


412TH TEST WING
TEST CAPABILITIES

2025



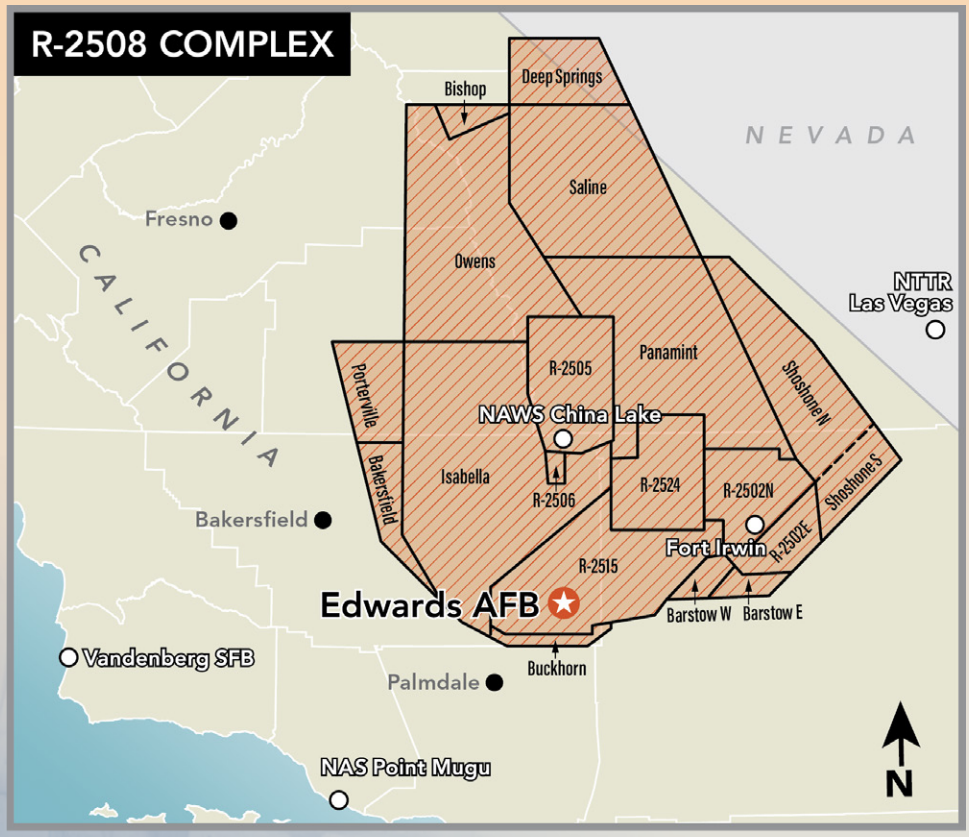

Edwards Air Force Base
California

412TH TEST WING
Edwards Air Force Base

MISSION: We Test & Evaluate advanced aerospace systems – with world-class installation and mission support – to accelerate war-winning capabilities to the warfighter.

VISION: The Center of the Aerospace Testing Universe
Testing Tomorrow's War-Winning Capabilties Today!

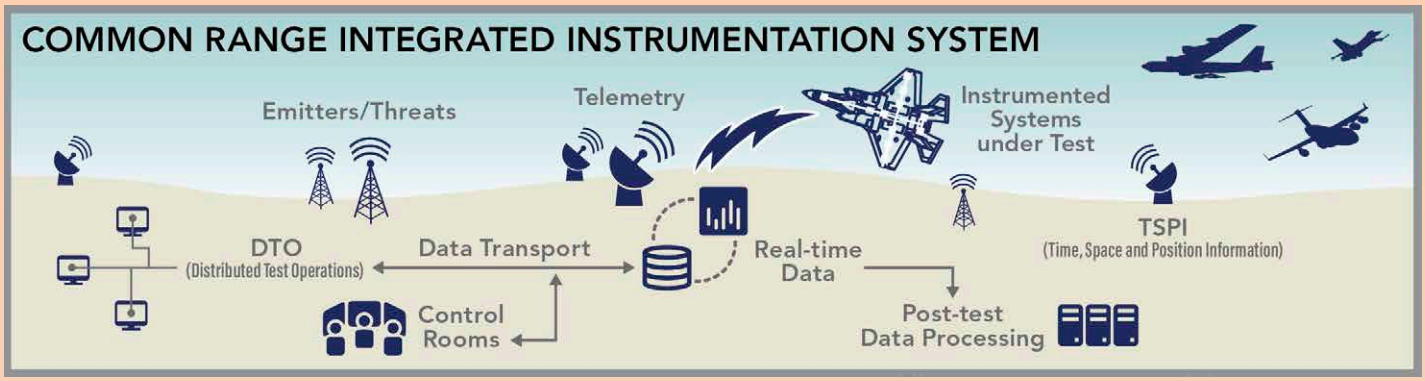
The 412th Test Wing (412 TW) at Edwards Air Force Base is designated a Major Range and Test Facility Base (MRTFB) Activity under Department of Defense Directive 3200.11. The MRTFB provides robust and flexible test and evaluation (T&E) capabilities to develop, acquire, field and sustain reliable and effective weapon systems to meet current and future warfighter needs. The MRTFB infrastructure consists of open-air ranges, test facilities, instrumentation data processing capabilities and other test resources that must be preserved as a national asset to provide T&E capabilities in support of the DOD acquisition system. The 412 TW Commander is the range operating authority for MRTFB assets at Edwards AFB.



The 412 TW partners with Naval Air Weapons Center, China Lake and the National Training Center at Fort Irwin to offer world-class restricted-use airspace – the R-2508 Complex. The complex is likely the most important multiple service special-use airspace in the National Airspace System. The R-2508 Complex contains bombing ranges, supersonic corridors, low altitude high-speed maneuver areas, radar intercept areas, and refueling areas.

Edwards offers comprehensive range capabilities critical to successful T&E execution, such as open-air signal emitters, threats, instrumentation systems, data transport systems, real-time mission control rooms, time-space-position information, distributed test operations, post-test data processing, and decades of subject matter expertise in T&E. Edwards AFB is centrally located among several other DOD MRTFB locations: Nevada Test and Training Range at Nellis AFB; Western Range at Vandenberg SFB; the Naval Air Warfare Center, Weapons Division at Point Mugu; and the Naval Air Warfare Center, Weapons Division at China Lake. Data acquisition and transmission systems link Edwards to these neighboring ranges, which enables real-time data analysis and multi-service interoperability. Edwards connection to the Defense Research and Engineering Network (DREN) enables widely distributed test operations.

Edwards AFB is known as **"The Center of the Aerospace Testing Universe,"** because the time-tested expertise of the Edwards workforce, independent analysis and expert evaluation of performance against requirements set Edwards apart in turning test data into



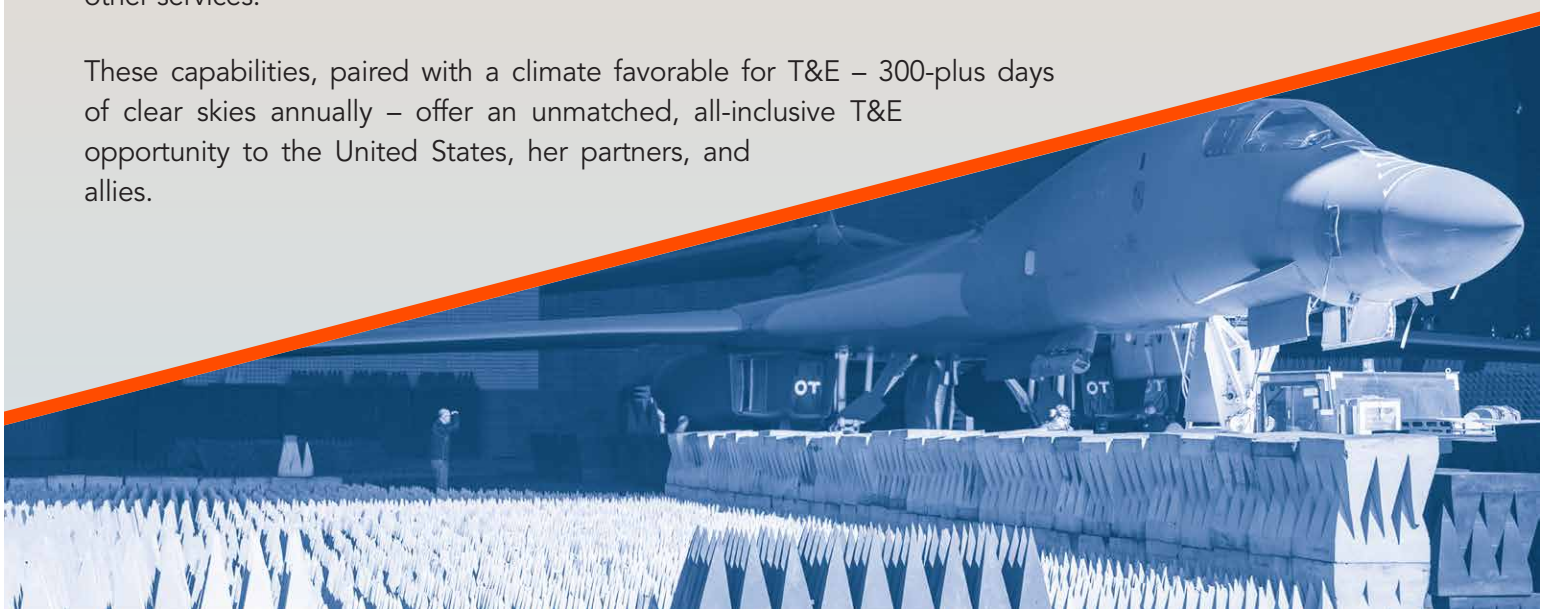
actionable information. Edwards personnel are highly skilled and deeply experienced testers and evaluators with proven expertise in mission systems, aircraft and range instrumentation, electro-optical and infrared sensors, radio frequency systems, aircraft performance, flying qualities, telemetry test operations, and many other T&E disciplines.

Edwards is home to the largest anechoic test chamber in the world, the Benefield Anechoic Facility. The BAF is capable of handling almost all DOD aircraft. The primary purpose of the BAF is to test and integrate avionics systems in a secure, repeatable, and electromagnetically-controlled environment using state-of-the-art simulation and stimulation technology that closely duplicates actual combat mission environments.

Edwards offers T&E modeling and simulation at its Integrated Facility for Avionics System Test (IFAST). The IFAST offers live-virtual-constructive environments for multi-ship operations based on unclassified and classified information up to top secret, sensitive compartmented information and special access program levels. The IFAST has multiple manned flight simulation laboratories supported by operational flight program and effects-based simulations including an F-16 system integration lab, F-35 mission systems simulator, F-35 flight science simulator, and F-22/F-16 emulation lab.

Edwards is the future home of the Digital Test & Training Range, enabled by the Joint Simulation Environment (JSE). The JSE is a government owned and operated, immersive virtual simulation environment that supports 4th-, 5th- and 6th-generation mission systems research, development, test and evaluation. The JSE provides integrated use of Navy and Air Force facilities, models, methods, and tools, including man-in-the-loop (MITL) and hardware-in-the-loop (HITL), with the ability to link geographically distributed MITL and HITL assets. JSE also leverages intelligence community models and an expandable architecture to support future JSE growth and extension to other services.

These capabilities, paired with a climate favorable for T&E – 300-plus days of clear skies annually – offer an unmatched, all-inclusive T&E opportunity to the United States, her partners, and allies.



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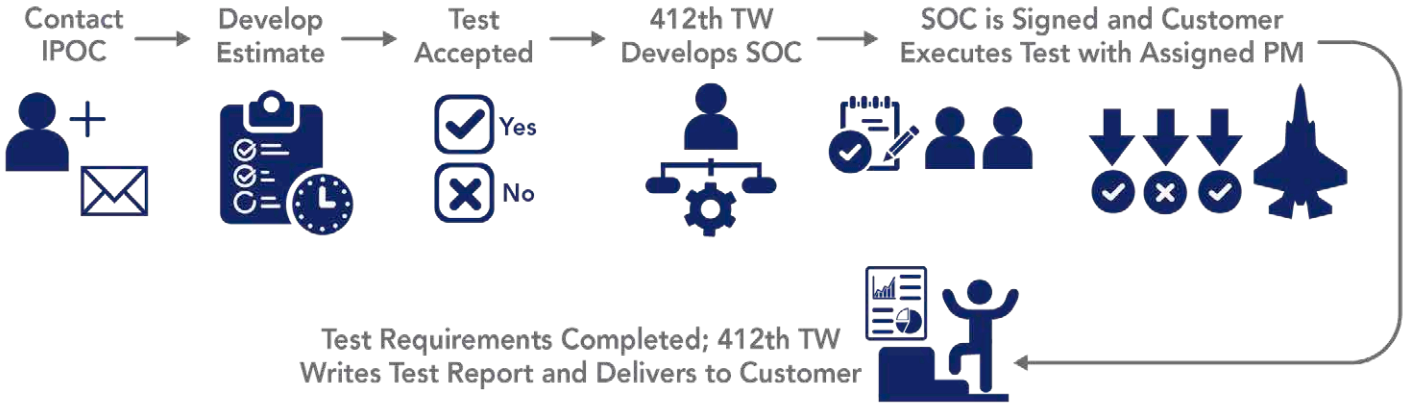
CONDUCTING BUSINESS WITH THE 412TH TEST WING

The 412 TW offers extensive test and evaluation capabilities. Our team focuses on providing the best possible data and a positive test experience for our customers, consisting of government organizations, private industry partners, and academic institutions.

The following steps summarize how the 412 TW plans and conducts test programs.

1. A potential customer contacts our Initial Point of Contact, or IPOC, (see contact information below) to inquire about test and evaluation services. Lead time for our testing services ranges from 2 to 24 months, depending primarily on test complexity.
2. The 412 TW provides a program introduction document template to assist in defining customer requirements.
3. The 412 TW may provide an initial rough order of magnitude cost estimate and schedule availability for customer inquiries.
4. The 412 TW sends the customer an advance funding request for initial planning funds.
5. Once initial funding is received, the 412 TW prepares a test concept document for the customer's signature that establishes an understanding of customer requirements.
6. Using this information, the test wing prepares a statement of capability (SOC) or a contract, which becomes the formal agreement between the wing and the customer for test requirements, scope, schedule, risks, and costs.
7. Once the SOC is signed, the test wing requires the balance of test funding to proceed.
8. A 412 TW project manager (PM) then works closely with the customer during the test planning phase to review and finalize the test plan, test matrix, and data reduction and analysis requirements. They also conduct safety planning, prepare the necessary documents to schedule test periods, and configure all systems to support testing.
9. The 412 TW PM then assists the customer with obtaining access to the installation, 412 TW computers, long-distance access when at a 412 TW location, and general test wing and local area information. Customers are free to contact the project manager at any time with questions.
10. The customer is billed for actual charges and costs for labor and facility operations during this entire process.
11. Once the test is complete, the 412 TW provides analyses and data products as detailed in the SOC or contract.



Those seeking assistance or additional information about the 412th TW can visit: www.edwards.af.mil. Those who want to test at Edwards, email: 412TW.IPOC@us.af.mil.

Photo by Ethan Wagner, Public Affairs

412TH TEST WING

Test Engineering Group

(412 TENG)

MISSION: We own T&E… Delivering decision-quality knowledge to maximize impact.

VISION: Accelerating and transforming T&E through intelligent risk-taking.

TEST RANGE

The 412 TW hosts one of the premier test ranges in the country. The 412th Range Squadron (412 RANS) provides a multitude of capabilities that stimulate the creation of critical data on systems under test for further analysis and evaluation, while simultaneously facilitating seamless mission execution. The 412 RANS is comprised of two major functional areas – mission control and mission data – both of which are imperative to successful test execution. These functional areas are supported by engineering and operations to ensure the infrastructure and people are able to execute the missions. For every mission, the 412 RANS combines each element of the test through a complex network of landlines and open-air communication, moving real-time data quickly and efficiently between the system under test and the mission control room, allowing flight test engineers to make real-time technical and safety calls. This backbone has been extended to other ranges across the United States – Point Mugu, China Lake, Utah Test and Training Range, White Sands Test Center, Eglin AFB, Boeing facilities in St. Louis, and others, using Distributed Test Operations. These capabilities allow geographically-dispersed engineers to collaboratively see and evaluate test data - a critical force-multiplier given the limited number of available engineers. At the same time, 412 RANS personnel support the range systems that enhance mission data,

including stationary and moving targets for increasingly complex sensors, positional truth data collectors, video recordings of munitions, expendables, and anything else that affects the aircraft. 412 RANS capabilities allow the 412 TW to execute test missions that include but are not limited to sensors, weapons, flight sciences, navigation, and large-force exercises such as Orange Flag. The dedication and expertise of personnel in the 412 RANS enable the success of the 412 TW's mission.

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As warfighting capabilities become increasingly complex, the 412 RANS continues to evolve and adapt. The squadron is currently incorporating new range capabilities to support autonomy and next-generation sensor suites, while also investigating new telemetry technologies in the face of reduced spectrum availability.

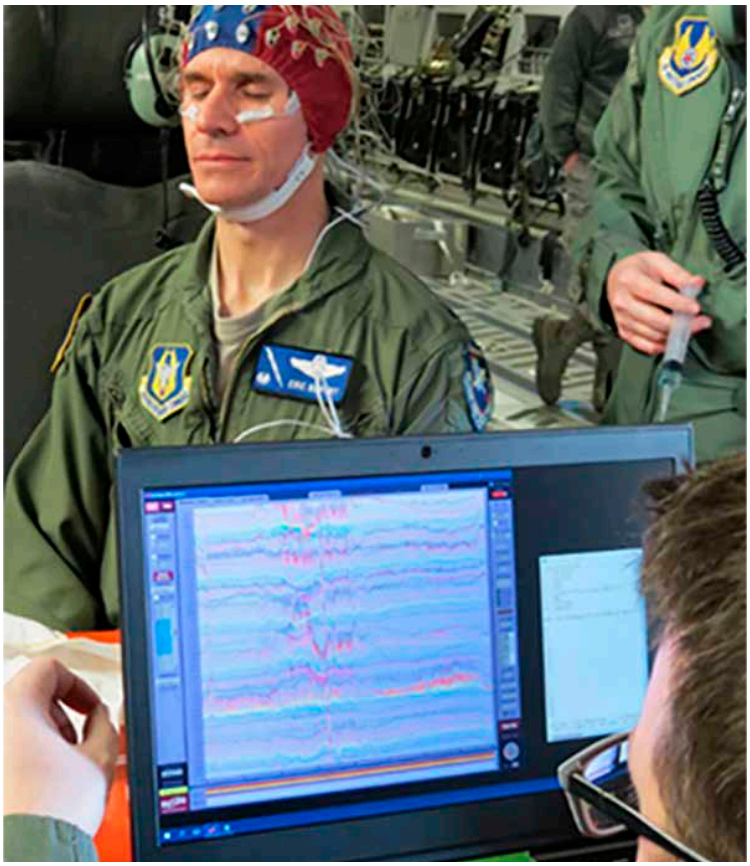
INSTRUMENTATION

There is no knowledge without information, and there is no information without data. The 812th Aircraft Instrumentation Test Squadron (812 AITS) empowers the test-range workforce to deliver decision-quality evaluations through the critical step of data collection. The 812 AITS has developed, designed, delivered, and maintained complex instrumentation for a wide variety of aircraft, including B-1, B-52, F-16, F-22, F-35, C-17, KC-46, and others. These instrumentation systems not only passively collect aircraft bus data, but also independently collect "orange wire" data from sensors installed at key locations throughout the aircraft to meet test requirements. The critical parameters collected interface with telemetry systems for transmission to mission control rooms for analysis and real-time mission calls. As the instrumentation systems often require significant aircraft modifications, instrumentation engineers follow a rigorous process to ensure airworthiness is maintained.

As aircraft capabilities evolve, the 812 AITS continues to evolve with them. The squadron continues to improve efficiency and effectiveness by using cutting-edge technology to capture all critical parameters while meeting growing demands for data collection capacity. For example, the squadron is currently exploring technologies such as wireless and small-scale instrumentation, while also working with the 412 RANS to provide an instrumentation interface for bidirectional telemetry.

DATA MANAGEMENT

The 812th Test Support Squadron (812 TSS) serves a number of key functions in ensuring successful test and evaluation, the first being data management – taking the critical step of converting data into information. The 812th TSS manages post-mission processing of data at six locations for six platforms up and down the flight line, facilitating engineers' abilities to analyze and evaluate performance of the system under test. They also support the development of analytical tools to convert the data into information that supports the broader set of disciplines. Additionally, the test support squadron plays a vital role in workforce development, developing



and conducting training ranging from critical technical competencies to leadership and communication skills, ensuring our engineers are effective in all aspects of the job. The squadron also provides statistics experts to consult with engineers to ensure statistical rigor and confidence in test plans, as well as a technical research library that provides a plethora of resources for engineers to further develop their knowledge base.

The test support squadron is a leading force in modernizing data analytics to empower engineers to get more out of collected data. The squadron's efforts to improve data analytics include incorporating Artificial Intelligence and machine learning into operational tools, creating a common data platform across the test enterprise, developing standardized software tools to be shared across the enterprise, and improving network infrastructure.

TEST ENGINEERING

The final step to evaluating a system is converting information into knowledge. The 773rd and 775th Test Squadrons offer deep expertise in flight sciences, avionics, and weapons integration disciplines, ranging from envelope expansion and hypersonic capabilities to autonomy. Our engineers develop and execute technically rigorous test plans, then analyze and evaluate system performance, providing this knowledge to key stakeholders to inform critical decisions.

While some members of our team focus on executing today's mission and fielding current capabilities, our other scientists and engineers are looking ahead to ensure that future warfighter needs are met. As platform capabilities evolve, our experts work to ensure that test capabilities evolve in parallel to adequately challenge aircraft capabilities. For example, our Electro-optical/Infrared Team is currently developing enhanced targets using advanced technology that will adequately challenge tomorrow's sensors, while simultaneously investigating truth data collection and modeling capabilities that will improve analysis and reduce flight test time. Our Command, Control, Intelligence, Surveillance and Reconnaissance group continues to evolve capabilities to test tactical communications and data links as those systems advance on next generation aircraft. Finally, our Flight Test Engineering Lab complex, expected to be operational in 2025, will be dedicated to advancing avionics test and facilitating digital transformation efforts throughout the group. ■

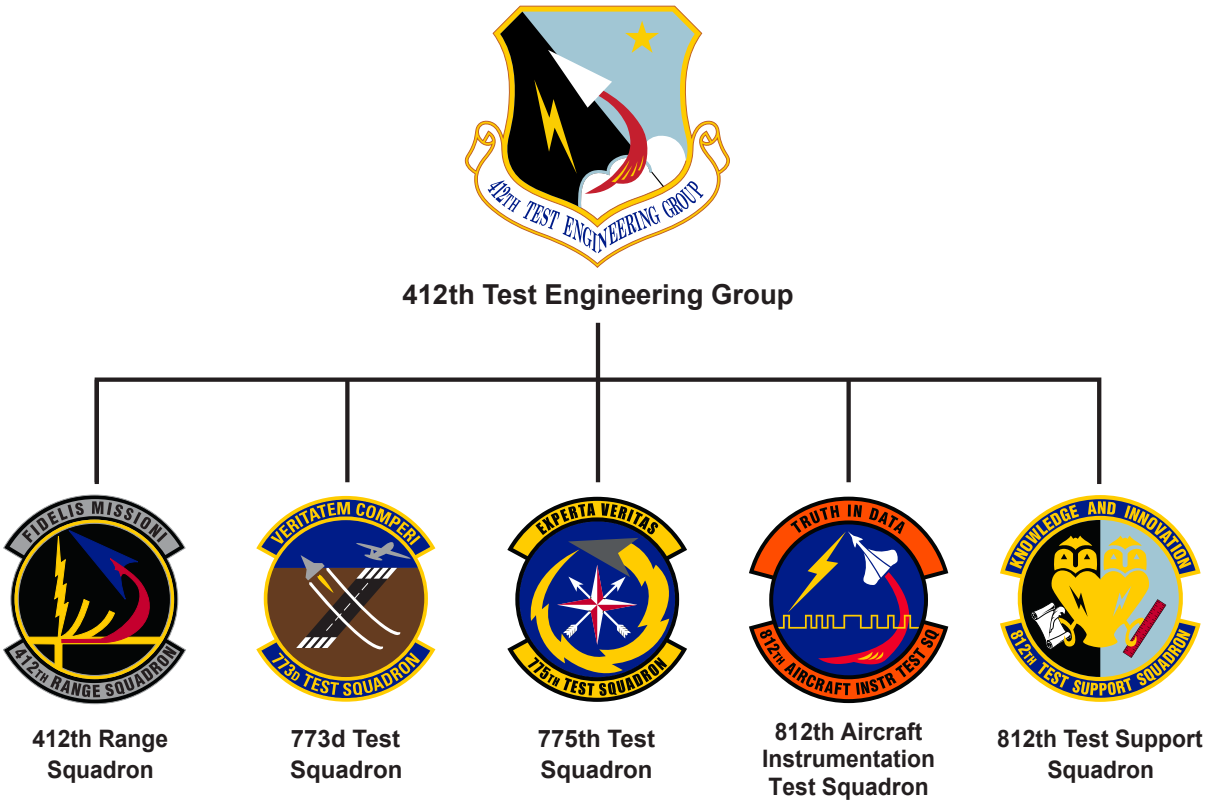


Photo by Carlo Casem, Public Affairs

412TH TEST WING

Electronic Warfare Group

(412 EWG)

MISSION: Provide our nation and its allies expertise and credible capabilities to perform Electronic Attack and Survivability Test & Evaluation, ensuring our continued wordwide air dominance.

The primary mission at the Air Force Test Center is to test aircraft systems to ensure that only safe, reliable, and effective products are deployed to the war fighter. Electronic Warfare test engineers at the AFTC are trained and kept up to date on all EW systems, both new and old. Test engineers develop these emerging technologies, while working side by side with some of the world's most experienced pilots, system operators, and engineers.

There are six categories of EW systems that are tested at Edwards: radar/missile warning receivers, jammers, towed decoys, expendable countermeasures, directed energy, and low observable technology.

BENEFIELD ANECHOIC FACILITY

The Benefield Anechoic Facility (BAF), located at Edwards Air Force Base, is the largest anechoic test facility in the world, "providing a virtual open-air range within four walls and ceiling." At the BAF, the 772d Test Squadron provides comprehensive systems and test engineering applied to the developmental T&E of military and commercial RF systems. The BAF can conduct installed-systems tests on almost any DOD aircraft, testing their radio frequency (RF) systems over a wide swath of the electromagnetic spectrum. The primary mission of the BAF is repeatable test and integration of avionics systems in a secure, electromagnetically-controlled, free-space environment, using state-of-the-art simulation and stimulation technology that closely duplicates actual combat missions. With the increased demand posed by integrated Electronic Warfare/Information Operations and net-centric RF systems that require greater interoperability and compatibility, the BAF is a valuable tool for today's highly integrated weapon systems.

PHYSICAL CHARACTERISTICS AND SUPPORT

- 264 ft. L x 250 ft. W x 70 ft. H
- 175-ton, 80 ft. diameter turntable
- Two (2) 40-ton hoists

ANECHOIC CHAMBER RF CHARACTERISTICS

- RF shielding from external environment:
  ≥ 100 dB (0.01 – 18 GHz)
- Typical quiet zone isolation:
  - 0.5 GHz* ≥ 72 dB
  - 1.0 GHz ≥ 84 dB
  - 2.0 GHz ≥ 96 dB
  - 3.0 – 18 GHz ≥ 100 dB

CHAMBER APPLICATIONS AND FUNCTIONALITY

- Complete end-to-end installed systems test in a free-space environment
- Dense, high fidelity RF threat simulation and verification
- Electronic Warfare/Information Operations
- Radar target return and electronic countermeasures collection, measurement and analysis
- Antenna pattern measurement
- Intra- and Inter-Systems Electromagnetic Interference and Compatibility
- Electromagnetic environmental effects measurements
- GPS signal simulation and test

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* Below 0.5 GHz desirable quiet zones are achieved with case-by-case configurations and special techniques used to isolate the system under test from potential undesirable chamber reflections.

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- Proficient RF, EW systems and systems test engineering expertise and know-how
- State-of-the-art RF, digital, and video instrumentation infrastructure

TYPICAL MANNED AND UN-MANNED VEHICLE SYSTEMS TESTED

- SIGINT and ELINT systems
- Network centric systems of systems
- Communications and navigation
- Identification friend or foe
- GPS (including anti-jam and controlled reception pattern antennas)
- Radar systems
- Radar warning receivers
- Electronic Countermeasures (on-board and off-board)

EW RF THREAT SIMULATION AND GENERATION

- Frequency range: 100 MHz – 18 GHz
- High-fidelity, high-density** Combat Electronic Environment Simulator based
- Direct injection or free-space radiation at the SUT
- 24 individual channels (either dedicated or multiplexed)
- 360° azimuth coverage
- Variable elevations based on SUT-chamber geometry
- Dynamic user-defined scenarios
- SUT receive antenna characteristics

COMMUNICATION, NAVIGATION AND IDENTIFICATION

- Frequency range: 20 MHz – 2 GHz
- Direct injection or free-space radiation at the SUT
- High-fidelity, high-density Joint Communications Simulator based
- 72 simultaneous RF emitters, can be added as background (pulsed signals time-shared); 2,000 emitters in a scenario
- IFF: Interrogations and replies, AIMS certified – modes 1, 2, 3A, 4, 5, and S

DATA LINK CAPABILITIES

- Ku-Band SATCOM link provides remote monitoring and control of UAVs or RPVs from customer mission control centers
- Link-11/16 multi-link system test and training tool – includes error message generation
- Link-16
  - – Advanced communications environment
  - – Faithful time slot messaging
  - – Environment Gateway Simulator
  - – Management System (LMS-16) data capture of RF transmissions
- Commanders Tactical Terminal Integrated Broadcast Service – Interactive

ELECTROMAGNETIC INTERFERENCE/ ELECTROMAGNETIC COMPATIBILITY

- Source – Victim scenarios (antenna isolation or coupling)
- High-intensity radiated fields, radiation susceptibility
- Radiated Emissions, Conducted Emissions

ANTENNA PATTERN MEASUREMENT

- Stand-alone and installed antenna measurements
- Quantifies the system antennas field of view in an installed configuration.
- Large or fighter-sized aircraft
- Rapid automated phase and amplitude collection
- Polarizations: RHCP, LHCP, vertical, horizontal, slant and axial ratio

DATA PROCESSING & INSTRUMENTATION RESOURCES

- Real-time displays of data from SUT, chamber videos and data measuring/collecting systems in state-of-the-art test control room
- Monitor/record up to 2 PCM, RS422, RS232 and 8 Mil-Std-1553B
- Threat generation activity files
- Time correlated data files
- Data formats and media as requested by customer

SUPPORT UTILITIES SYSTEMS

- Aircraft electrical power:
  - – 400Hz AC
  - – 270VDC (Supports F-22 and Joint Strike Fighter)
  - – 28 VDC
- Instrumentation power: 28 VDC
- Liquid cooling: PAO, EGW and Coolanol
- Air cooling
- Two hydraulic systems

SECURITY

The BAF is designed to meet any classification level. Additional security measures are implemented if your test program has special security requirements.

** The number of simultaneous threats depends on the duty cycle of the chosen emitters and the desired fidelity of the simulation (e.g., 1.35 million pulses per second with 10 CW emitters and a dropout of 3 percent).

DIGITAL INTEGRATED AIR DEFENSE SYSTEM

The 772d Test Squadron has developed and maintains the Digital Integrated Air Defense System (DIADS). DIADS accurately simulates command and control system impacts on the battle space and generates the enemy's perception of the air picture. The system incorporates real world trackers used by modern enemy air defense systems currently deployed throughout the world. DIADS sensor models generate perceived aircraft locations, which are fed into those trackers used by modern enemy air defense systems. The system can simulate a country's, or region's, assets that are currently deployed or projected to be operational in the near future. The simulation can be operated stand-alone, faster than real-time for constructive use, or in various Man-In-The-Loop/Hardware-In-The-Loop real-time modes.

The modeling allows testing against individual threats in a one-versus-one or one-versus-many scenario up to full, mission-level testing to stress operational plans and support both developmental and operational testing along with full-scale training exercises. DIADS provides insight into the total RF environment expected in combat by faithfully representing the signals that pilots and systems will encounter when facing the enemy.

DIADS has extensive interfacing capabilities and can be used in support of large-scale, distributed testing or training exercises using standard interfaces such as DIS, TENA, and ASTERIX to interface with the customer's systems as required. Testing with DIADS can be completed either at customer facilities or the DIADS Mission Systems Laboratory.

KEY FEATURES:

- Validated command and control models
- Flexible mission development
- Live, virtual, constructive
- Scalable to handle large simulations
- Continuous modernization efforts
- Multiple scenario databases
- Intel-representative models
- Aircraft blue/red
- Red radars and SAMs
- Multi-generational command and control
- Runs on RHEL 7/8
- WebUI allows Windows clients
- Standard interfaces:
  - DIS
  - TENA
  - ASTERIX

SIMULATES:

- Air surveillance radars
- Aircraft detections
- Track initiation and updating
- Identification Friend or Foe
- Filtering tracks of interest
- Present air picture
- Surface to air weapons control

DIADS FUNCTIONS IN:

- Constructive digital scenarios
- Real-time with MITL alongside synthetic operators
- HITL environments

SAMPLE CUSTOMERS:

- F-22A: Air Combat Simulation (ACS) Increment 3.1 OT
- F-35: Operational Test and Evaluation (OT&E) at the JSE
- Red Flag: Nellis Test and Training Range and Joint Pacific Alaska Range Complex
- MALD/J: Miniature Air Launched Decoy/Jammer OT&E
- 318th Range Squadron: cyber testing

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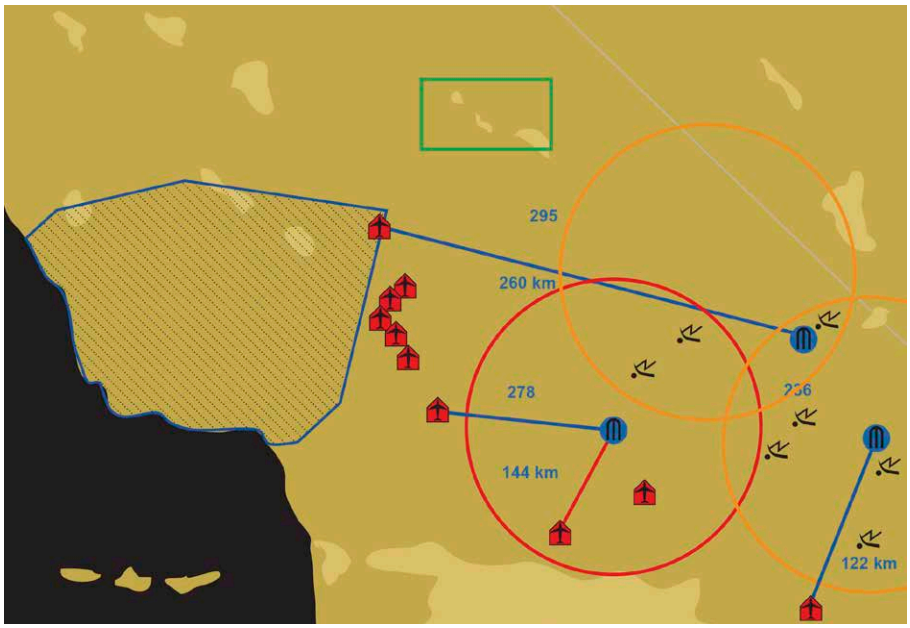

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INTEGRATED FACILITY FOR AVIONICS SYSTEM TEST

Simulators offer live virtual constructive environments for multi-ship operations at the unclassified and classified levels.

F-22 / F-16 EMULATION LAB

- Three interactive cockpits
- Control room environment
- Emergency procedures
- Development training
- Departure characteristics
- High-risk envelope expansion
- AA/AG tactics and maneuver dev
- Communication protocols
- Real-time data review
- Human factors / workload
- Flight / avionics familiarization
- High-risk flight dynamics
- Data analysis
- Multiple ship / multiple service
- Atmospheric sensitivity studies

F-16 SYSTEM INTEGRATION LAB

- Full hardware-in-the-loop
- APG 68 v5 radar
- Pod and weapon connectivity / integration
- Link-16 capable (DREN or RF)
- Tactical communications
- Cyber test augmentation
- Flight / avionics familiarization
- Avionic system training
- DREN for distributed operations
- LOS to flight line and bomb ranges
- Roof antenna farm

F-35 MISSION AVIONICS SIMULATOR

- 8 interconnected F-35 cockpits
- Configurable blue / red players
- Video monitoring and recording
- Validated AA and AG threats
- 3D data / scenario visualization
- AA/AG tactics and maneuver development
- Human factors / workload
- Control room environment
- Cockpit pilot-vehicle interface training
- Weapons training

F-35 FLIGHT SCIENCE SIMULATOR

- Two cockpits / labs
- Control room environment
- High-risk envelope expansion
- Emergency procedures
- Two-ship operations
- Real-time data review
- Control room environment
- Flight / avionics familiarization
- High-risk flight dynamics
- Data analysis
- Multiple ship / multiple service
- Atmospheric sensitivity studies

These simulators can be configured as test surrogates for developmental or improvement and modernization initiatives. Past and current events include:

- Cyber test demonstrations
- RF countermeasures techniques
- F-16 / F-18 LINK16 interoperation
- F-16 / Global Hawk BACN interop
- F-16 improved data modem evals
- Weapon emulator development
- F-16 / target pod compatibility
- Hardware / software integration
- Interoperability
- Distributed operations
- Multiple ship / multiple service
- Live virtual constructive

JOINT SIMULATION ENVIRONMENT

The Joint Simulation Environment (JSE) enables fifth generation-plus developmental test, operational test, high-end tactics training, and experimentation in the world's highest fidelity, highest density threat environment. The JSE is an Air Force and Navy effort that provides a high-fidelity digital representation of an open-air test environment that incorporates physics-based models in concert with OFP digital twins. The JSE is a transformative capability that leverages best-of-breed models to present high-fidelity, low-latency, large-force digital testing and training events. This unique capability offers a variety of services to a wide range of users from operational testers, developmental testers and engineers to program managers and decision makers at all levels.

The JSE consists of six major building blocks: software battlespace environment, physical computing infrastructure, own-ship system under test, pilot interface systems, mission facilitation rooms, and overarching facilities for systems.

AFTC WILL HOST JSE FACILITIES AT EDWARDS AFB AND NELLIS AFB:

- Edwards JSE will host 4x F-22, 4x F-35, 4x configurable threat and friendly cockpits
- Nellis AFB will host 4x F-22, 8x F-35, 8x configurable threat and friendly cockpits, and 2 HITL labs, with future growth for more in out years

FULLY INTEGRATED WEAPON FLY-OUT MODELS TO INCLUDE SEVEN WEAPONS

HIGH-FIDELITY AND LOW LATENCY CAPABILITIES:

- Limited electronic attack and electronic protect models
- Multi-mission test platforms
- 3 High-fidelity Red Air models
- 6 virtual air threats hosted in medium-fidelity pilot-in-the-loop cockpits in domes for fair-fight
- 4 Red Air missiles
- 17 high-fidelity surface-to-air missile models
- Separate blue, red and white force briefing and control areas
- Customizable denial zones
- Customizable scenarios
- Weather effects, night/day operations
- Physics-based environment for infrared and RF propagation
- Dozens of constructive blue and red models (F-22, F-18, E-2, etc.)
- Full mission data capture, playback, and post-processing

BUILT-UPON MULTIPLE GOVERNMENT-OWNED MODELS:

- Government Reusable Interface Domain (GRID) – Physics based interactions and propagation effects to all entities
- Weapons Server Common Environment – 9 real-time, high-fidelity kinetic weapon fly outs, blue countermeasures
- Visuals – Synchronized out-the-window, targeting forward looking infrared and distributed aperture system, and synthetic aperture radar map
- Analysis and Reporting Tool – Data recording, analysis, and playback
- Next Generation Threat System – Synthetic environment generator models hundreds of threat and friendly constructives; hosts high-fidelity Missile and Space Intelligence Center (MSIC) and National Air and Space Intelligence Center (NASIC) models
- 15 authoritative, high-fidelity MSIC SAM models
- DIADS – C3, data flows, and operator displays of a threat IADS. Early warning radars
- Simulation Control Executive – Orchestrates simulation initialization and execution
- Extensible Architecture for Analysis Generation of Linked Simulations Effects-Based Simulation – seven high-fidelity NASIC Red Air and Red Air-Air missile models
- Probability of Removal – Weapon/target pairing algorithm for kill removal
- Shot Log – Real-time and debrief tool that shows all shots taken during mission
- Government Simulation Interface, government-owned Interface Control Domain for interfacing with the GRID ■

412TH TEST WING

Test Management Division

(412 TMG)

MISSION: Manage test projects to deliver timely, objective and accurate information for the Warfighter

TEST MANAGEMENT

The Test Management Division organizes, trains, and equips approximately 100 personnel directly involved in day-to-day management of the test mission across the 412 TW Combined Test Forces (CTFs). In addition, the 412 TMG provides information systems, software and operating instructions for the field and ensures that 412 TW business and project management processes are defined and supported.

PROJECT MANAGEMENT (412 TMGG)

The 412 TMGG delivers and sustains project management solutions to enable management and execution of the 412 TW test project portfolio. Our project managers provide support from project initiation to closeout, working to meet cost and schedule commitments and ensuring that high-quality, affordable, supportable and effective defense systems are delivered to the warfighter as quickly as possible. Our CTF Deputy Directors provide senior civilian leadership and oversight of the test project portfolio and CTF Directors in all aspects of unit operations.

RESOURCE PLANNING AND ANALYSIS (412 TMGB)

The 412 TMGB provides personnel, tools, and processes to enable the management and execution of the 412 TW's reimbursable and non-reimbursable business portfolios. Our business leaders provide financial and requirements planning and oversight support to the 412 TW CTFs. Our program analysts facilitate the program-introduction and statement-of-capability process to secure reimbursable business for the 412 TW.

PROJECT PROVISIONING (412 TMGBB)

The 412 TMGBB provides provisioning support for the 412 TW to include munitions allocations, project management, and the Initial Point of Contact process for new and prospective customers (see page 3).

SPECIAL PROJECTS (412 TMGS)

The 412 TMGS supports all DOD and U.S. Government classified, sensitive, and unique test programs at the 412 TW in a secure, streamlined and effective manner. This includes special access program (SAP) project and business management, strategic planning and oversight of SAP facilities for the 412 TW and tenant organizations, and SAP support staff assistance for 412 TW and Air Force Test Center leadership. ■

412TH TEST WING

Operations Group

(412 OG)

MISSION: Inform Air Force and DOD decision makers by safely and effectively planning, executing and reporting on ground and flight tests

The 412th Operations Group (412 OG) is made up of an operations support squadron (OSS) and seven flight test squadrons (FLTS). The 412 OSS is responsible for airfield operations, runways, Space Positioning Optical Radar Tracking (SPORT), airdrop, and the Test Parachute Program (TPP). Each flight test squadron aligns under a CTF or Integrated Test Force (ITF) to conduct full-spectrum test and evaluation.

412TH OPERATIONS SUPPORT SQUADRON SERVICES

AIRFIELD OPERATIONS: 412 OSS services include weather, air traffic control, terminal airspace management, airfield and flight management, radar, air traffic control and landing system and communications systems maintenance, airfield equipment, and transient services. Generally, the airfield is open for operations on weekdays with a control tower for the Class D airspace around Edwards AFB. Uncontrolled airfield operations require prior coordination with the airfield manager. Local weather services are available seven days a week.

RUNWAYS: There are 14 runways on Edwards AFB. Four are paved and 10 are on dry lakebeds. The two main paved concrete runways are more than 2.5 miles long. The unpaved runways are on two dry lakebeds, Rogers Dry Lake, which provides a natural extension to the two main paved runways, and Rosamond Dry Lake. These lakebed runways occasionally become unavailable during the winter months, when rain can leave standing water on the lakebeds, making them unusable for aircraft.

SPORT generally operates during daylight hours on weekdays and helps control the restricted airspace around Edwards AFB (R-2515). Services include radar monitoring, radar traffic advisories, safety alerts, airspace boundary calls, radar vectoring, arrival sequencing, control of special use airspace like the spin areas, airborne flight safety assistance and more. When airspace R2515 is not scheduled for DOD use, it is usually released to the Federal Aviation Administration (FAA) and limited services are available through Joshua Approach.

AIRDROP includes services related to experimental research, development, test and evaluation (RDT&E) aerial deployment systems for personnel, cargo, vehicle, and other systems. Other airdrop services may be available upon request and capabilities validation.

TEST PARACHUTE PROGRAM: The TPP provides RDT&E to help produce safe and effective personnel parachutes for the U.S. Air Force in support of the joint warfighter. Other TPP services may be available upon request and capabilities validation. The TPP personnel apply their expertise, experience, and adaptability to provide current and future parachute systems to the warfighter. TPP experts leverage cutting edge technologies across domains to deliver unique, value-driven solutions that make warfighters effective and lethal in any operating environment.

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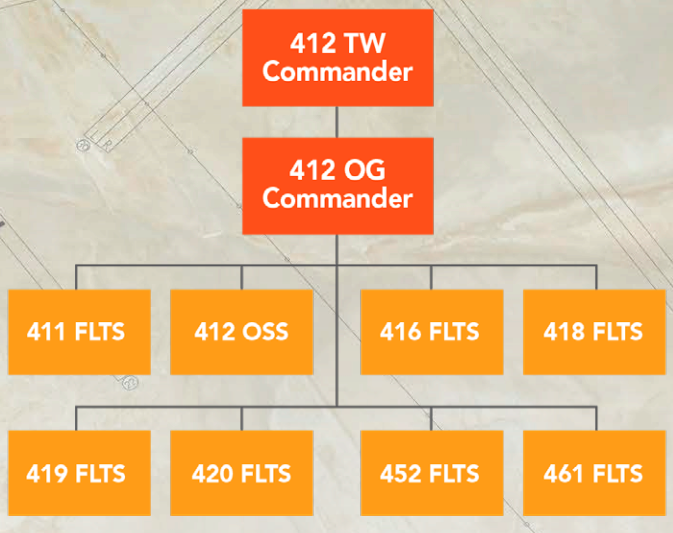
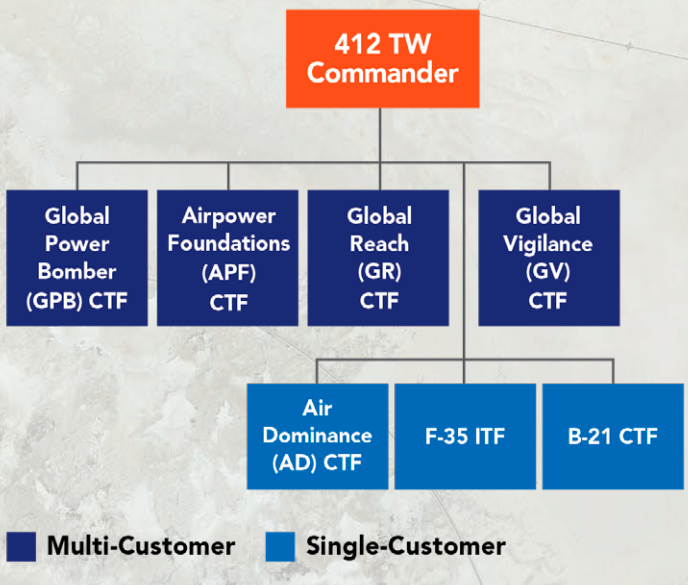
FLIGHT TEST SQUADRON OVERVIEW

Flight test squadrons are typically aligned under the umbrella of a CTF. The FLTS commander is also the CTF director. The 412 OG Commander retains administrative control (ADCON) of the FLTS commander and assigned operations personnel. ADCON includes responsibilities such as direct supervision, training and administrative responsibilities, and human resources support.





COMBINED TEST FORCE / INTEGRATED TEST FORCE OVERVIEW

CTF/ITFs oversee the full range of developmental test and evaluation at Edwards AFB for their assigned aircraft. Resposibilities include program management, flight operations, and test and evaluation. CTF/ITFs have day-to-day operational control over personnel that are matrixed to the CTF/ITF from other organizations (e.g., TMG, TENG, EWG, etc.). In most cases, an FLTS is aligned under each CTF/ITF and is staffed with Operations Group personnel. The CTF/ITF director is dual-hatted as the squadron commander.

CTF DESCRIPTIONS

The **GLOBAL POWER BOMBER CTF/419 FLTS** tests and evaluates USAF bomber aircraft (including B-1, B-2 and B-52) to modernize the aircraft and integrate new weapons systems. The CTF also operates the C-12 Formal Training Unit.

The **AIRPOWER FOUNDATIONS CTF/416 FLTS** comprises three Integrated Test Forces: F-16 ITF, T-7 ITF, and Emerging Technologies ITF. The F-16 ITF tests and evaluates USAF and Foreign Military Sales F-16 aircraft to include modernization, weapons systems integration, and research and development projects. Additionally, the F-16 ITF is responsible for T-38 modernization testing, F-16 chase and target support for test programs across the 412 TW, and high-altitude departure recognition, avoidance, and recovery training for U.S. and international F-16 pilots. The T-7 ITF tests the T-7A Red Hawk, the USAF's newest jet trainer aircraft, to evaluate performance, flying qualities, loads, flutter, systems, and propulsion test planning, execution, and reporting. The Air Force plans to acquire 351 aircraft to replace the aging T-38. The Emerging Technologies ITF provides agile, innovative flight testing and explores armed forces warfighting capabilities of tomorrow. Current focuses include small unmanned aerial systems for testing/operational use, autonomous systems development and implementation, and industry partnerships that are exploring development of Electric Vertical Take-Off and Landing platforms and supersonic/hypersonic vehicles.

The **GLOBAL REACH CTF/418 FLTS** tests and evaluates USAF airlift and refueler aircraft (including C-5, C-17, KC-10, KC-46, KC-135 and partner-nation aircraft) to modernize the aircraft and integrate systems. The CTF also partners with the 370th Flight Test Squadron, a U.S. Air Force Reserve Squadron, to provide aerial refueling support for Edwards AFB.

The **AIR DOMINANCE CTF/411 FLTS** tests and evaluates F-22 aircraft during modernization efforts and integration of new weapons systems. This CTF is also responsible for development of the NGAD family of systems.

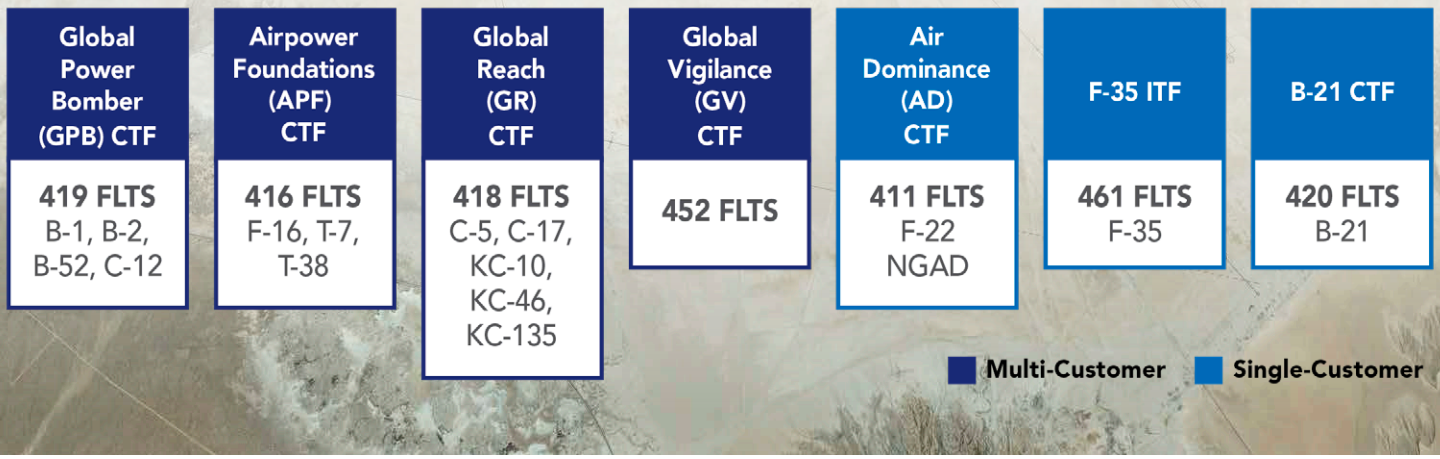
The **F-35 ITF/461 FLTS** is the DOD's lead developmental flight test unit for sensors, weapons, and software on all three variants of the F-35. The efforts of the F-35 ITF/461 FLTS will benefit the 826 fielded F-35 aircraft in the U.S. Air Force, Marine Corps, and Navy and the other nations participating in the F-35 program.

The **GLOBAL VIGILANCE CTF/452 FLTS** tests and evaluates USAF remotely piloted aircraft to modernize the platforms and integrate weapons systems.

The **B-21 CTF/420 FLTS** is an integrated team of test professionals from Northrop Grumman, 420 FLTS, and Detachment 5 of the Air Force Operational Test and Evaluation Center that provides support to the B-21 flight test program.

CTF AND FLIGHT TEST SQUADRON LINKAGE

CTFs and FLTS are inherently linked. The FLTS is responsible for operating the aircraft and providing administrative support, while the larger CTF provides the test team of engineers, project managers, financial managers, maintenance technicians, and any other required personnel. ■



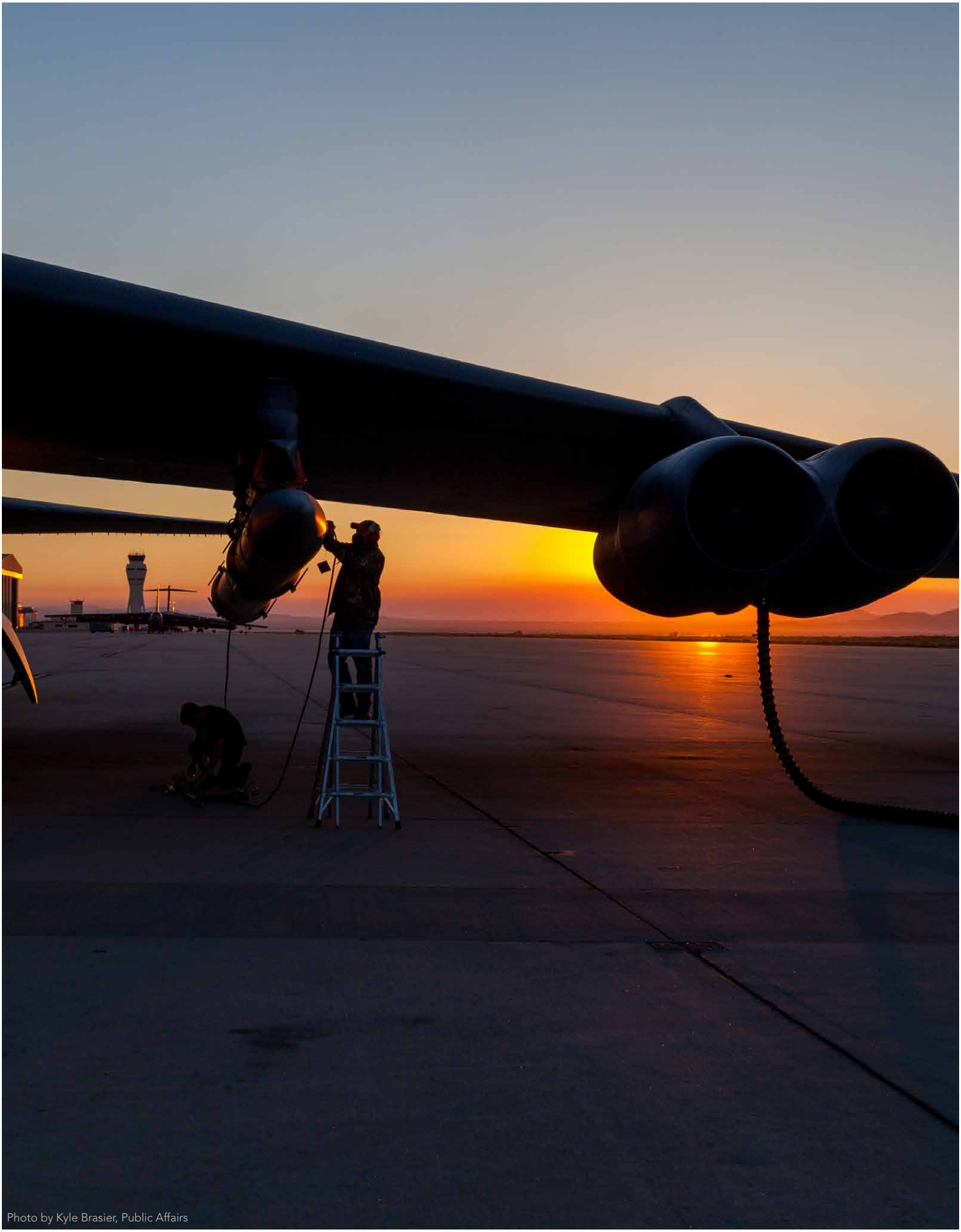


Photo by Kyle Brasier, Public Affairs

412TH TEST WING

Maintenance Group

(412 MXG)

MISSION: Generate safe, reliable airpower with properly trained and well-equipped personnel ready to execute test and evaluation missions!

VISION: Continue to be the Testing Center of the Aerospace Universe

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The 412th Maintenance Group (412 MXG) is the U.S. Air Force's most diverse maintenance group with over 1,800 Total Force Integration (TFI) Airmen, 14 operating locations, five squadrons, Maintenance Operations, Weapons Standardization, Quality Assurance, 73 uniquely configured aircraft across 26 mission design series (MDS) and 20 engine variants valued at $7.9 billion for test and evaluation.

Additionally, the 412 MXG sustains 284 facilities worth $3.3 billion. The long, proud history of the 412 MXG dates to 1949 and continues today with the group remaining a recognized logistics leader in providing innovative solutions for complex logistics and ground test problems while providing outstanding flying mission support to America, its allies and partners. The group's personnel provide unequaled skill and technical expertise in working with advanced systems and technologies enabling top-tier support and supportability evaluations for the myriad aircraft and systems across the Department of Defense (DoD).

912TH AIRCRAFT MAINTENANCE SQUADRON

912 AMXS consists of three aircraft maintenance units – the 418th, 419th, and 420th Aircraft Maintenance Units – performing safe and reliable maintenance executing world-class ground and flight test on 13 diverse aircraft representing the Air Force's portfolio of modified heavy aircraft.

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412TH LOGISTICS TEST SQUADRON

412 MXLS includes 12 operating locations across the United States including some embedded within system program offices and aerospace manufacturing facilities. From this unique vantage point, the 412 MXLS tests and evaluates logistics capabilities, systems and equipment to ensure readiness and operational effectiveness.

412TH AIRCRAFT MAINTENANCE SQUADRON

412 AMXS employs 475 TFI Airmen that generate safe and reliable test aircraft in support of ground and flight testing on 51 uniquely modified T-38, F-16, F-22 and F-35 aircraft. Unit members deliver the future faster through a unified total force team, capable of integrated operations with the largest defense contractors, providing cutting edge capability to the war fighter. The unit also works in lockstep with the U.S. Air Force Test Pilot School to develop the world's premier test professionals for the United States and its allies.

412TH AIRCRAFT INSTRUMENTATION TEST SQUADRON

412 MXIS provides test evaluators with the knowledge, understanding and support for non-standard and non-production data derived from acquisition instrumentation systems installed on aircraft, munitions and other DoD systems. Squadron personnel are experts in airborne Class II modifications planning, designing, manufacturing, modification and installation of non-standard and non-production data acquisition instrumentation systems for eight diverse flight test squadrons encompassing 17 different MDSs, systems and subsystems under test.

412TH MAINTENANCE SQUADRON

412 MXS provides maintenance support for over 81 modified aircraft, 26 MDSs, and 20 engine variants worth $9.4 billion. The squadron's 493 TFI Airmen manage 1,053 pieces of aerospace ground equipment, $93 million of munitions, and 9,600 calibrations enabling five military branches and six allied nations to provide strategic capabilities in support of America's priorities. The 412 MXS is composed of the following flights:

- The **Fabrication Flight** possesses unique manufacturing and modification capabilities specific to the manufacture, repair, overhaul, corrosion control and inspection of aeronautical and non-aeronautical parts and equipment. These highly trained personnel have a wealth of experience in various metals, composite honeycomb structures, thermoplastic materials, thermosets, ceramics and fiberglass. The flight's capabilities include paint and corrosion control, aircraft structural repair including composites, non-destructive inspection as well as machine and welding shops. The Covered Corrosion Aircraft Wash Facility is a unique facility with lighting for 24-hour operations that is large enough to accommodate C-5 aircraft. Additionally, the facility includes a soap foamer and two high-pressure hot water wash units.
- The **Component Repair Flight** specializes in manufacturing, repairing and inspecting airplane parts and equipment. The flight also offers maintenance and testing for armament systems, ejection seats, avionic units, electronic attack pods and generators. The flight supports training and testing for a variety of aircraft and battery types. It contains an advanced integrated systems test station, an aerial tow target shop, a battery shop, conventional avionics, egress, electrical support

of flight and ground training test, electronic warfare, a mechanical element and an armament area.

- The **Aerospace Ground Equipment (AGE) Flight** sustains, tests, and evaluates a vast and diverse array of AGE in support of NASA, DoD and foreign military sales customers, including bombers, fighters, tankers, cargo aircraft, experimental platforms and Unmanned Aerial Vehicles (UAVs) across numerous mission design series.
- The **Maintenance Flight** is home to several distinct and diverse sections that are second to none. The Fuels Systems Section repairs, functionally checks and inspects aircraft fuel systems, fuel tanks, hydrazine systems, and related components on a highly diverse fleet of airlift, bomber, fighter, tanker and trainer aircraft. Next, the F-16 Phase and Heavy Maintenance Repairs Section performs major aircraft repairs, isochronal inspections and launches the aircraft they produce. Inspection Section's T-38 Phase, hydraulic, wheel and tire, crash-damaged disabled aircraft recovery, end of runway and transient alert functions provide major and minor isochronal as well as periodic and special inspection capabilities.
- The **Propulsion Flight** provides full three-level and additional two-level maintenance capabilities on several standard and prototype engines. The advanced technical expertise of our personnel allows us to provide full Component Improvement Program capability and depot-level repair capability. The flight also provides off-equipment repair and test.

412TH MAINTENANCE OPERATIONS

412 MXO oversees aircraft and munitions maintenance operations control, plans and scheduling, maintenance analysis, facilities, 412 MXG budget, manpower, strategic planning and process improvement, training, logistics and security.

412TH MAINTENANCE QUALITY ASSURANCE

412 MXQ provides oversight of aircraft and munitions quality assurance and aircraft weight and balance with the only field-level pit scale designed to test and evaluate DoD and UAV aircraft.

412TH WEAPONS STANDARDIZATION

412 MXW consists of highly trained weapons loaders that handle one-of-a-kind munitions for DoD, allied and partner nations. This section provides training and certification to all 412 TW weapons load crews and validates new weapons load equipment and procedures. This section hosts the 412 TW's quarterly and annual weapons load competition designed to amplify the wing's culture and connect members to the test and evaluation mission. ■

Photo by Carlo Casem, Public Affairs

412TH TEST WING

Civil Engineer Group

(412 CEG)

MISSION: The 412 CEG lead-turns the future, maintains the present, and protects the environment. Our experienced personnel provide installation, maintenance, construction and repair of Edwards AFB real property, while ensuring environmental stewardship and encroachment management of the installation. We plan and execute emergency management operations for local, regional, and national emergency response, including contingency and mobility operations. We provide fire service support to real property and aircraft. Finally, the 412 CEG provides Explosive Ordnance Disposal (EOD) operational support to ranges and area of operations in the stateside assigned area of operations and deployment sites.

VISION: Innovators Lead Turning the Future

The 412th Civil Engineer Group (412 CEG) is organized into two squadrons (the 412th Civil Engineer Squadron (412 CES) and the 812th Civil Engineer Squadron) and three Divisions (Engineering Division, Environmental Division, and Installation Management Division). Each squadron and division provides a distinct capability, but all are fully synchronized and interdependent in order to support the 412 TW mission.

ENGINEERING DIVISION

The 412th Engineering Division (CEN) is a lean cradle-to-grave project development and execution organization consisting of 36 engineering professionals from an array of disciplines including civil, structural, transportation, mechanical, and electrical engineering. This diverse engineering team provides planning, programming, a Comprehensive Asset Management Plan, integration, and execution of facility/infrastructure requirements that exceed the 412 CES's organic capabilities. The Project Management Branch of CEN executes design, maintenance, repair, and construction contracts utilizing 42 execution methods including architecture and engineering service contracts, indefinite delivery/indefinite quantity contracts, simplified acquisition of base engineer requirements contracts, multiple award construction contracts, and blanket purchase agreements. The Execution Support Section (ESS) of CEN maintains a comprehensive Geographic Information System to assist with dig permits and project siting. ESS also maintains all project design files such as as-built drawings. The Portfolio Optimization Branch of CEN is a single source for requirements integration and Base Comprehensive Asset Management Plan development. The Program Development Section of CEN performs base comprehensive planning, project programming, and technical design to restore and upgrade base facilities and infrastructure systems. The Planning Section of CEN performs base comprehensive planning, environmental planning, and space optimization. The Energy Management Section of CEN leads efforts to improve energy resiliency, optimize energy demand, and assure energy supplies.

ENVIRONMENTAL DIVISION

The mission of the 412th Civil Engineer Environmental Division (412 CEV) is to protect human health and the environment while supporting mission accomplishment by lead-turning mission requirements to ensure all Edwards AFB programs comply with environmental statutes and regulations and by being effective and efficient stewards of the environment. The 412 CEV is responsible for managing the natural and cultural resources of Edwards AFB through the implementation of the Integrated Natural Resource Management Plan and the Integrated Cultural Resource Management Plan. We ensure that the installation complies fully with the Endangered Species Act, the Migratory Bird Treaty Act, the National Historic Preservation Act, the

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Archaeological Resources Protection Act, while coordinating government-to-government consultation with Federally Recognized Tribes. The 412 CEV manages the preparation and approval of environmental planning documents required by the National Environmental Policy Act and the Environmental Impact Analysis Process; assures all activities on Edwards AFB are compliant with all federal, state and local environmental regulations; and manages all regulatory permits associated with clean air, clean water, hazardous waste, solid waste, toxic waste, and hazardous materials. Through the Pollution Prevention Program, we introduce new materials and processes that reduce the volume and toxicity of hazardous waste produced by the base, while making the processes safer and more efficient. The 412 CEV oversees the Environmental Management System that helps senior leadership focus resources on the most important environmental issues. CEV has established ongoing working relationships with federal, state, and local regulators to sustain cooperation and address environmental issues. While most tenant units are subject to Air Force Policy and Processes, NASA Armstrong maintains its own environmental management office that coordinates with the Air Force based on the type and location of activities involved. Support for Plant 42 is advisory only as the Air Force Life Cycle Management Center is responsible for their program. The Air Force Civil Engineer Center (AFCEC) Installation Support Section (ISS) is responsible for managing the Environmental Restoration Program and the Military Munitions Response Program and conducts remediation activities to address release of hazardous substances, pollutants, and contaminants to protect human health and the environment; assures that all past releases of hazardous materials and wastes have been properly identified, investigated, and remediated in accordance with the Federal Facility Agreement (FFA) and all other appropriate and relevant regulations. The AFCEC ISS manages all hazardous waste and material cleanup efforts not otherwise covered by the FFA, while keeping the public and regulatory agencies aware and involved in base cleanup decisions.

INSTALLATION AND MANAGEMENT DIVISION

The Installation and Management Division (IMD) integrates the 412 CEG's management of real property and provision of IT support. IMD's Budget Section manages all funds allocated to the 412 CEG, including funds for maintenance, repair, and construction projects (from centralized and decentralized facility sustainment, restoration, and modernization programs); service contracts; utilities; and material purchases. The Real Property Section documents all real property and real property installed equipment gained, modified, or disposed. In coordination with AFCEC, the Real Property Section is also responsible for all real property instruments, including ingrants and outgrants for DOD and non-DOD organizations with a presence within Edwards AFB or the 12 geographically separated locations.

412TH CIVIL ENGINEER SQUADRON

The 412th Civil Engineer Squadron's (412 CES) mission is to provide efficient and effective life-cycle operations, maintenance, and repair to facilities and infrastructure. The squadron is authorized 188 positions, operates on a single shift, but is on-call for after-hours emergencies. The 412 CES is organized into the four flights: Heavy Repair, Infrastructure Systems, Facility Systems, and Operations Engineering. Work is prioritized, executed, and tracked in accordance with standardized prioritizations: emergency work, preventative maintenance, scheduled sustainment work (high, medium, and low), and enhancement work. The squadron maintains and repairs all Air Force real property and real-property installed equipment. The Squadron's responsibilities are truly daunting, as Edwards AFB has the largest electrical distribution system in the Air Force, with approximately 800 miles of overhead and underground distribution, 5 switching stations, 16 substations augmented by 63 RPIE (real property installed equipment) generators and 402 fire alarm systems. The Facility Systems Flight is also responsible for two sets of BAK-12 aircraft arresting systems. The water, gas, and fuels system on Edwards AFB is the second largest in AFMC at 644 miles with 3.6 million gallons of Petroleum, Oil and Lubricants. Our Pavements Team maintains four concrete runways totaling eight miles, 14 lakebed runways totaling 60 miles, 284 miles of paved roads, and 287 miles of unpaved roads. The 412 CES team is augmented with contractors provided under approximately 28 service contracts, such as custodial, installation solid waste management, grounds maintenance, and wastewater treatment plant to name a few. The squadron executes its functions according to many plans, such as the Base Support Plan, Antiterrorism/Force Protection Plan, Installation Barrier Plan, Energy Curtailment/Management Plan, Hazardous Communications Plan, Snow and Ice Control Plan, Pest Management Plan, and Water Operations Plan to name a few, along with the annually-updated Squadron Action Plan which includes six focus areas with Measures of Effectiveness.

812TH CIVIL ENGINEER SQUADRON

The **EXPLOSIVE ORDNANCE DISPOSAL (EOD)** team's mission is to mitigate hazards to personnel and property posed by weapons and explosive materials across all physical domains. Core mission areas include Nuclear Weapon Response, Unexploded Explosive Ordnance, Aerospace Systems and Vehicles, Irregular Warfare, Counter-IED, Combating WMD's, Operational Range Clearance, Defense Support to Civil Authorities, and VIP Protection. The squadron provides 24-hour emergency response support across 481 square miles, including Edwards AFB and the surrounding communities of Rosamond, Tehachapi, California City, and Mojave. EOD also supports assigned aircraft and munitions testing, including priority test missions, with same day destruction of classified materials, and destroys hazardous materials produced by the Air Force Research Lab (AFRL).

The **READINESS AND EMERGENCY MANAGEMENT FLIGHT:** The primary mission of the Emergency Management Program is to save lives; minimize the loss or degradation of resources; and continue, sustain, and restore operational capability in an all-hazards physical-threat environment at Edwards AFB. The flight is also tasked with managing the Emergency Operations Center (EOC), which is the command and control support element that coordinates information and resources to support the installation's actions before, during, and after an incident. The EOC uses Command and Control Incident Management Emergency Response Application as its common operating picture solution to interface with tactical first responders and emergency responders. The flight has several specialized pieces of equipment to respond to, and recover from, an all-hazards event. We employ the Incident Command Post, which is a mobile command and control trailer that provides office space for key personnel supporting the on-scene Commander or Recovery Operations Chief. We also provide a large array of Chemical, Biological, Radiological, Nuclear (CBRN) detection equipment. This equipment allows CBRN teams to respond and test presumptive hazards, to assist in determining local threat conditions, and to establish entry and mitigation plans. In addition to providing specialized equipment, all personnel assigned are subject matter experts in CBRN Defense Tactics, Techniques and Procedures. The Office of Emergency Management

assists all host and tenant organizations with establishing Unit Emergency Management Programs, developing Emergency Action Plans, providing preparedness training, and collaborate on exercise development to test all facets of response and recovery actions to support mission continuation during an event.

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The **FIRE AND EMERGENCY SERVICES FLIGHT (FES)** is staffed with 120 personnel – 43 military firefighters, 68 civilian firefighters, and nine civilian Emergency Medical Dispatchers. The flight responds to more than 1,200 emergencies annually. Equipment and personnel are postured to respond to a variety of incidents, including aircraft rescue and firefighting (ARFF), structural fire suppression, wildland urban interface, emergency medical services (EMS), technical rescue operations, and hazardous materials (HAZMAT) incidents involving chemical, biological, radiological, nuclear, or explosive materials. Through its Fire Prevention Section, the FES Flight also provides non-emergency services such as fire code inspection and enforcement, facility plans reviews, and public education programs utilizing virtual reality trainers. Due to the size of Edwards AFB, the FES Flight is distributed among five fire stations.

FES Flight maintains Memorandums of Understanding (MOU) or Mutual Aid Agreements (MAA) with a number of internal and external emergency service agencies. These agencies provide support beyond traditional fire suppression:

- California City Fire Department (MAA)
- LA County Fire Department (MAA)
- Kern County Fire Department (MAA)
- San Bernardino County Fire Department (MAA)
- 412th Medical Group (MOU for EMS)

Each agreement clearly defines its purpose and terms. These interagency relationships provide a cost-effective method of maintaining adequate emergency services for the communities we serve, while bolstering the camaraderie and working relationships. ■

- **Fire Station 1** is located on the flight line in Building 1223. This station provides ARFF, structural fire supression, technical rescue, HAZMAT, and EMS. It also hosts the Fire Alarm Communication Center. Demand Zones within Fire District 1 include assembly, business, industrial, residential, and storage facilities.
- **Fire Station 2** is located in Building 5560, within Edwards AFB's housing area. This station provides structural fire supression, technical rescue, HAZMAT, and EMS. Demand Zones within Fire District 2 include assembly, business, daycare, educational, health care, industrial, residential and storage facilities. Most facilities within this district have fire protection systems, fire suppression systems, or both.
- **Fire Station 3** is located on South Base in Building 250. This station provides ARFF, structural fire supression, technical rescue, HAZMAT and EMS. Demand Zones within Fire District 3 include business, industrial, and storage facilities. This district includes special mission hangars and munition storage/maintenance areas.
- **Fire Station 4** is located at the AFRL in Building 8370. This station provides structural fire supression, technical rescue, HAZMAT, and EMS. Demand Zones within Fire District 4 include assembly, business, industrial and storage occupancies.
- **Fire Station 5** is located on North Base in Building 4456. Resources from the station provide ARFF, structural, technical rescue, HAZMAT, and EMS. Demand Zones within Fire District 5 include business, industrial, and storage facilities.

UNITED STATES AIR FORCE

Test Pilot School

(USAF TPS)

MISSION: Create highly-adaptive critical-thinking test leaders to accelerate multidomain capabilities to the warfighter

VISION: Impassioned leaders advancing war-winning capabilities

TEST MANAGEMENT PROJECT

The U.S. Air Force Test Pilot School (USAF TPS) is the world's premier institution for flight test education, training, and research. This is where the Air Force's top pilots, combat systems officers, and engineers learn how to lead and execute full-spectrum test and evaluation of aerospace weapons systems.

The USAF TPS Test Management Projects (TMP) are the student-led thesis projects for the master's level curriculum. These projects are a "cradle-to-grave" projects, during which the students plan, coordinate, execute, and report on a real-world test program. Although these projects are limited to no more than two weeks of actual flight test, they provide our customers a unique opportunity to fly on USAF TPS aircraft.

The most common TMPs fly on USAF C-12s, T-38s, or F-16s and occasionally the X-62A VISTA. Since these aircraft are USAF owned, the customer does not pay for flight hours or the student labor cost: although, the customer does support integration and pre-test engineering work. TMPs are not limited to these aircraft, but customers may have to pay flight hour costs for other aircraft. This provides a unique opportunity for smaller projects to use military aircraft and the unique test resources available in the Edwards AFB airspace.

In order to be a TMP customer, the project must have a U.S. government sponsor. A selection board is held twice a year to rank prospective projects based on their ability to meet TPS educational objectives, to benefit the warfighter and/or test community, and to meet the strict timeline associated with the TMP. TPS focuses on giving our students an opportunity to think critically about a complicated problem, come up with novel test techniques to gather test data, and to use peer-reviewed analysis techniques to develop data-supported conclusions. Finally, systems under test must be sufficiently mature to be able to meet a 2-week execution period that is fixed on the academic schedule. For further information, please contact the United States Air Force Test Pilot School at (661) 277-3000. ■

412TH TEST WING

Air Force Plant 42

"Vision to Victory!"

MISSION: Deliver timely, effective, efficient support, empowering development, production, flight test, and sustainment for the world's most advanced aerospace systems

VISION: Set conditions for innovative aerospace development, delivering next generation warfighter lethality!

Air Force Plant 42 is a government-owned, contractor-operated industrial plant located in the Antelope Valley approximately 60 miles northeast of Los Angeles with proximity to the concentration of the aerospace industry in Los Angeles, R-2508 restricted airspace and the resources of Edwards AFB. Plant 42 supports an estimated 16,000 contractors and government employees, occupying more than 3.5 million square feet of floor space covering more than 5,700 acres with a replacement cost of $4.5 billion. The industrial production facilities are uniquely suited to fully support the nation's newest and most advanced military and commercial aerospace systems. It is one of four Air Force plants located throughout the United States and is managed by the Acquisition Environmental and Industrial Facilities Division at Wright-Patterson AFB. Plant 42 is unique in that it has a government-operated airfield complex and hosts three major defense contractors: The Boeing Company, Lockheed-Martin Corporation, and Northrop Grumman Corporation. The plant's mission is to provide industrial facilities for the design, development, production, modification, depot maintenance and production flight test of U.S. aerospace systems. Some of the world's most advanced and successful aircraft were designed, fabricated, assembled and tested at Plant 42. Examples include the following Collier Trophy winners: F-104, F-100C, space shuttle, U-2, SR-71, B-1, B-2, F-117, F-22, X-47 and RQ-4 series. Other examples include the F-5E, XB-70, X-32, X-35, X-51, B-21 and other unmanned air systems.

412TH TW OPERATING LOCATION, AIR FORCE PLANT 42 CAPABILITIES

The 412th Test Wing operating location provides base operations support services for the common area at Air Force Plant 42. The test wing provides command and control of the Plant 42 airfield complex and the personnel that support the industrial facilities. The organization

provides airfield management, business integration, civil engineering, contract management, environmental services, fire protection, crash and rescue, recovery, information technology, logistics, security in addition to ground, weapons and flight safety for the common area of the plant. The common area includes the airfield with two 12,000-foot runways and an assault landing zone. The airfield complex is available for operations from 5:30 a.m. to 10 p.m. Monday through Sunday. Runway 4/22 is 150 feet wide, and Runway 7/25 is 200 feet wide, providing enhanced safety during aircraft testing. Airfield management supports flight planning, scheduling and airspace management with air traffic control provided by Federal Aviation Administration-contracted air traffic control tower services. The Class D airspace is a 4.3 nautical mile radius up to 2,500 feet above ground level. Weather observation is provided by the 25th Operational Weather Squadron from Davis-Monthan AFB. The typical annual aircraft traffic count is just over 30,000 operations.

As a production flight test installation, the test wing supports ground taxi test and first flight of manned and unmanned development and production aircraft from DOD contractors.

AIR FORCE PLANT 42, LIFE CYCLE MANAGEMENT CENTER, DETACHMENT 4

Located at Air Force Plant 42, Detachment 4, a unit of the Air Force Life Cycle Management Center at Wright-Patterson AFB, Ohio, through the Command and Control, Intelligence, Surveillance and Reconnaissance Division at Robins AFB, Georgia, is the responsible test organization for planning, conducting and reporting on all U-2 flight test programs. The unit conducts U-2 developmental and operational mission support and post-depot-maintenance acceptance flights. The unit also provides quality assurance oversight of depot and flight test maintenance activity and validates technical changes to the aircraft, equipment and technical publications. ■

412TH TEST WING

Mission Support Group

(412 MSG)

MISSION: War fighters delivering agile combat support enabling war-winning capabilities

VISION: Breaking barriers to enhance mission execution

The Mission Support Group conducts test-enabling installation operations for Edwards AFB, its 50-plus mission partners and a population of over 14,000 people.

THE 412TH SECURITY FORCES SQUADRON provides integrated base defense and force protection for all Edwards people and missions, while simultaneously preparing and deploying defenders in support of worldwide contingencies and combat operations. Its combat arms section equips personnel from the 412th Test Wing, Air Force Plant 42, Los Angeles AFB, March Air Reserve Base, Marine Corps Air Station Miramar, six local Army units, Defense Criminal Investigative Services and NASA with cutting-edge, innovative marksmanship skills to enhance our nation's war fighting capabilities year-round.

THE 412TH COMMUNICATIONS SQUADRON operates and defends Edwards' cyberspace domain and is responsible for full-spectrum information technology capabilities to enable weapons system testing, evaluation and development to deliver war-winning capabilities to our nation's combat air forces.

THE 412TH LOGISTICS READINESS SQUADRON integrates transportation, fuel, supply and logistics planning to provide world-class support for the Edwards AFB mission.

THE 412TH FORCE SUPPORT SQUADRON enables the human war fighter, providing exceptional personnel and manpower administration, as well as morale, welfare and recreation support programs and services for the entire community of Edwards AFB.

THE SCHOOL LIAISON PROGRAM serves as the installation's liaison office to 128 local schools, including the three on-base public schools operating within the California Muroc Joint Unified School District. The program services nearly 2,000 military-connected students and supports programing to host installation welcome events, summer camp opportunities for families, STEM enhancement, job shadow opportunities and parent partnerships and workshops.

The 412th Mission Support Group also serves as the base liaison to the Army and Air Force Exchange Service, Defense Commissary Agency and the Palmdale City manager.

412TH MSG

Security Forces Squadron (412 SFS)

MISSION: Conduct persistent law enforcement and aggressive defense operations at Edwards Air Force Base and Plant 42 to deter and defeat threats to the test mission while maintaining readiness to support operations worldwide.

VISION: A resilient, motivated, intelligent and cohesive defense force that sees first, understands first and acts deliberately.

1. INVESTIGATIONS

- Provides investigation services for the majority of crimes on the installation to include larceny, assault, domestic violence, and drugs

2. FLIGHT OPERATIONS

- Maintains 5-minute response times to security incidents and 15-minute response times to law enforcement calls across 302,000 acres of installation property with multiple military and civilian jurisdictions, supporting 55 tenant and partner organizations

3. VISITOR CONTROL CENTER (VCC)

- Processes and distributes short-term passes, visitor access lists and entry authorization lists for 55 tenant units

4. PASS AND REGISTRATION

- Answers customer service inquires on pass and registration procedures and operations in-person and over the phone
- Provides long-term visitor passes
- Restricted Area Badge issuing authority

5. REPORTS AND ANALYSES

- Unit administrative liaison between commanders and first sergeants for all base units and contractor agencies
- Conducts local records checks for law enforcement and official government agencies

6. ANTITERRORISM

- Provides local training and guidance on antiterrorism program management
- Coordinates with special events points of contact
- Conducts installation risk management

7. TACTICAL AIR BASE AIR DEFENSE

- Provides counter-unmanned aircraft system (UAS) detection. Provides intercept of operators. Liaises with the Office of Special Investigations and local law enforcement to cite offenders. Controls kinetic counter-UAS capabilities

412TH MSG

Communications Squadron (412 CS)

MISSION: Defend, develop, and deliver agile cyber capabilities to empower test and evaluation excellence

VISION: Elite professionals breaking cyber barriers to advance the future of warfighting

1. CYBER SERVICES

- Computer maintenance and help desk support
- Defensive cyber operations
- Commercial and DSN telephone services
- Communications security
- Frequency and spectrum management
- Land mobile radio service
- Network infrastructure – copper, fiber and antenna

2. MISSION PARTNER SUPPORT

- FOIA and privacy act support
- Wing cybersecurity office and system accreditation
- Capability and resource estimates
- IT change and configuration management
- Secure internet protocol router café

3. TECHNOLOGY SOLUTION DESIGN

- Infrastructure planning and installation
- IT project management
- Software development and testing
- Enterprise data center and data system hosting

INNOVATION PROJECT

The squadron procured an NVIDIA Datacenter GPU accelerator enabling the creation of artificial intelligence models that automatically detect the actions of cyber adversaries much faster than humans can accomplish, saving thousands of labor hours for cyber defense analysts and protecting the test mission against emerging cyber threats.

412TH MSG

Logistics Readiness Squadron (412 LRS)

MISSION: Warfighters delivering global logistics support for The Center of the Aerospace Testing Universe

VISION: A professional, cohesive team ready to provide diverse on-target logistics support

1. BASE SUPPORT VEHICLES AND EQUIPMENT (BSV&E) MANAGEMENT, OPERATIONS, AND PROCUREMENT

- Provides efficient and economical transportation capabilities to support mission requirements.

2. PETROLEUM AND CRYOGENICS

- Provides specification aviation, ground, and alternative fuels to the installation and tenant organizations, including cryogenic products, to facilitate base operating support functions and aircraft sortie generations.

3. SUPPLY, STORAGE, AND DISTRIBUTION (NON-MUNITIONS)

- Implements actions associated with storage and shipment of materiel and products in all classes of supply except Class V and Class VIII, as defined in Joint Publication 4-09.

4. INSTALLATIONS MOVEMENT

- Plans, manages, and executes movement activities including movement of passengers, cargo, and personal property.

412TH MSG

Force Support Squadron (412 FSS)

MISSION: Develop, support and sustain a ready and resilient Team Edwards

VISION: Deliver unmatched customer support, competent guidance and continuous innovation to enable and strengthen our total force community

1. MANPOWER, MILITARY PERSONNEL AND CIVILIAN PERSONNEL

- Common Access Card and Defense Enrollment Eligibility Reporting System (DEERS) customer support
- Appropriated and nonappropriated fund staffing and recruiting
- Manpower standards and determination
- Continuous Process Improvement (CPI) program
- Unit manpower documents (UMDs)
- Organization change requests (OCRs)
- Employee management relations
- Military evaluations and civilian appraisals
- Deployment out-processing and in-processing personnel accountability

2. FORCE DEVELOPMENT

- Military and civilian college and career counseling
- First-term enlisted, officer and civilian orientation courses
- Airman Leadership School
- Enlisted development advisory services
- Base library

3. READINESS, BASE HONOR GUARD AND MORTUARY AFFAIRS

- Unit personnel deployment
- Emergency response planning
- Reception of forces
- Search and recovery operations
- Disposition, preparation and casketing of remains
- Next of kin entitlements briefing
- Transportation of remains
- Dignified arrivals
- Funeral travel
- Military funeral honors

4. FSS MARKETING & RESOURCE MANAGEMENT

- Morale, welfare and recreation commercial sponsorship and advertising
- Private organization support
- Installation non-appropriated fund management
- Non-appropriated fund information technology support

5. CHILD & YOUTH SERVICES

- Child Development Center and School Age Annex
- Youth programs (open recreation, teen programming, youth sports and instructional activities)
- Family childcare and school liaison service

6. SUSTAINMENT & COMMUNITY SERVICES

- Dining facility and fitness center complex
- Lodging facilities
- Official mail center
- Aero Club and outdoor recreation facilities
- Consolidated club complex
- Bowling and family entertainment center
- Arts and crafts, auto hobby shop and car wash
- Community activity center and information, tickets and travel
- Installation UNITE program
- Base-wide event management

412TH MSG

The School Liaison Program (SLP)

MISSION: To coordinate education support services to maximize opportunities for academic success for transitioning military and civilian children/youth.

The SLP is the central point of contact for school related matters working directly with Edwards base leadership, families, school districts, and local communities. The SLP fosters and promotes quality education for military and civilian children by providing resource and referral services to family support agencies on Edwards AFB and in the local community.

1. DIRECT IMPACT ON MISSION AND FAMILY AND FAMILY READINESS

- Directly affects recruiting, readiness, retention and the future of the force through outreach, advocacy, and partnership initiatives that generate real-time solutions for military-connected students.

2. INSTALLATION COMMANDER-DRIVEN PROGRAM

- Mandated O-6 or above, direct, regular, horizontal and vertical communication and engagement

3. EDUCATION-COMMUNITY PARTNERSHIPS

- Cultivating and sustaining educational and community partnerships are the cornerstone of the program

4. PARTNERSHIP INITIATIVES

- **STARBASE Edwards:** Partnership with STARBASE to host installation welcome events and summer camp opportunities for families
- **STEM:** Partnership to provide installation tours for teachers and students from the surrounding communities
- **Job Shadow Program:** Collaboration with 412 MXG to support airframe and powerplant career and Aircraft Maintenance Technology Training Program at PSMI High School
- **Student Transition Programs:** Support student transition and resiliency programs like Anchored4Life at local schools
- **Parent Workshops:** Child and Youth Programs and Exceptional Family Member Program (EFMP) to provide workshops topics including kindergarten readiness, supporting children with special needs, and relocating with school-aged children
- **Partnership with EFMP:** To support special education navigation through resource accessibility, school district navigation, state law, and educational compliance requirements

5. COLLEGE, CAREER AND MILITARY READINESS

- Connection to recruiters, Junior Reserve Officers' Training Corps (JROTC), and service academies
- Job shadow and internship opportunities
- Career days, college fairs, community engagements, and installation tours

6. LINES OF EFFORT FOR LEGISLATION

- Funding connected to Military Student Identifier
- Waiving requirement for California residency for military-members to join local school boards

7. TRANSITION AND DEPLOYMENT SUPPORT

- Military Interstate Compact Compliance
- Educator Professional Development and support events
- Provides Permanent Change of Station, Temporary Duty Location, and Remote and Isolated resources and information

8. GRANTS AND SCHOLARSHIPS

- Provides and promotes student scholarship and grant opportunities
- Supports school district grants including Federal Impact Aid and the National Math and Science Initiative ■


TEST

412TH TEST WING

Medical Group

(412 MDG)

MISSION: Power Readiness and Innovation through Healthcare Excellence

VISION: Unified Medics Fueling a Ready, Fit Force to Fly, Fight and Win… Anytime, anywhere through Modernized Healthcare

The 412th Medical Group is comprised of two hundred medics across two squadrons. In addition to traditional clinical medical services for active duty servicemembers, dependents and retirees, the 412th MDG supports the test mission through a range of readiness and operational medical functions.

412TH OPERATIONAL MEDICAL READINESS SQUADRON

412 OMRS provides healthcare specialists in risk management for the full spectrum of unique operational test and evaluation requirements, hazards, risks, controls and interventions.

FLIGHT AND OPERATIONAL MEDICINE: 412 OMRS delivers aerospace medicine services supporting a wide range of populations: both military members and Department of Defense civilians in flying classes I, II and III; operational support flyers and non-flight populations that fall under the special operational duty categories such as air traffic control, special warfare airmen, explosive ordnance disposal, missile operators, personnel reliability assurance program, fire fighters and other operational personnel as required.

The squadron provides urgent response in support of all test and evaluation flights within the R-2508 airspace complex with professionally trained aerospace medicine technicians and flight surgeons who have transport capabilities to Level 1 and 2 trauma centers and hyperbaric treatment options. During emergency responses, the squadron offers health risk assessments and protective measures for responders and the surrounding community.

The squadron also supports mission operations and flight test for NASA spaceflight, Air Force Research Laboratory and all other operations using Edwards AFB facilities and airspace.

OCCUPATIONAL AND ENVIRONMENTAL HEALTH: The squadron offers additional support to monitor the industrial and environmental factors unique tothe test and flight environments. It also provides surveillance for base-wide safety and exposure programs. The squadron:

- Evaluates air, water and soil impacted by biological, chemical or radiological agents.
- Evaluates the installation drinking water to confirm it meets Environmental Protection Agency standards.
- Measures and manages surveillance programs for ionizing radiation, electromagnetic fields and noise exposure in all Edwards testing facilities.
- Provides oversight for built environments, including industrial and administrative workplaces, facilities intended for community use and housing.

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- Inspects and provides oversight to ensure safe water and sanitation facilities.
- Conducts public health food safety inspections for all installation food service venues.

412TH HEALTHCARE OPERATIONS SQUADRON

412 HCOS includes traditional primary care and ancillary services for routine and preventative beneficiary healthcare.

ROUTINE AND PREVENTATIVE PRIMARY CARE: The 412th HCOS provides:

- Full spectrum medical care for the 233 NATO partners enrolled at the test pilot school, including pharmacy, laboratory, radiology and immunization services.
- Routine and pre-deployment immunizations and supports multiple flu and deployment readiness lines in various locations across the installation.
- Plant 42 support via the ScriptCenter® pharmacy automated kiosk, which provides local prescription pick-up for beneficiaries in the Palmdale area.
- On-call laboratory services for urinalysis and drug testing for in-flight emergencies and for vehicle accidents when illicit substances may be suspected.

PARAMEDIC AMBULANCE SERVICES: Squadron ambulances are staged at three strategic locations – the main clinic, Bldg. 5525; the flight medicine annex, Bldg. 3925; and Air Force Research Laboratory, Bldg. 8255. Each has the capability for advanced life support and provides care for all members of the Edwards community, regardless of employment or beneficiary status.

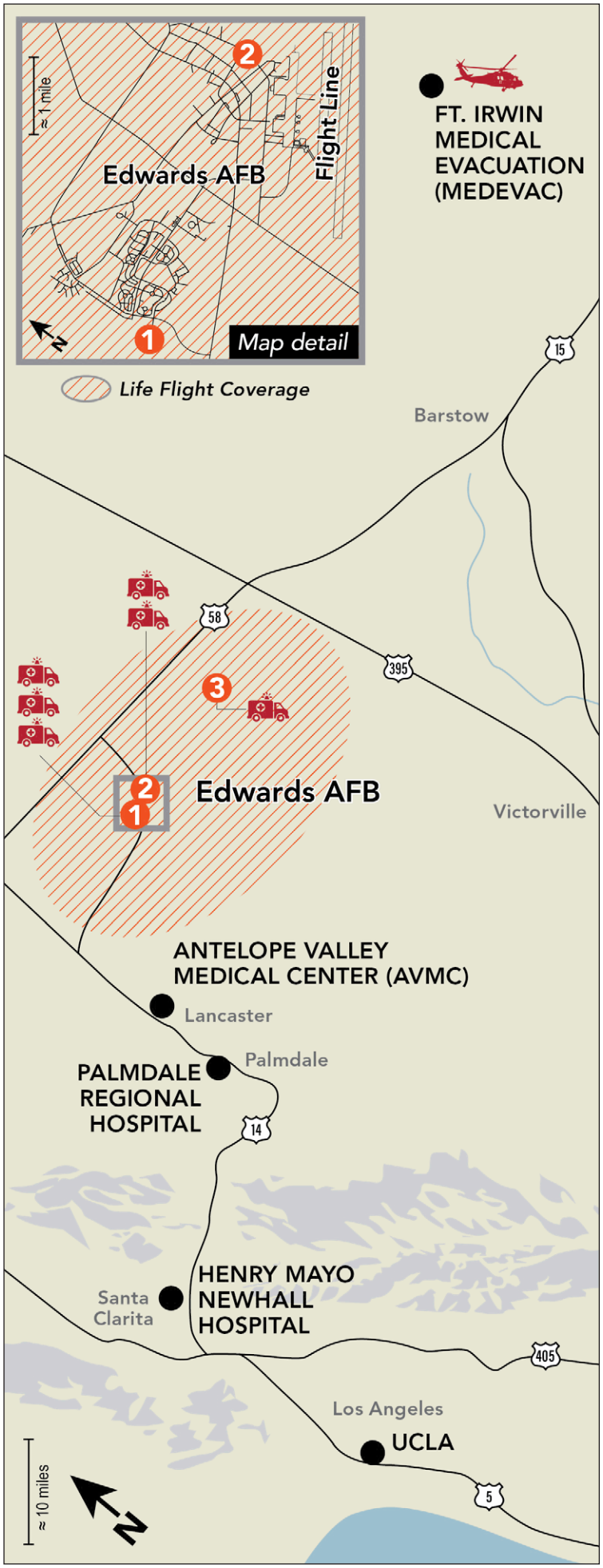
Additional medical information:

- In-flight emergency response: The ALS EMS crews respond to after-hours in-flight emergencies in conjunction with fire and emergency services. During duty hours flight medicine has primary basic life support response for IFEs.
- Acute care: Edwards AFB is not resourced to provide emergency services, but the medical treatment facility will dispatch an ALS ambulance for interfacility transportation as required by Kern County regulations and protocols.
- Air transport medical services: medevac services are coordinated through the emergency communication center and emergency medical dispatch, an off-base support network.

OFF-INSTALLATION MEDICAL SERVICES: Memorandums of agreement are in place with Palmdale

Regional Hospital, Antelope Valley Medical Center and Antelope Ambulance that establish procedures for joint emergency planning and emergency operations as needed. Ft. Irwin medevac may also be used if local resources are unavailable. For more acute injuries or conditions, the local resources are:

- The nearest Level I trauma center: there are multiple Level I trauma centers in the Los Angeles area, which is about 90 miles and 100-plus minutes away.
- The nearest facility supporting decompression events: UCLA, which is 98 miles and 100-plus minutes away.
- The nearest Level II trauma center – for emergencies like strokes, cardiac events, burns or pediatric trauma: AV Medical Center, which is 28 miles and about 35 minutes away. ■



412TH TEST WING

Public Affairs

(412 TW/PA)

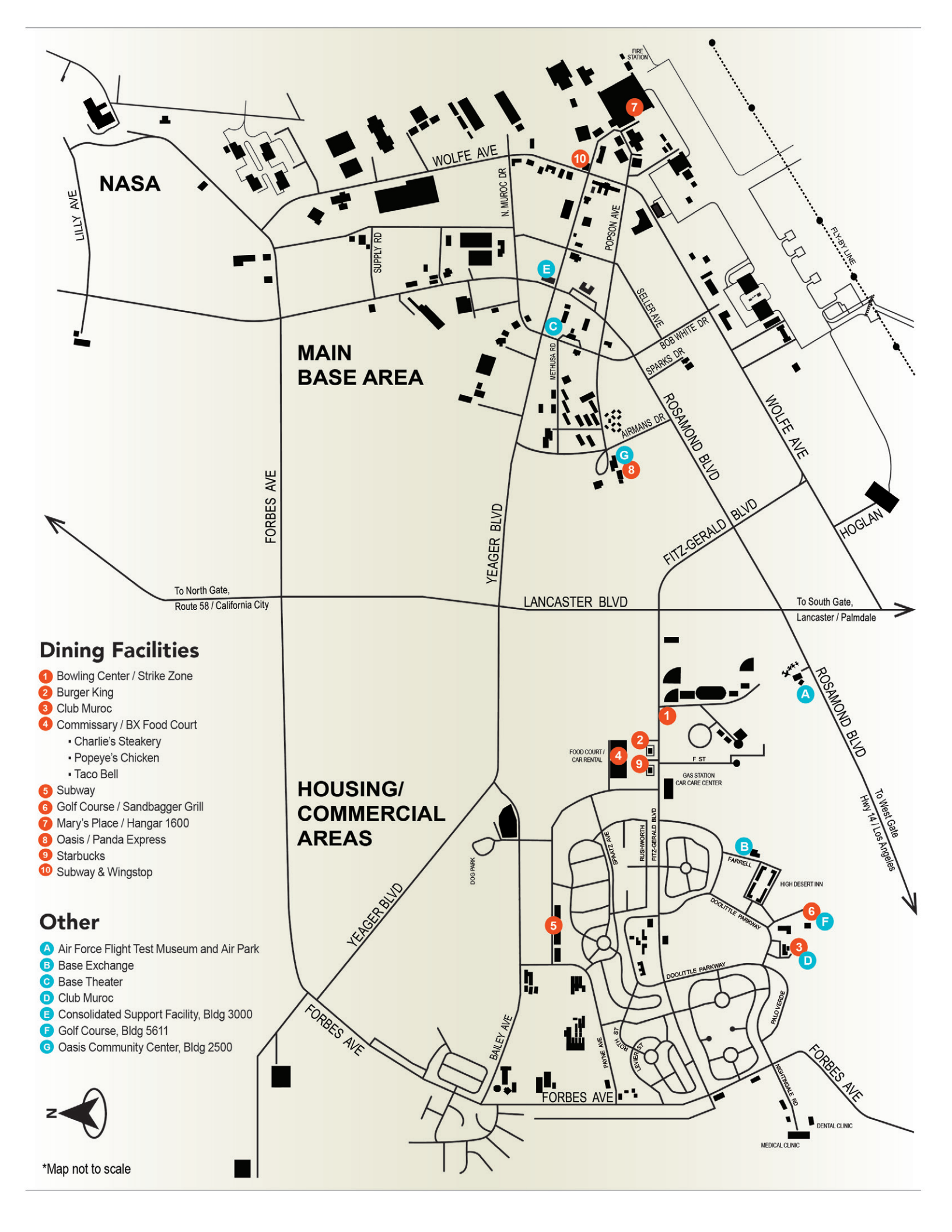
MISSION: We support the commander by engaging internal and public audiences with credible, timely and accurate information and imagery to strengthen support for Team Edwards, leveraging information and imagery – while enhancing operational security – to achieve global operational effects, and producing multimedia products to advance mission objectives.

PUBLIC AFFAIRS:

The 412th Test Wing has a robust and experienced Public Affairs team to meet the special requirements of diverse testing entities. Capabilities include "boots on the ground" photography and video support for system program offices, ensuring both secure and adequate coverage. Public Affairs is also the sole authority for assigning photo authorization letters for program offices that wish to have their own cameras on base. The Public Affairs creative design team boasts world-class graphic design and printing capabilities. All R-2508 airspace maps are printed in-house at the Public Affairs graphics shop.

AERIAL PHOTOGRAPHY:

Public Affairs also manages the base audiovisual contract, which includes the Air Force's only civilian aerial photography team devoted to flight test documentation. PCI Productions provides in-flight photo and video services for the test enterprise. The team captures high-resolution still and video imagery for safety and data analysis by test engineers and teams. They also collect high-speed video that captures events at thousands of frames-per-second – events that are otherwise too fast for the human eye. This includes weapon separations, parachute or airdrop sequences and other aircraft functions. This data has a direct impact on each mission and helps tell a complete and accurate story of wing and Air Force Test Center programs, saving the Department of Defense time and money through vital test documentation. The aerial photography team may be booked for most flight test efforts. ■



Dining Facilities

1. Bowling Center / Strike Zone
2. Burger King
3. Club Muroc
4. Commissary / BX Food Court
   - Charlie's Steakery
   - Popeye's Chicken
   - Taco Bell
5. Subway
6. Golf Course / Sandbagger Grill
7. Mary's Place / Hangar 1600
8. Oasis / Panda Express
9. Starbucks
10. Subway & Wingstop

Other

- A Air Force Flight Test Museum and Air Park
- B Base Exchange
- C Base Theater
- D Club Muroc
- E Consolidated Support Facility, Bldg 3000
- F Golf Course, Bldg 5611
- G Oasis Community Center, Bldg 2500

U.S. AIR FORCE™

For assistance or additional information about testing at Edwards,
scan the QR code, or email: 412TW.IPOC@us.af.mil

www.edwards.af.mil

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