requirements into design solutions
 - Perform risk reduction & technical analysis activities
 - Provide technical insight to developmental activities
 - **Verification, validation and correlation support**
 - **Information Technology, Information Assurance, & Financial Management Support**
 - **Facility integration and upgrades (in support of new capabilities and test)**
-

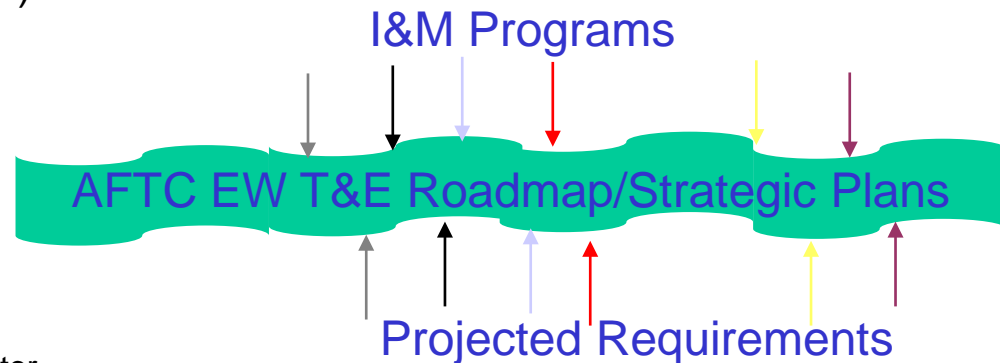


412 EWG Major Task Element Requirements (cont.)

Improvement & Modernization (I&M) Current Support on Infrastructure Programs

■ Sample Test Infrastructure Programs

- **ADTRA** (Advanced Dynamic Transmit Array)
- **AWTEC** (Advanced Warfare Test and Evaluation Capability)
- **CIMPLEX** (CEESIM* Improvement & Modernization Program Lifecycle Extension)
- **DIADS** (Digital Integrated Air Defense System)
- **NEWEG** (Next Generation Electronic Warfare Environment Generator)
- **RAGE** (Radar Air to Ground Environment)
- **MSTC** (Mission System Test Capability)
- **JSE** (Joint Simulation Environment)



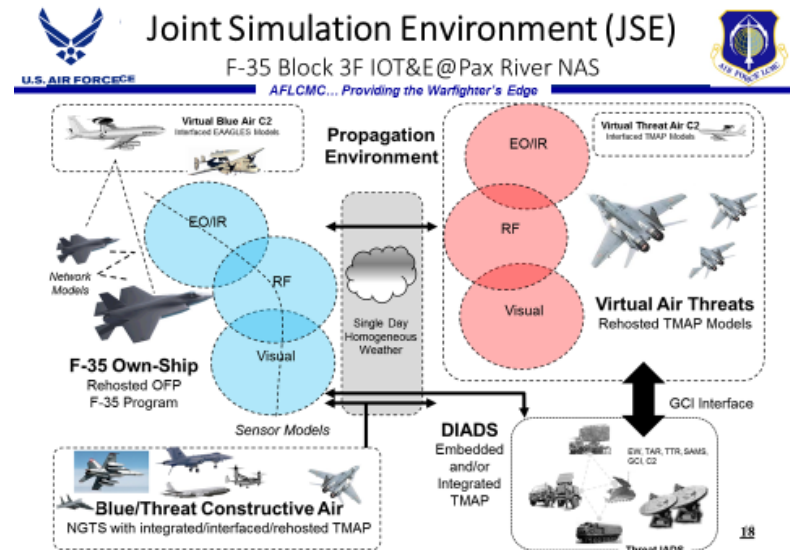
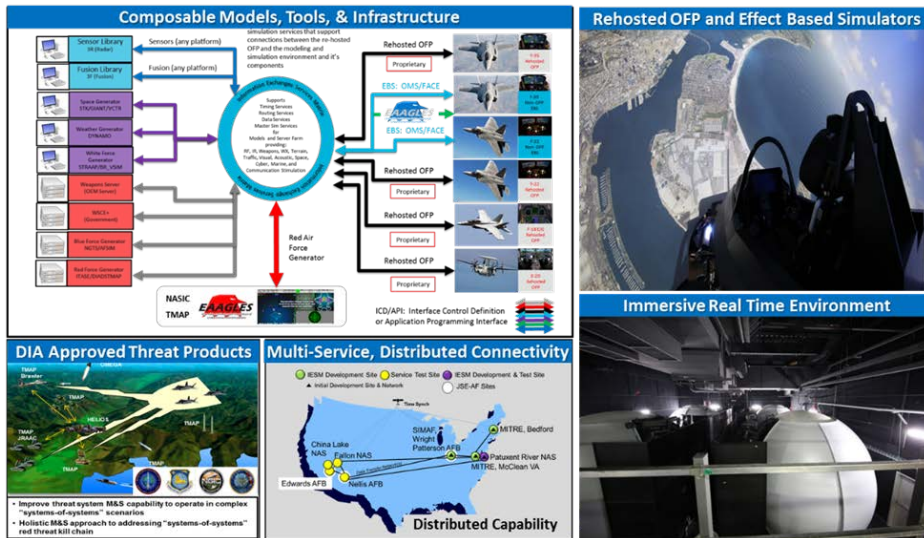
*CEESIM--Combat Electromagnetic Environment Simulator



Joint Simulation Environment (JSE) Activities

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- Establish / Development of JSE at Edwards and Nellis
 - 2xMILCON, acq/dev H/M/L fidelity sim, JSE architecture dev
- Provide day-to-day support for DT/OT in sim environment
 - Computer Scientist (i.e. re-host OFP, EBS dev,)
 - Engineers (i.e. sim operators, test scenario set up, ...)
 - PM, BFM, Facilities, and Security support



Integrity - Service - Excellence



- **“One Stop Shop” – but we don’t necessarily own it all!**
 - **Systems Engineering Council (cross-functional issues like NCW/NCO)**
 - **Integrated ground/flight test to increase OAR efficiency**
 - **Requirements validation w/customer base**
- **Affordable – cost effective risk management**
 - **Rapid Improvement Events (efficiency upgrades)**
 - **System Integration**
 - **Leverage Combined Test Force’s (CTF’s) to vet requirements/gain funding support (e.g. quick look tool set)**
 - **Leverage CTFs to drive BAF OAR-like data products to leverage a common 771st tool set**



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412 EWG Summary

- EW is a dynamic and diverse organization with unique interfaces to other organizations

“Survivability is our responsibility”

- Strong emphasis on systems engineering in all developmental programs
 - Responsible for development of a broad range of complex I&M programs
 - Many current and future challenges to improve and develop advanced infrastructure to test tomorrow’s weapon systems
-



412 EWG Task Element

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Questions?

Test Management Division Task Element



Mike Seelos
2 April 2019

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412 TMD Mission

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Deliver and sustain complete business and project management solutions to enable efficient, effective execution of the 412 TW Test and Evaluation mission

Train and Equip



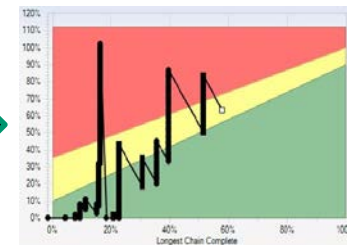
Standard Process:
 412 TW PM Handbook
 412 TW Program Analyst Handbook

Standard Tools:
 Project Cost Management Suite
 Concerto & Microsoft Project
 Consolidated Project List

Standard Training:
 PM Planning & Execution
 7 CBT Modules

Execute and Manage

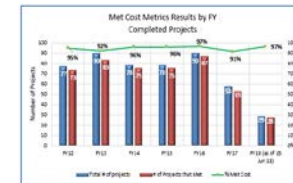
PERFORMANCE



Cost

Schedule

Deliver Results

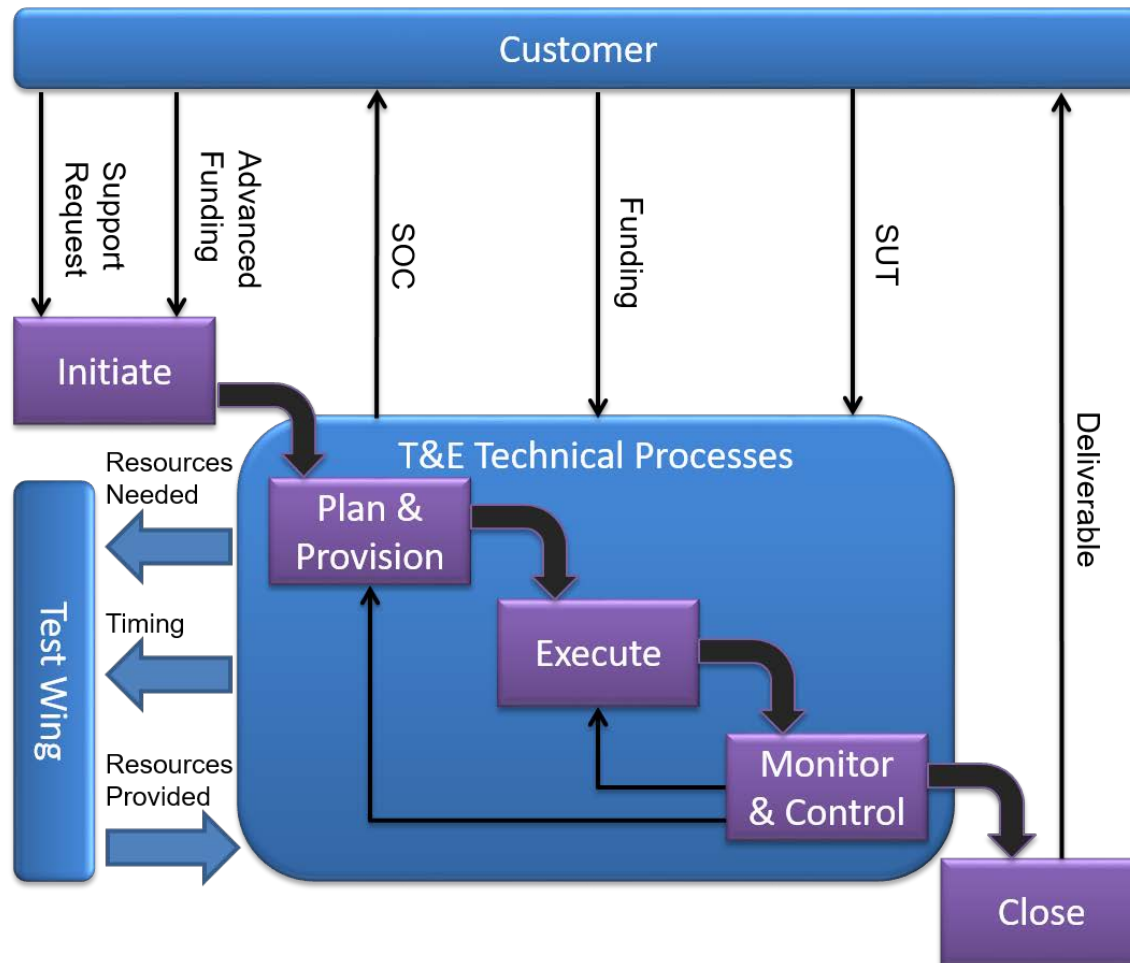


- Acquisition Milestones
- Fielding Decisions
- OT Certification
- Advanced HW buys



Project Management Process

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Overall 412 TMD Task Element Requirements

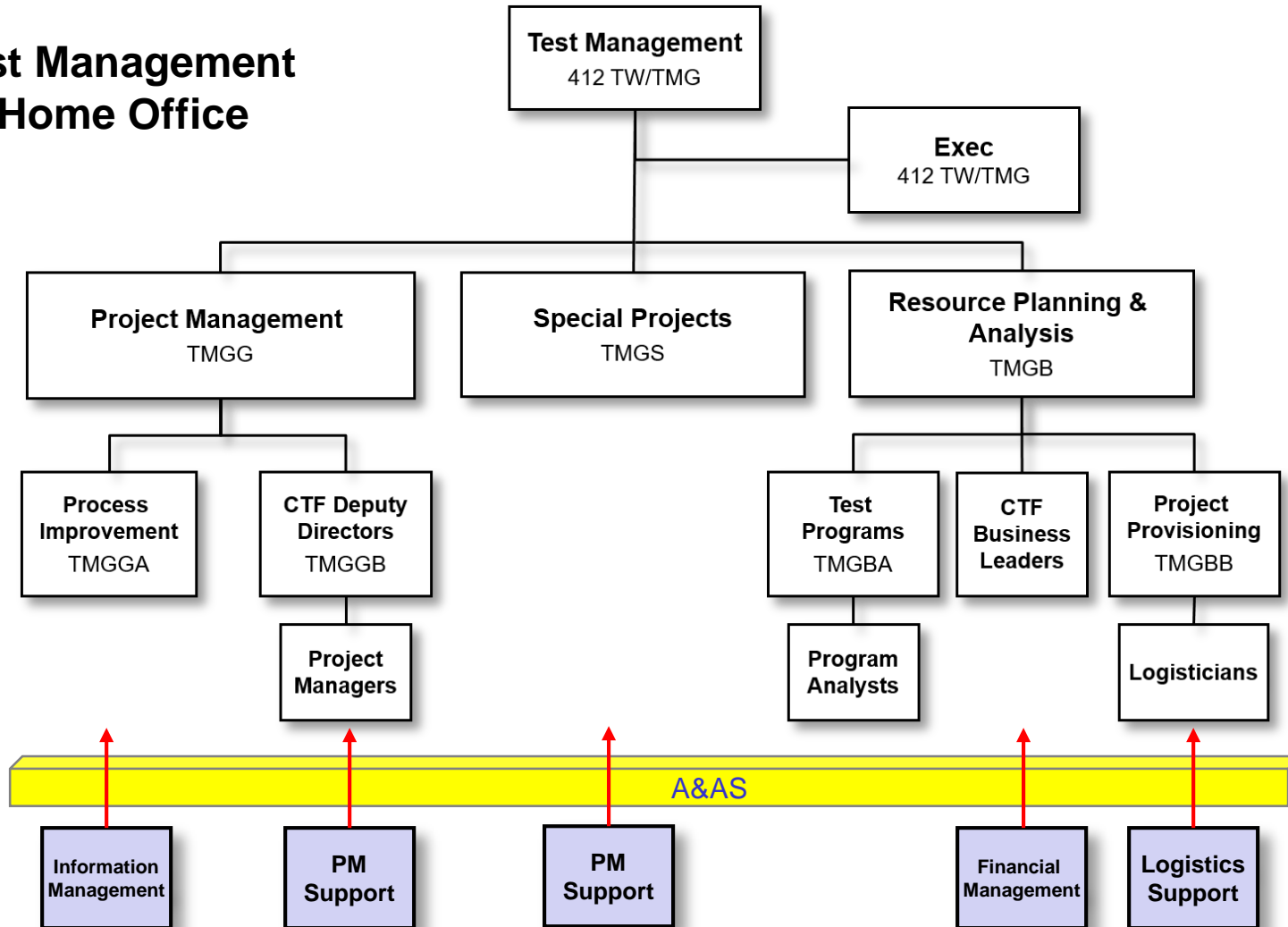
- **Advice and Advisory Services for 7+ CTFs and the Home Office**
 - Project Management Support (PMS)
 - Information Management Support (IMS)
 - Financial Management Support (FMS)
 - Engineering Technicians (ET)
 - Logistics Support (LS)
 - **Experience ranges from “Journey” to “Subject Matter Expert”**
 - Requires sound foundation in project management principles
 - Training for unique 412 Test Wing processes provided by TMD
 - **Work locations at Edwards AFB, CA and/or Plant 42, Palmdale**
 - **Ability to get an advanced security clearance a requirement for many positions**
 - Secret, Top Secret, Special Access Required (SAR) and Sensitive Compartmented Information (SCI)
-



A&S Support Within TMD

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Test Management Home Office

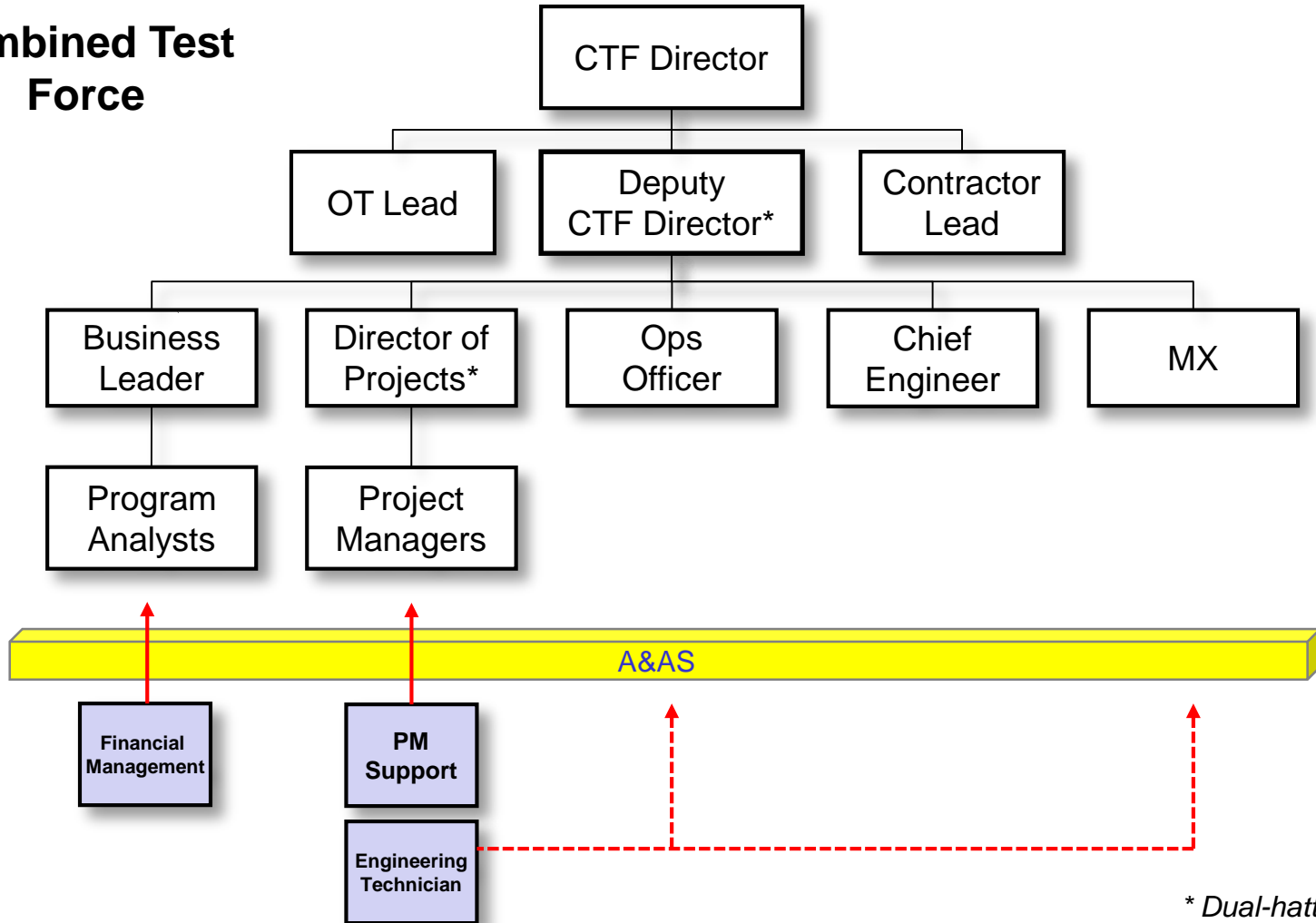




A&AS Support Within CTFs

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Combined Test Force



* Dual-hatted position



TMG A&AS Support

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■ Test Management / Project Management Support

- Provide programmatic support to the CTF test project managers**
 - Assist developing system ground and flight test schedule and resource requirements**
 - Planning and implementation**
 - Test Concept Documents**
 - Statements of Capability**
 - Test and Evaluation Master Plans**
 - Requires strong project management skills and expertise**
 - Specific system expertise desired**
 - Flight test experience preferred**
-



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TMG A&AS Support

■ Information Management Support

- Sustainment of a Theory of Constraints (e.g. Critical Chain) based project management system**
 - Process development & improvement**
 - Portfolio (multi-project) scheduling**
 - Project management training**
 - Development and sustainment of training materials**
 - Classroom and Computer Based Training (CBT) delivery**
 - Schedule and provide initial, recurring, and delta training**
 - Implementation of program management tools**
 - Concerto and a Project Cost Management System (PCMS)**
-



TMG A&AS Support

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■ Financial / Business Management Support

- 412 TW business process support and improvement to:
 - Support management of CTF flying hour program**
 - Assist in the development of capability and resource estimates for the CTF**
 - Support development of cost, schedule, performance and risk assessments**
 - Support Ad-hoc Cost studies and analysis****





TMG A&AS Support

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- **Engineering Technicians (ET) Support**
 - **Provide technical support, conduct data analysis and applies knowledge of engineering technology**
 - **Support tasks including but not limited to test and evaluation, test support, operation analyses and support activities**
 - **Ensure operational safety, suitability and effectiveness**
 - **Example: Air Vehicle Management at CTFs**
-



TMG A&AS Support

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■ Logistics Support (LS)

- Assist in managing facility construction projects associated with the bed down of new weapons systems**
 - Assist in budgetary requirements, development of facility requirements, planning detailed schedules, and identifying utility and configuration requirements**
 - Support development of technical documentation such as design packages, specifications, and drawings**
 - Assist in planning and designing activities for space, resource and equipment utilization, storage and disposal**
-



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TMD A&AS Support

Questions?

412th Civil Engineer Group Task Element



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2 Apr 2019

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412 CEG Mission

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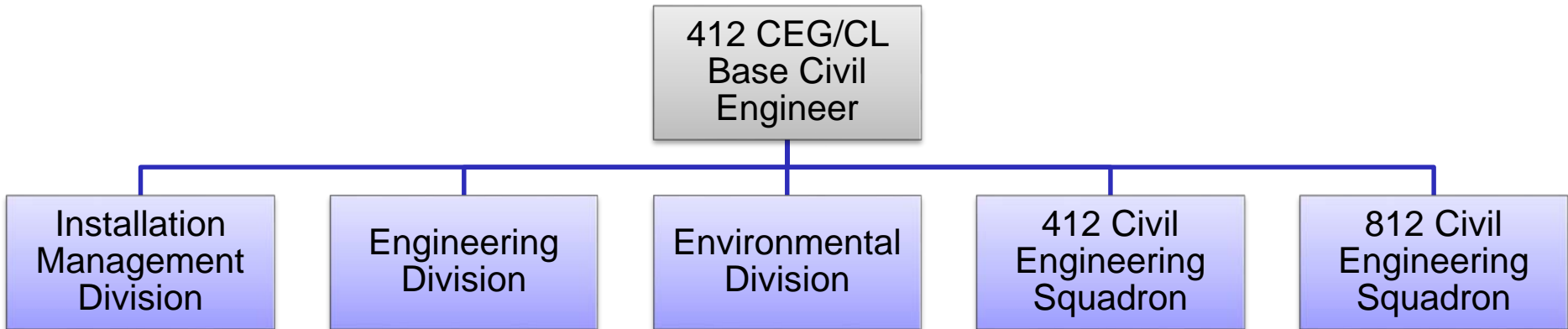
Maintain, Repair, and Construct Edwards' airfield, facilities, and supporting infrastructure. Provide EOD, Fire Emergency Services, and CBRNE support.

- **Conduct preventative maintenance and develop reoccurring infrastructure maintenance plans**
 - **Plan and program major repair and construction projects**
 - **Execute Air Force-funded projects as well as Program-funded and locally-funded projects**
 - **Provide environmental support and liaise with State and Federal environmental agencies**
 - **Provide fire emergency services for structural and airfield support**
 - **Train and equip EOD military personnel for local and deployment requirements**
-



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412 CEG Leadership



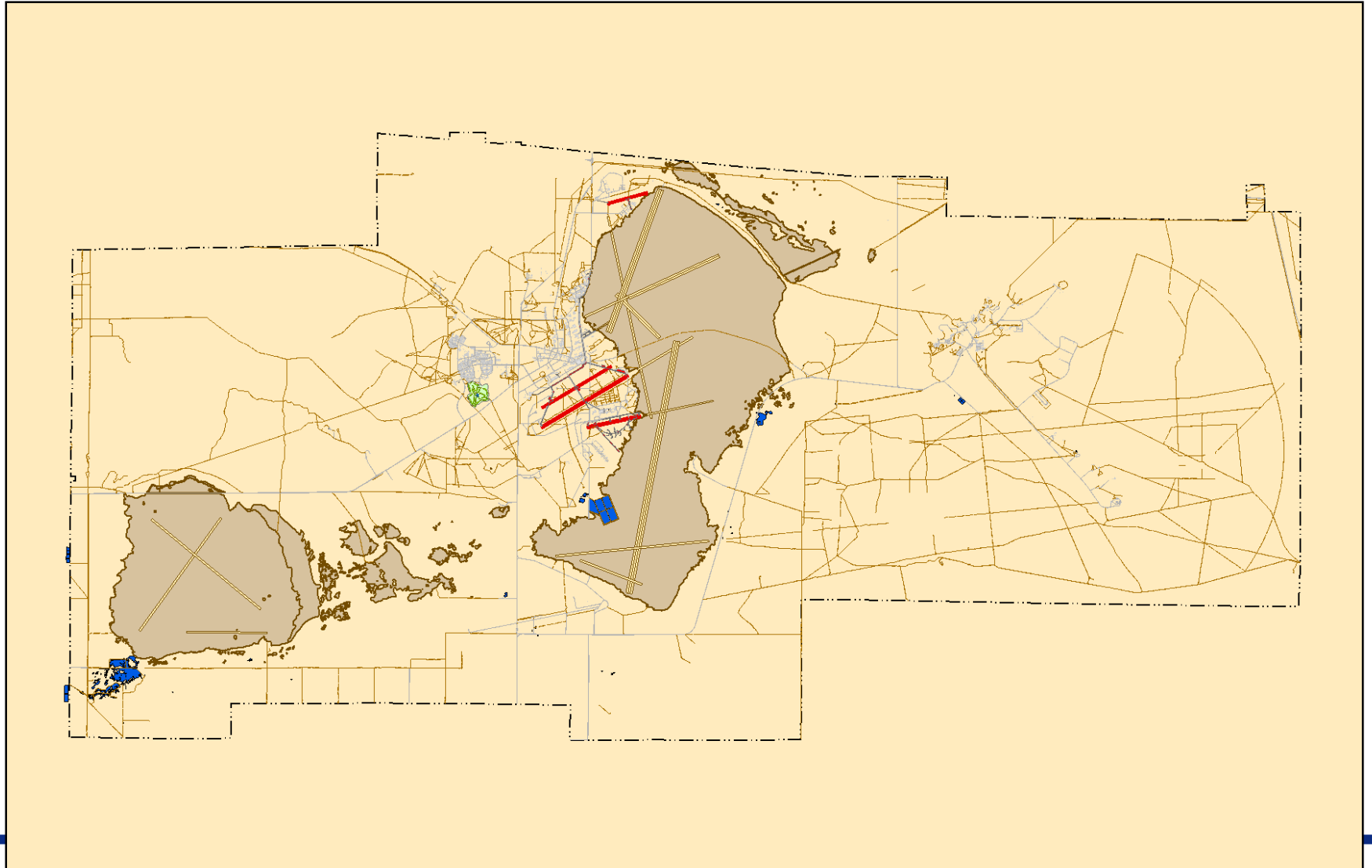
Overall assigned Manpower: ~ 400 Combined Work Force



Runways

(7.8 Miles of Paved Runways)

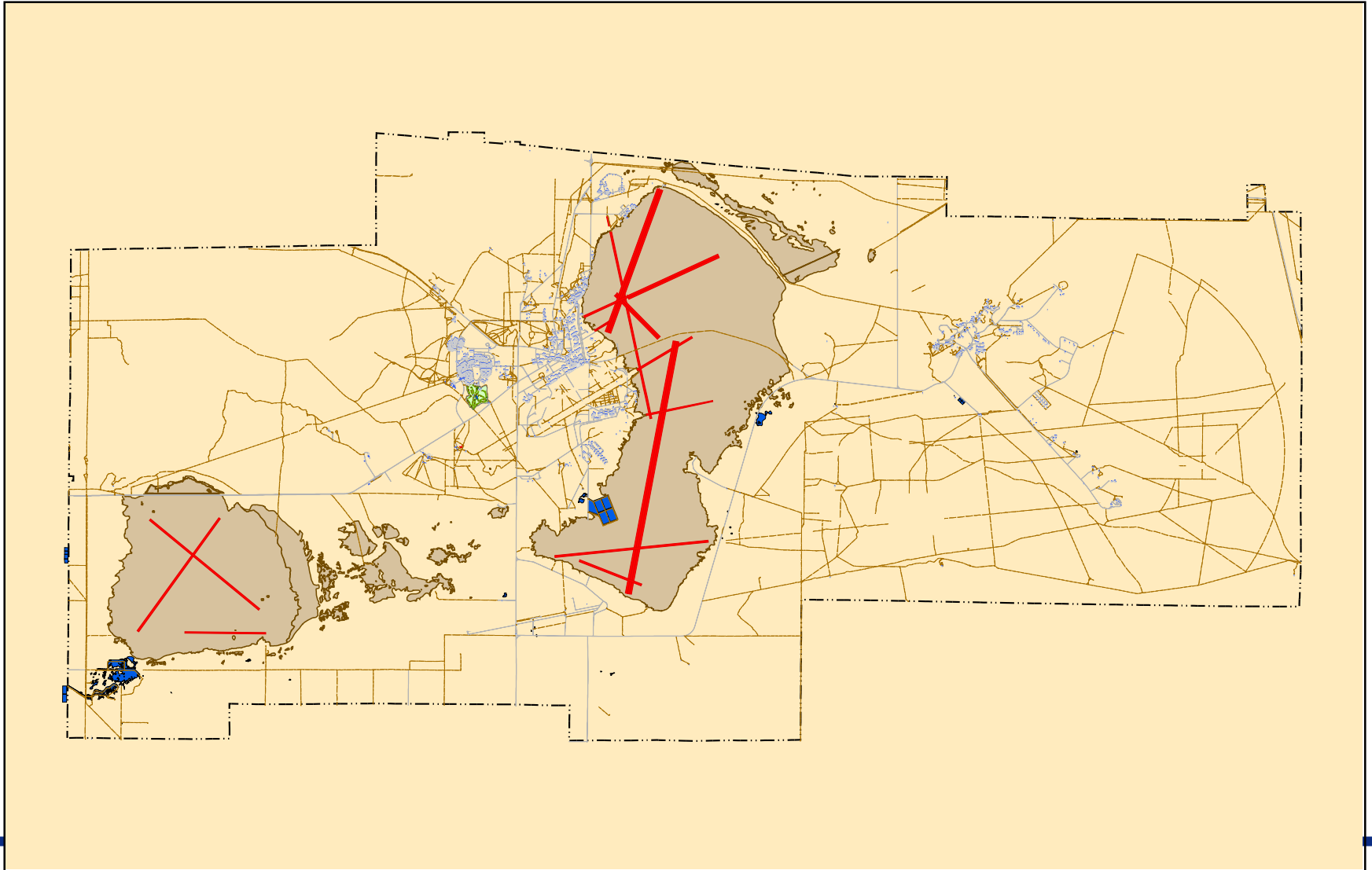
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Unpaved Runways (59 Miles of Lakebed Runways)

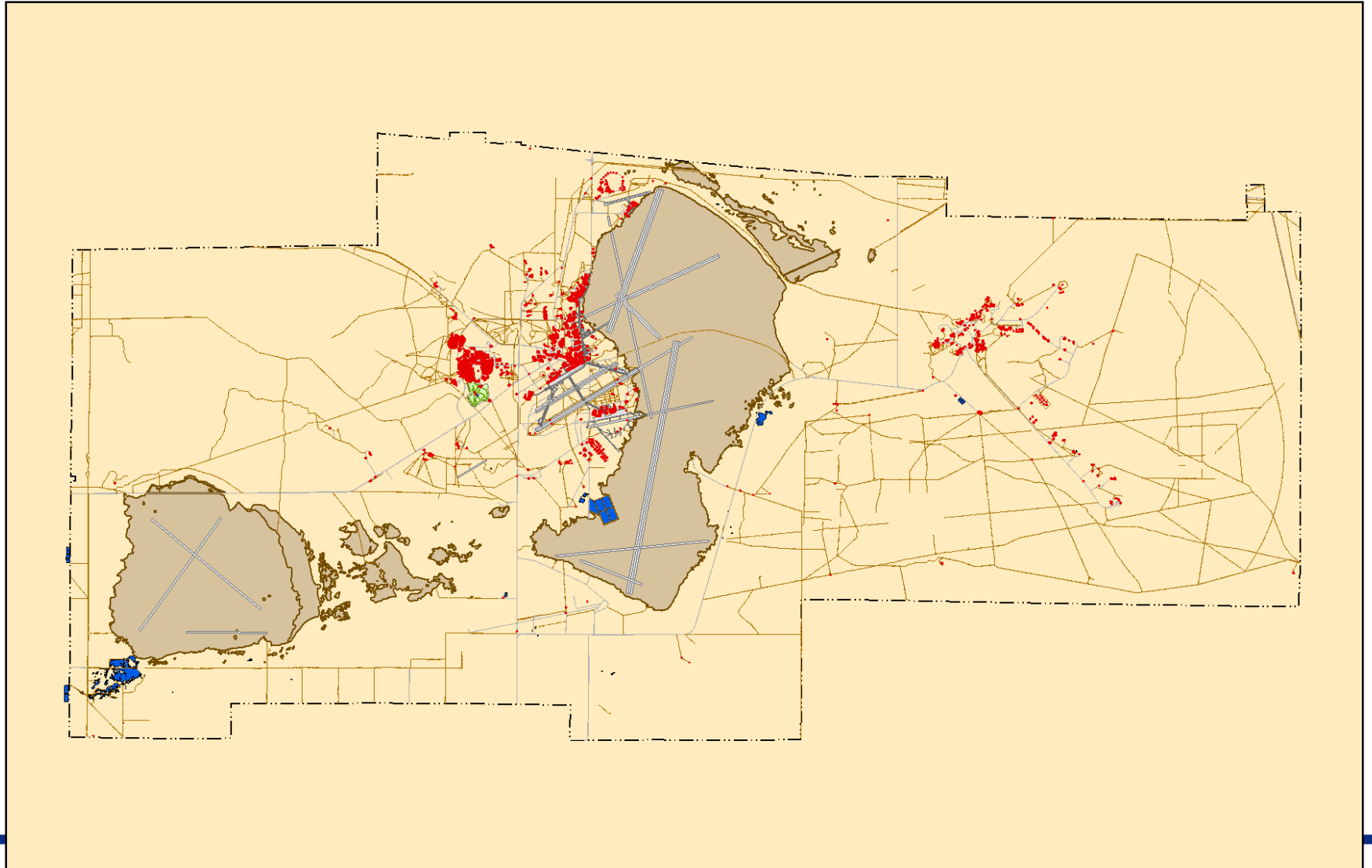
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Buildings ***(9.5 Million Square Feet Building Space)***

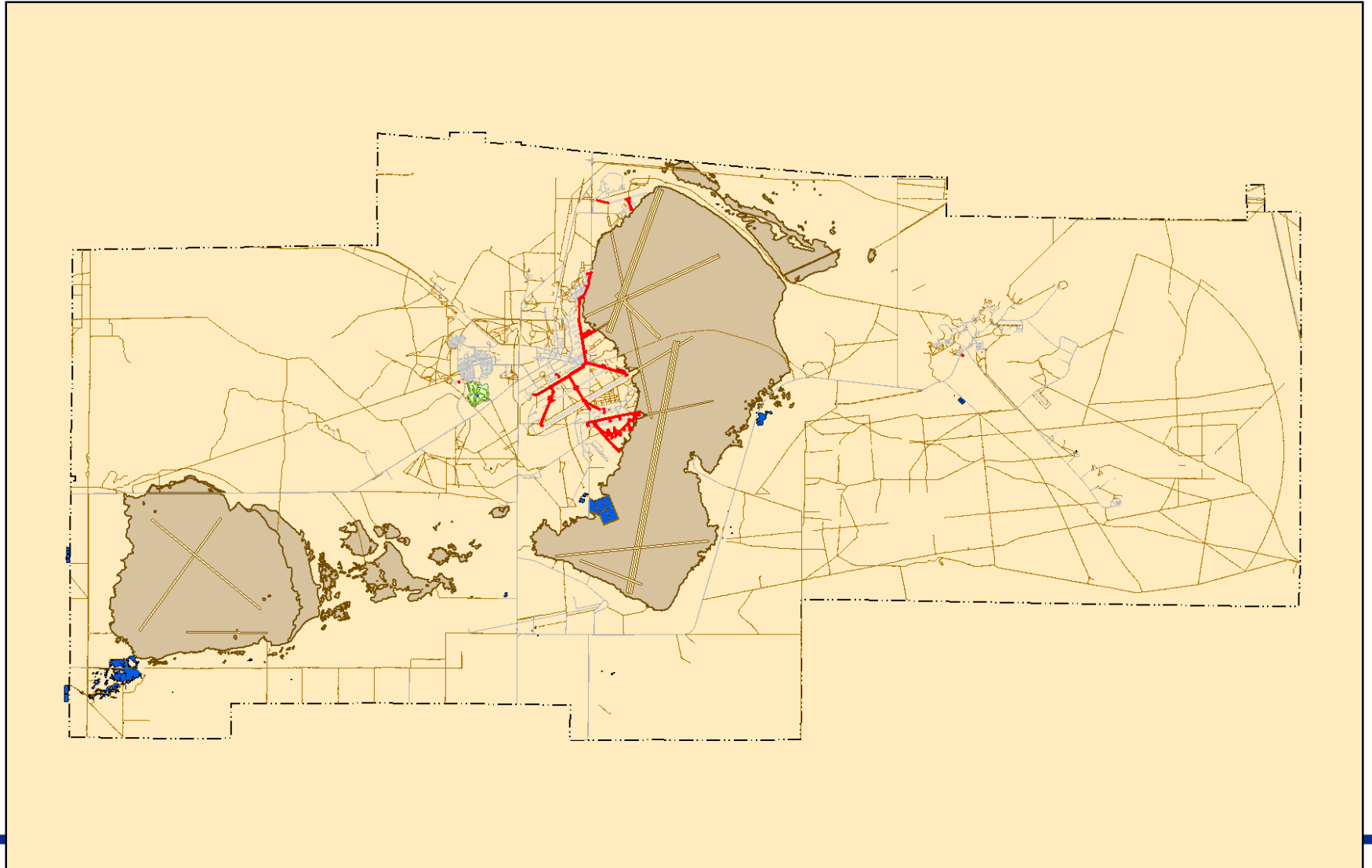
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Ramp Space (1.3 Million Square Yards Ramp Space)

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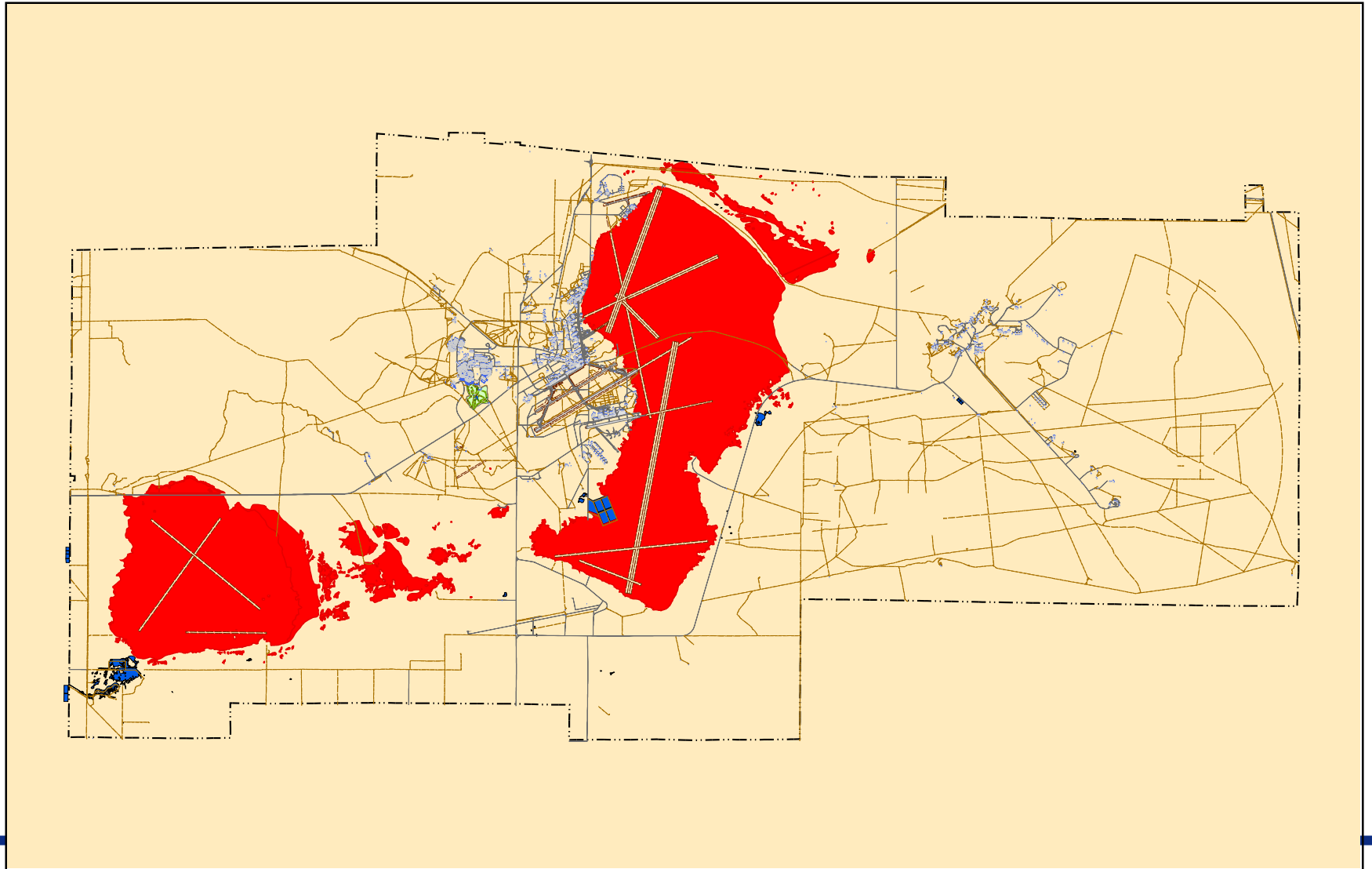




Lakebeds

(68 Square Miles of Lakebeds)

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Overall 412 CEG Task Element Requirements

- **Advice and Advisory Services for facilities general engineer and project management support**
 - Architectural, structural, civil, electrical, & mechanical engineering disciplines
 - Develop project documents for Special Interest Programs
 - Develop cost estimates
 - Conduct design reviews
 - Perform construction inspection
 - Review projects submittals
 - Complete closing documents
 - **Experience ranges from professional engineers to engineer technicians**
 - Requires sound foundation in engineering principles
 - Requires 5 or more years of experience in facility projects
 - **Work locations include all areas of Edwards AFB**
 - **Security clearance is not required**
-



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412 CEG Task Element

Questions?

REPORT DOCUMENTATION PAGE

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