



# WHITE SANDS

MISSILE RANGE  
NEW MEXICO

RANGE  
CUSTOMER  
HANDBOOK

# 2018

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# WHITE SANDS MISSILE RANGE

## Range Customer Handbook

# 2018



Cover: (main) Organ Mountains from White Sands Missile Range facing west, 2017 (Photo by G. Palombit); (bottom, left to right): KTMs during inspection (Photo by G. Palombit); Launch of ATACMS at WSMR, 2014 (Photo by WSMR Optics); OF-4 final flight, HAFB, 2016 (Photo by G. Palombit)

Inside Cover: (front) Felix and Paul Studios filmed the NASA Mars Rover in 2017 at White Sands Missile Range using a new 360-degree virtual reality camera. The white sand dunes were used to create a "Mars" like environment. (Photo by Felix and Paul Studios)



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# WELCOME TO WHITE SANDS MISSILE RANGE

## ***Birthplace of America's Missile & Space Activity***

**T**his handbook has been developed to help you recognize White Sands Missile Range capabilities, organizations, and processes for testing and training. You will find sponsor organizations, what planning documents are required, an overview of Range capabilities, useful administrative information on visiting the Range, and what to do once here. A companion document, "Appendixes of Range Customer Handbook," offers comprehensive policy guidelines, processes, and technical specifications associated with this handbook.

Your best source of information besides this handbook is your assigned Proposal Manager, Test Officer, or Range Sponsor organization. Early coordination is recommended for your program's seamless testing or training at WSMR.

### **Contact Information**

White Sands Missile Range  
Business Development Office  
[usarmy.wsmr.attec.mbx.team-white-sands@mail.mil](mailto:usarmy.wsmr.attec.mbx.team-white-sands@mail.mil)  
[www.attec.army.mil](http://www.attec.army.mil) / 1-866-532-9767

Commander  
US Army White Sands Missile Range  
ATTN: TEDT-WS-G5/9  
White Sands Missile Range, NM 88002

### **Program Portfolio**

White Sands Missile Range, once known as White Sands Proving Ground, has been in the test and evaluation (T&E) business since 1945. We have supported numerous programs to bolster our Nation's defense including the following key systems:

- Advanced Medium Range Air-to-Air Missile
- Aegis Readiness Assessment Vehicle
- Air Ground Integrated Layer Exploration Fires
- Army Tactical Missile System
- Bradley Fighting Vehicle
- Ballistic Missile Defense System
- Counter-Rocket, Artillery & Mortar
- Crew Exploration Vehicle
- Defense Threat Reduction Agency Programs-Deeply Buried Hardened Targets
- Expeditionary Fighting Vehicle
- Extended Range Gun Munitions
- Hawk Surface-to-Air High Mobility Artillery Rocket System
- Infantry Brigade Combat Team
- Japan Chu-SAM
- Japan Patriot
- Joint Air-to-Ground/Air-to-Surface Standoff Missile

- Joint Direct Attack Munitions
- Joint Land Attack Missile
- Elevated Net Sensor
- Joint Improvised Explosive Device
- Joint Tactical Radio
- Lance
- M1A1 Abrams Integrated Management Tank
- Multiple Launch Rocket System; Extended Release MLRS; Guided MLRS
- Navy Gun
- Non-Line-of-Sight Launch System
- Patriot and Patriot Advanced Capability 3 Missile
- Renewable Energy
- Roving Sands Training Exercise
- Supersonic Sea Skimming Target
- Small Diameter Bomb
- Standard Missile
- Stinger
- Stryker
- Terminal High Altitude Area Defense System
- Unmanned Aerial Systems (Aerostar; Extended Range Multi-Purpose Global Hawk; Hunter; Predator; Raven; Shadow; Sonobuoy Precision Air Delivery)
- Unmanned Autonomous Systems Test
- Unmanned Ground Vehicles (High Mobility Multipurpose Wheeled Vehicle; Robotic Convoy; Small Unmanned Ground Vehicle)

## Overview of the Range

White Sands Missile Range is part of the Army Test and Evaluation Command (ATEC). WSMR is designated as an activity within the DoD Major Range and Test Facility Base (MRTFB).

The Range possesses extensive capabilities and infra-

structure utilized by the Army, Navy, Air Force, NASA and other government agencies as well as universities, private industry and foreign militaries. As a tri-service facility, WSMR is responsive to command guidance for all DoD activities. WSMR supports the Warfighter with data collection and analysis, instrumentation development, modeling and simulation, research, assessment, and technical services.

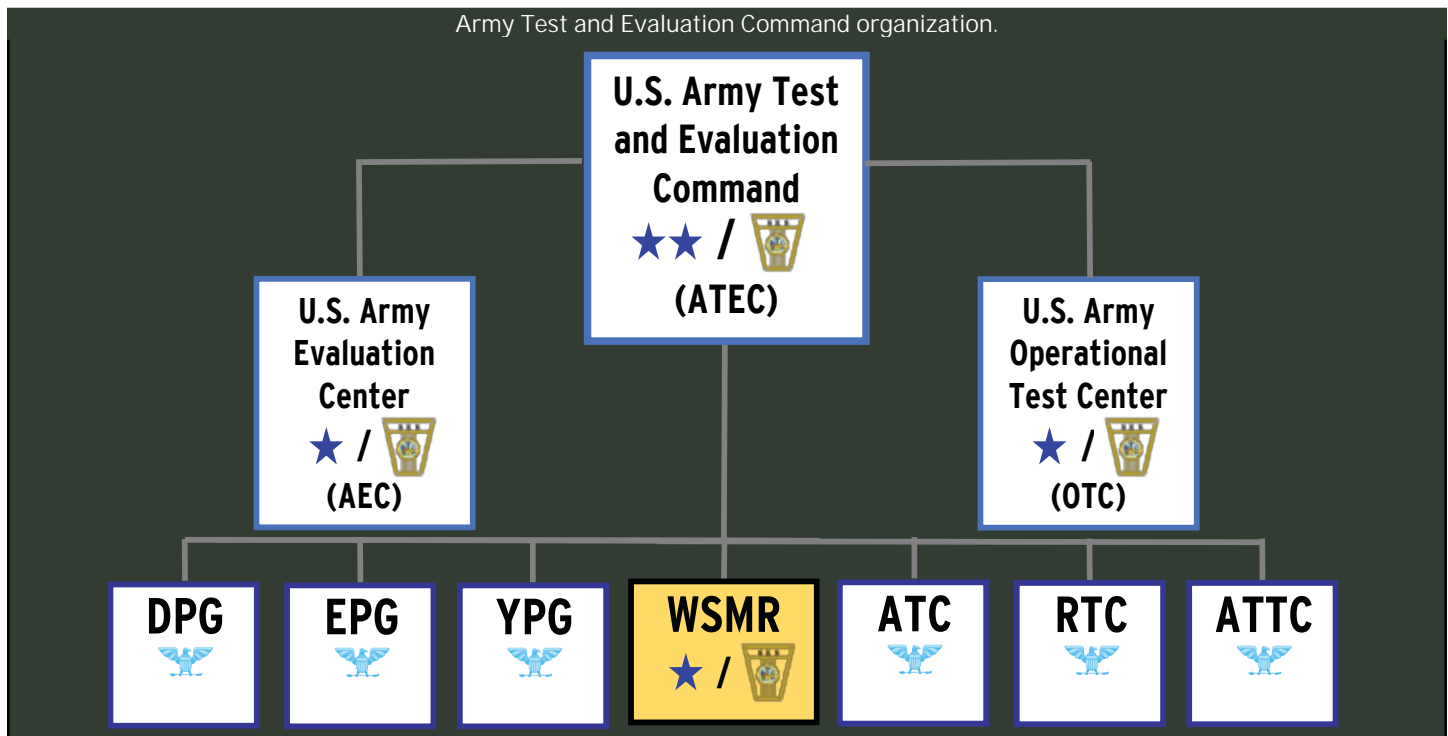
The large land mass, controlled airspace, and skilled personnel support testing of conventional munitions, unmanned systems, distributed system, countermeasures, space systems and sensors, directed energy, high and low altitude missile systems, explosives testing, ground and aerial targets flights, and low observable precision strikes to ensure military readiness and training events.

The unique tri-service installation facility is dedicated to the Test and Evaluation (T&E), research, and the assessment of military weapon systems and commercial products through testing and training. As the largest open-air land test range in the Department of Defense (DoD), we are home to capabilities such as state-of-the-art environmental testing chambers, an extensive data collection instrumentation suite, advanced data processing, and modeling & simulation (M&S) facilities. This places WSMR in a unique position to address present and future challenges facing the Warfighter.

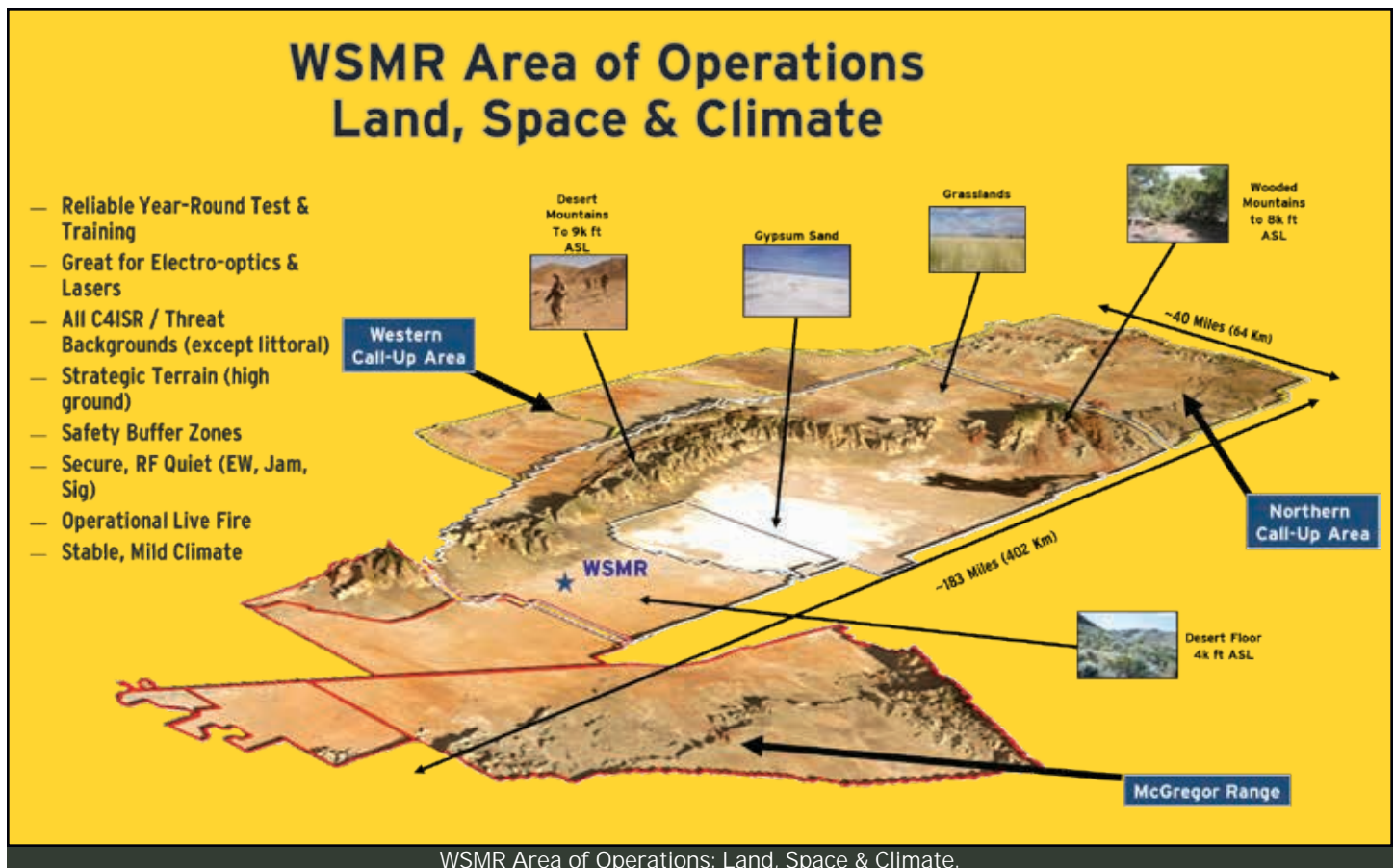
## Mission Statement

White Sands Missile Range, DoD's largest, fully-instrumented, open-air range, provides America's Armed Forces, allies, partners, and defense technology innovators with the world's premiere research, development, test, evaluation (RDT&E), experimentation, and training facilities to ensure our nation's defense readiness.

Army Test and Evaluation Command organization.



# WELCOME TO WSMR 2018 RCH



## Land, Airspace, & Geographical Infrastructure

WSMR is the largest overland testing facility in the Department of Defense, stretching across the northern Chihuahuan Desert. At over 2.2 million acres, the terrain consists of mountains, grasslands, shrublands, alkali flats, gypsum dunes and lava flows. The Range located in south-central New Mexico at an altitude of approximately 4,000 ft. Mean Sea Level (MSL). The landscape is varied, complex, and the diverse topography supports thousands of animals and plants. Mountains rising 8,000 feet are speckled with juniper and piñon. The valley floors are colored by geological features, grasslands, shrublands, and some surprising aquatic elements. Mountains of 5,000 to 12,000 ft. parallel WSMR on the east and the west and cross the range in a north-easterly direction about 75 miles north of the main launch complexes.

Additional WSMR launch areas are located in north-west New Mexico (Fort Wingate, just east of Gallup), southeast Utah (Green River) and in Idaho (Shoofly). These areas provide an overland flight corridor of 500 to 1,000 miles. Additional lead-time is required to bring these sites up to a fully operational status.

## Climatic Annual Mean Values

- Maximum/mean/minimum temps: 75/63/50°F
- Relative humidity: 39 percent
- Precipitation: 11.32 inches

- Snowfall: 7.8 inches
- Wind velocity: 7 mph with gusts to 35 mph and a record gust of 117 mph.

## Testing Environment Highlights:

- Climate is semi-arid with a visibility that is usually unlimited. Visibility greater than 6 miles, 311 days per year.
- Fewest weather delays anywhere: exceptional for optical data collection; the Tularosa Basin provides natural security and nearly zero encroachment.
- Mountains provide protection and security for directed energy (laser, HPM) testing ideal for conducting GPS and open air RF jamming in a live fire scenario and more.
- Land Space: 100 miles x 40 miles (160 km x 64 km) expandable to 180 miles X 60 miles (11,500 miles<sup>2</sup>) including neighboring Fort Bliss and call-up areas.
- Diverse terrain ranges from high desert valley at 4,000' MSL to desert and wooded mountains at almost 9,000' MSL.
- Airspace: 7,500 NM<sup>2</sup> (10,020 miles<sup>2</sup>) ground to space expandable to 8,410 NM<sup>2</sup> (11,130 miles<sup>2</sup>) restricted.
- WSMR Air Traffic Control center manages and controls the airspace.

The highly diverse, natural environment with all terrain types apart from littoral can be augmented with an extensive array of threat-representative ground and airborne targets as well as infrastructure targets, cave networks,



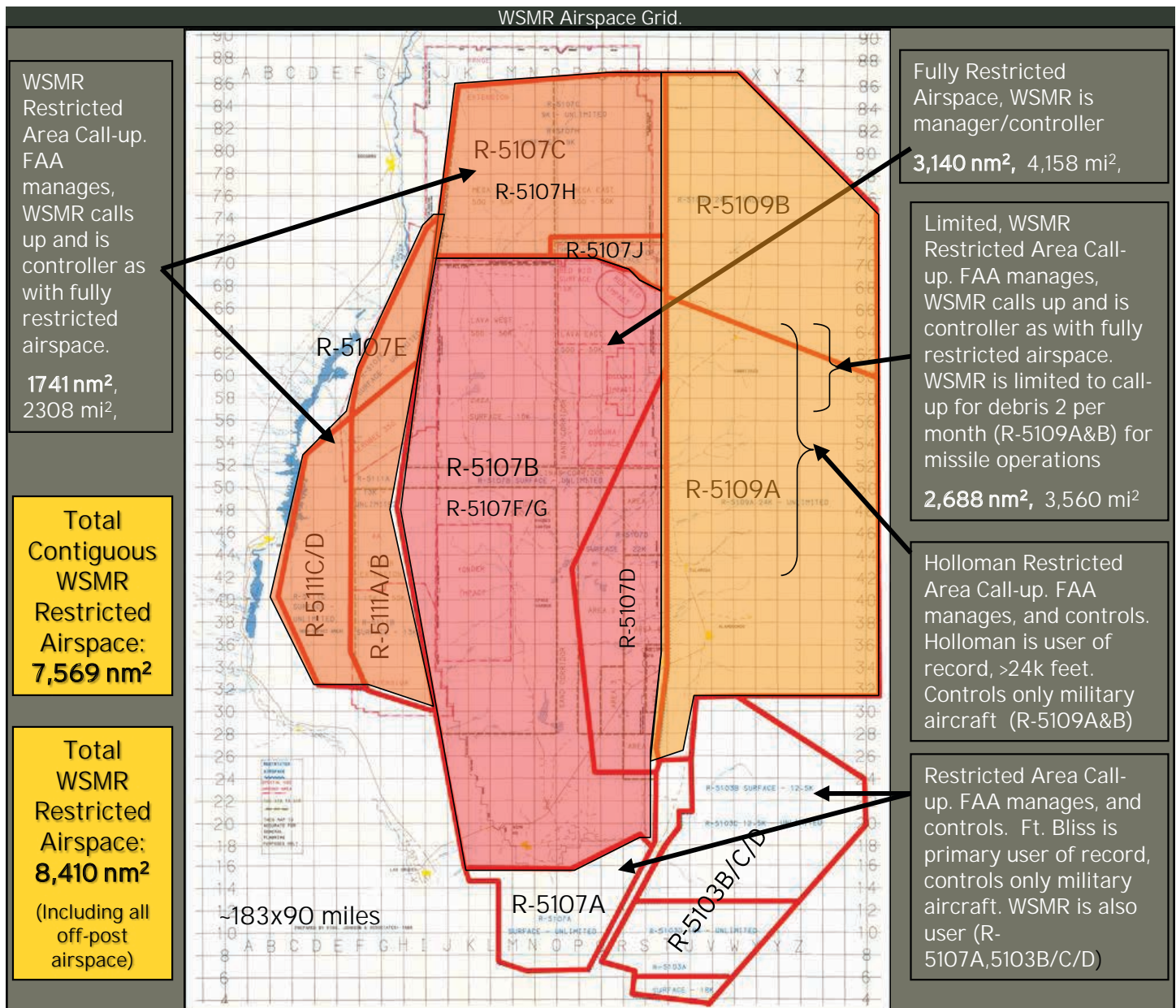
deeply buried structures, and employment of realistic electro-magnetic and ECM environments. Ground targets run the gamut of depreciated vehicle hulks (no cost) to fully functional remote controlled threat and surrogate armored vehicle formations. Aerial targets include subscale and full scale drone aircraft, and other Unmanned Aerial Systems (UAS) that can be flown in formation to assess electronic warfare, countermeasures and measurement systems.

WSMR is populated with major test facilities and laboratories, along with launch and impact sites. WSMR features over 3,000 instrumentation sites, extensive instrumentation and a data processing facility for real time and deferred test data processing. These capabilities are augmented by several resident organizations and by WSMR-controlled restricted airspace over the Range.

The Range controls all its electromagnetic radiation,

conducts research and development involving Range instrumentation, and operates nuclear, high energy laser, and aerial cable test facilities.

Other capabilities include providing timing signals, target support, telemetry, flight safety, hazardous explosive tests, calibration and standards, photography, trajectory, attitude and event measurements, communications throughout the Range, recovery of components, report preparation and data evaluation. Additional capabilities include storage of ordnance and propellants and providing environments for controlled, simulated or static testing.



# WELCOME TO WSMR 2018 RCH

## Range Organizational Structure

WSMR is collectively known as Team White Sands and is comprised of two main areas, the Garrison and the Test Center (WSTC). The WSMR Garrison manages installation resources to promote wellbeing, improve infrastructure, and preserve the environment. WSTC is responsible for overall planning and execution of test and evaluation missions.

The Materiel Test Directorate (MT) is the testing arm of WSMR. It provides evaluation of Army systems, materiel and equipment through field and laboratory testing.

The Range Operations Directorate (RO) operates and maintains the WSMR real-time and post-test computer systems. In addition, it provides state-of-the-art, real-time processing and display of both range instrumentation and telemetry data for range customers, as well as post-test analysis. This includes processing of Radar, Telemetry, Global Positioning System (GPS), Optical, and Drone Formation Control System (DFCS) data. It provides pointing data back to instrumentation and customer vans to improve instrumentation tracking. It provides capability for data filtering to smooth plots for display purposes, generation of Instantaneous Impact Predictions (IIPs) for Flight Safety decisions, as well as graphic displays of present position plots and numerical data on various parameters. In

addition to mission execution, this is used for pre-mission setups for flight safety and Range customers, as well as for post-mission playbacks of logged mission data.

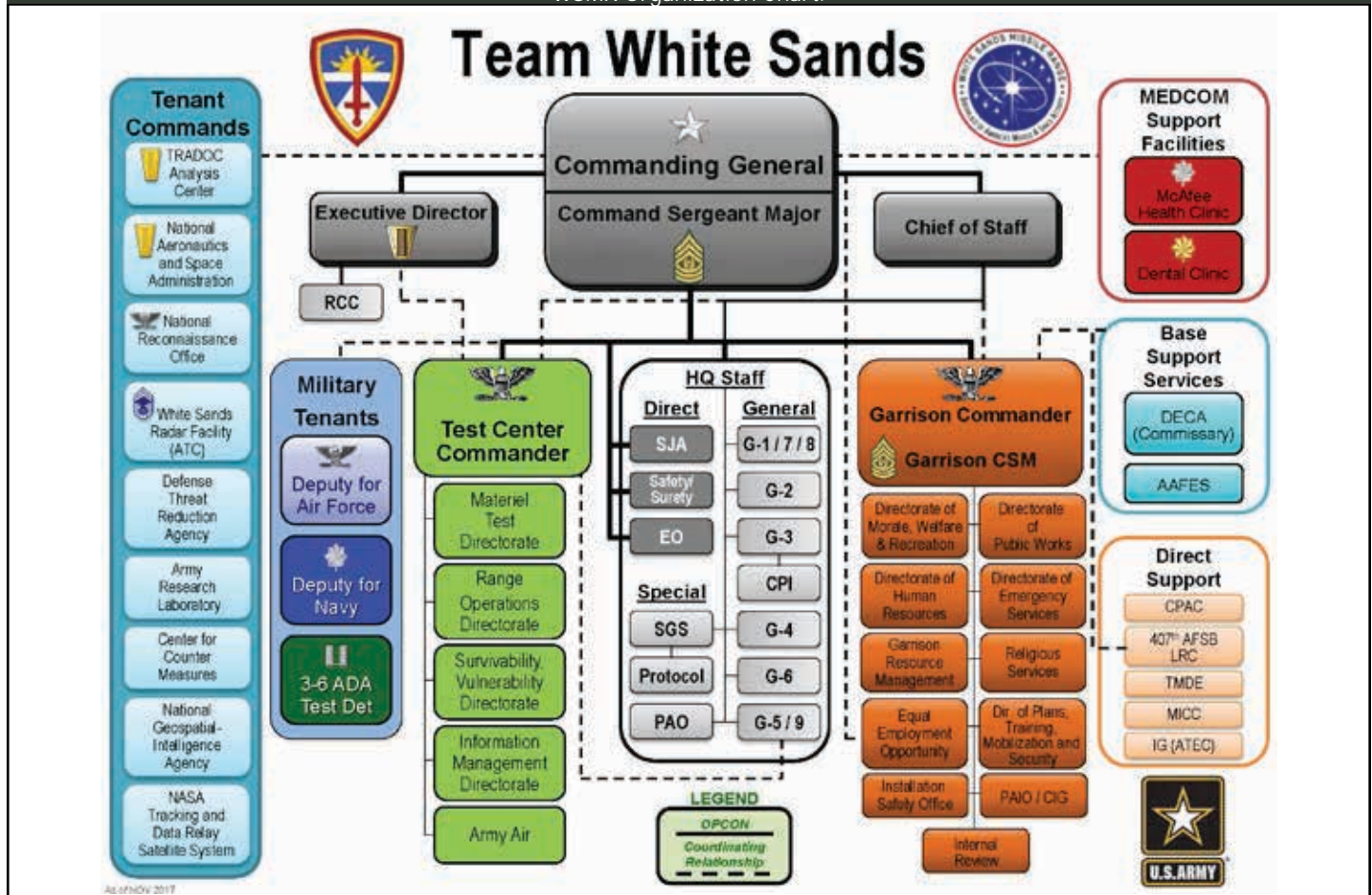
The Information Management Directorate's mission is to be the provider of choice for the full spectrum of information and communications technology and information management services, including distributed networks, data management, frequency spectrum management, and communications security, in support of the WSMR workforce, WSMR test mission customers, and the Office of the Army's Chief Information Officer (CIO)/G6 mission. In summary, the organization securely delivers data and information to those that need it.

The Survivability, Vulnerability & Assessment Directorate (SV) is a recognized center of expertise for nuclear effects test and evaluation, temperature, shock, wind, rain, and various electromagnetic environments, and operates the High Energy Laser Test Facility (HELSTF).

The Deputy for the Navy has many unique test facilities supporting weapon testing, missile assembly and testing, and research rocket build-up and launch operations. They are the liaison with WSTC and sponsor for Navy test programs.

The Deputy for the Air Force provides test sponsorship for programs testing on WSMR. They are the liaison for Air Force programs and interface with WSTC.

WSMR Organization Chart.







# INTERFACING WITH THE RANGE



## Doing Business with the Range

**W**hite Sands is interested in doing business with you and assisting with your testing and training requirements. The WSMR Business Development Office (BDO) is your initial point-of-contact (POC) when inquiring about details of test program planning and execution.

The WSMR Business Development Office stands prepared to evaluate your inquiry and provide a support proposal and corresponding cost estimate for your anticipated test program. Business development specialists can be contacted at the following:

WSMR Business Development Office  
usarmy.wsmr.attec.mbx.team-white-sands@mail.mil  
[www.attec.army.mil](http://www.attec.army.mil)  
866-532-9767

## Testing Process

The general process a test program uses to interface with WSMR includes the following major phases:

**PHASE I:** The test program originator works hand-in-hand with their initial WSMR contact – the WSMR BDO Proposal Manager.

The WSMR BDO Proposal Manager serves as the primary POC for supporting the test, from the initial support

inquiry through the point of funding. The Proposal Manager is also your “go-to” person for conceptual test support planning, test facility information, detailed map requirements, and addressing questions regarding airspace, capabilities, the test scheduling process, instrumentation and data options, contractual matters, and non-disclosure concerns. The WSMR BDO Proposal Manager will assist your test program in the following ways:

- Review your Request For a ROM, Request for Proposal (RFP), test plan, or an equivalent document prepared by your organization explaining your test concept and requirements.
- Provide assistance with identifying specific test support capabilities, expertise or facilities that may be of benefit to your test program.
- Identify options for locations and facilities to site your test program at WSMR.
- Provide information about WSMR test capabilities, policies and procedures.
- Develop a Team WSMR Support Proposal (including a cost and schedule estimate) based upon your requirements and in response to your RFQ, RFP, or test plan.
- Coordinate and provide guidance regarding processes to transfer funding, enter into commercial contracts, Proprietary Information Agreements (PIAs) or Non-Disclosure Agreements (NDAs).
- Facilitate teaming with other Team WSMR

# INTERFACING WITH THE RANGE

## 2018 RCH

organizations, partner organizations, tenant organizations, and/or range elements to provide support to your test program IAW the WSMR Support Proposal developed for your program.

- Develop rough order of magnitude (ROM) cost estimates, as required, for your organization's early programmatic planning and forecasting purposes.
- Host site visits to WSMR for your test team.
- Establish the appropriate local WSMR sponsor and WSMR Test Officer for your program.

**PHASE II:** The WSMR BDO Proposal Manager facilitates determination of the appropriate local WSMR test sponsoring organization for your test program.

The local WSMR sponsoring organization is the WSMR organization (usually representing Army, Navy or Air Force) that will be responsible for supporting your test program from receipt of funding through test execution and post-test/reporting. In addition, your program's local WSMR sponsoring organization also assigns a WSMR Test Officer to your program.

The choice of the local WSMR test sponsoring organization for your program is a function of many factors, including: customer's preference, ultimate consumer for the system being tested, specific expertise in the type of testing being proposed, etc. For instance, if your test program is being funded by the Air Force, we would more than likely get the local Air Force Detachment here at WSMR to be your program's sponsoring organization.

The assigned WSMR Test Officer will take over from the WSMR BDO Proposal Manager as your program's primary POC at WSMR, following receipt of funding.

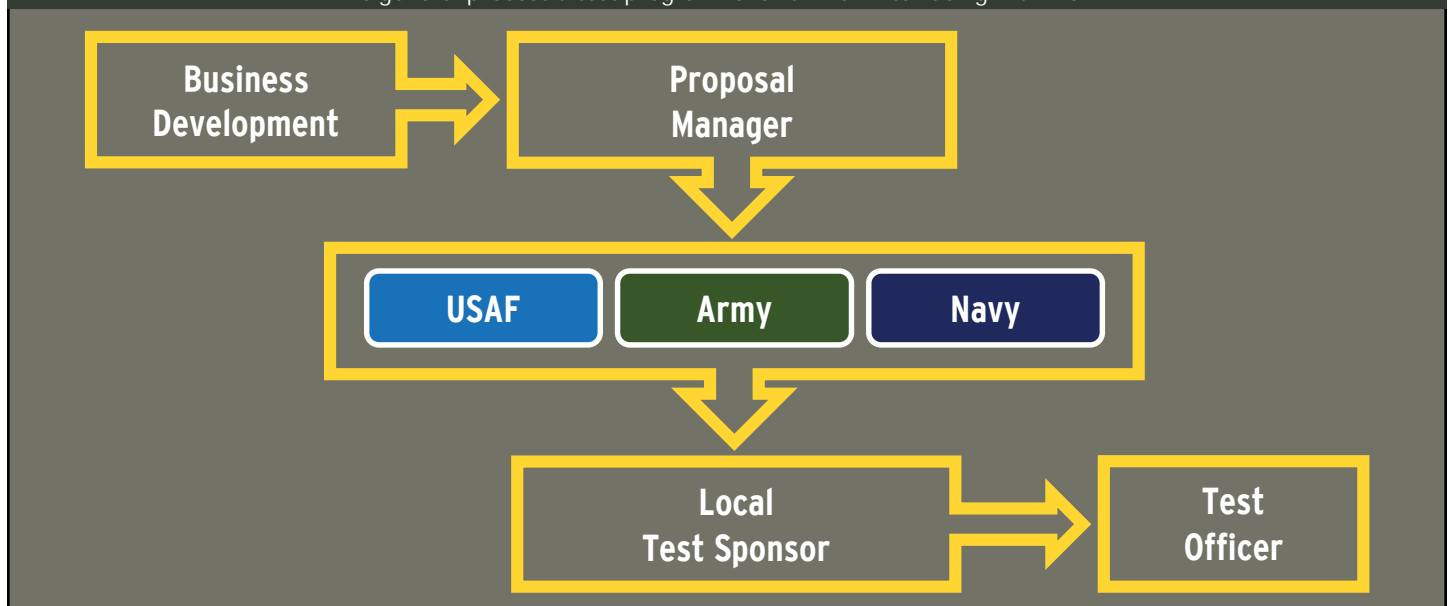
**PHASE III:** The test program originator works hand-in-hand with a WSMR Test Officer assigned to the test program from the local WSMR sponsoring organization.

The assigned WSMR Test Officer serves as your primary POC for supporting your test from the funding transfer

point throughout detailed test planning, test scheduling, test execution and post-test/reporting. The Test Officer is also your "go-to" person for test scheduling, financial tracking, and logistical, safety, environmental, and instrumentation planning and coordination, as well as test conduct and project closeout. In addition, the Test Officer will assist your test program in the following ways:

- Preparing WSMR Range Operations-required customer/test documentation. All test support requirements are submitted to WSMR Range Operations through the sponsor. The sponsor confirms all customer support requirements.
- Ensuring all required logistical support is coordinated and provided, as scheduled.
- Acting as your test program's representative to obtain WSMR services as required and in dealing with WSMR organizations on financial matters.
- Representing your test program during Range scheduling meetings.
- Coordination of applicable safety and environmental documentation, through approval.
- Emplacing job orders directly with supporting Team WSMR organizations to obtain non-scheduled support.
- Providing test event and financial tracking.
- Acting as your test program's advocate in getting an appropriate WSMR Range Program Priority level assigned to your test program.
- Overseeing all local processes/documentation required to get scheduled test events executed as planned.
- Test reporting (if required).
- Supporting visits of VIP test observers, media, etc., that you wish to attend your test events.
- Acting as your test manager's single WSMR POC for all events/support required to complete testing at WSMR.

The general process a test program follows when interfacing with WSMR.





### Sponsor Organizations



A soldier keeps a machine gun ready while providing security to soldiers emerging from a building constructed above a large tunnel complex at WSMR. (Photo by J. Hamilton)

#### Army

**ARMY MATERIEL TEST DIRECTORATE (MT)** sponsors Army programs, except for high energy laser programs and those programs conducted by Army Research Laboratory. MT also performs test and evaluation of various Army weapon systems.



Chief of Naval Operations (CNO) Adm. Jonathan Greenert visits Naval Surface Warfare Center (NSWC), Port Hueneme Division's White Sands Detachment. The facility, established in 1946, offers facilities and personnel supporting storage, assembly, integration, live-fire testing, and recovery of missile, gun, and rocket systems. (Photo by N. Laird)

#### Navy

**NAVAL SURFACE WARFARE CENTER PORT HUENEME DIVISION DETACHMENT WHITE SANDS (NSWCPHD-Def. WS)** sponsors Navy programs and research rocket launches for a variety of customers. White Sands Navy programs include directed energy weapons, guided munitions and lasers, surface and air launched live-fire weapon systems testing, missile and rocket assembly, Navy gun systems testing, radar development, upper air research rocket launch operations, and assembly and launch of ballistic missile target vehicles.

#### Air Force

**AIR FORCE 96TH TEST GROUP DETACHMENT 1 (DET 1, 96TH TG)** sponsors Air Force programs testing on WSMR. Det. 1 assists you, the customer, in preparing documentation for support services and coordination of WSMR logistic and support resources. Air Force programs include air-launched missiles, tactical fighter training, flight testing of advanced weapons and avionics systems, specialized ordnance testing and high altitude and tethered balloons.

The WSMR Sponsor Organization represents you, the customer. The Sponsor Organization has overall responsibility for coordinating test support activities necessary in planning and executing a test program and will assign a Test Officer (TO) to serve as the primary coordination POC for all test support activities. Test Officer responsibilities include:

- Providing information about WSMR capabilities, policies and procedures.
- Preparing customer documentation. All requirements are submitted to the Range through the sponsor. The sponsor confirms all customer support requirements.
- Ensuring that the services requested from contractors are authorized under the terms of their contracts.
- Acting on behalf of the customer to obtain WSMR services and in dealing with WSMR organizations on financial matters.
- Representing the customer on the Range scheduling requirements and providing updates of workload forecasts for each program.
- Placing job orders directly with various WSMR organizations to obtain non-scheduled support.
- Providing information about on-Range and safari capabilities.

The Sponsor Organization Test Officer will in turn coordinate all Range requirements.

USAF 22th Air Refueling Wing KC-135 Stratotanker pilots from McConnell Air Force Base, Kan., participate in a training mission during Red Flag 11-3 at Nellis Air Force Base, Nev. Airmen from Holoman AFB, N.M., also took part. (Photo by B. Clashman)





# MISSION PLANNING ON THE RANGE

## Planning and Documentation

**T**est planning and execution will be performed using a modified version of the Universal Documentation System (UDS). The UDS was designed by the Documentation Group of the Range Commanders Council (RCC).

The UDS provides a means for customers to submit their requirements to the test ranges and for the test ranges to respond to those requirements. The full UDS system is explained below for background knowledge and understanding.

The Test Officer/Proposal Manager assists customer in writing Program Introduction (PI) using the customer's Test and Evaluation Master Plan (TEMP). The Program Introduction (PI) is the initial planning document submitted by a WSMR customer. The PI should state in general terms the overall requirements for the program. The PI establishes the scope of the program and is used by WSMR to identify requirements for new support capabilities.

The TEMP details project requirements and program scope. The PI assists Range elements, instrumentation and support organizations, the Environmental Office, the Garrison Command and others on how they can support the requirements. WSMR then create the Statement of Capability (SC) with this information and present it to the customer. The SC is the WSMR response to the PI. Support

capabilities, support limitations, responsibilities, and other subjects are identified in this document, which serves as a baseline reference for subsequent WSMR support of the program.

The Sponsoring Organization's Test Officer then begins to work with the customer on specific detailed requirements. The Test Officer and customer create the Operations Requirement (OR) document together. The OR is a detailed statement of information and requirements for one or more specific operations. Please note, this document is only used by Range Operations and Information Management directorates. WSMR customer submits as many ORs as are required for the operations to be conducted during the lifetime of the program. The Range Engineer coordinates range instrumentation and support based on detailed information provided in the OR. Each WSMR support plan is the response of a WSMR support organization to the requirements submitted in an OR. A WSMR support plan shows the specific support to be provided for the operation(s) contained in an OR. Examples of these WSMR support organizations might include the following branches: Radar, Optics, Telemetry, Flight Safety, Range Control, or Data Sciences. The Test Officer is also available to assist the customer in preparation of an Operations Security (OPSEC) plan which is required prior to the start of testing.



Each program is assigned an ATEC Decision Support System (ADSS) program number which serves as the unique program identifier and remains with the program throughout its life cycle on the Range. These numbers are assigned by ATEC HQ. ORs will also be assigned a number within blocks categorized for Army, Air Force, Navy, or Other programs. The time required for processing the UDS requirements documents will vary, depending on the complexity of the program and the operations.

## Range Policy

There are several policies WSMR has in place to help the planning stages of your test program flow smoothly. Please find a synopsis of Environmental Considerations, Security, Safety, Scheduling, Airspace, Frequency Utilization and Management, and Resource Management information in the following pages.

### ENVIRONMENTAL CONSIDERATIONS POLICY:

Range Customers and Sponsors should incorporate environmental policy early in the test planning and decision making process to ensure environmental requirements are met and to avoid potential mission delays and increased costs.

### NEPA AND AR200-2:

The National Environmental Policy Act (NEPA) requires that any proposed Federal action considers environmental effects as part of the planning process. The NEPA process encourages public involvement in decision-making and collaboration between federal, state, and local agencies. In compliance with the NEPA mandate, Army Regulations (AR) 200-2 provides specific environmental and documentation requirements for Army actions. WSMR is subject to NEPA and all federal and state regulations involving air and water quality regulations, endangered species protection, waste and material handling and disposal, and historic preservation.

### NEPA PROCESS AT WSMR:

NEPA is used to help WSMR continue sustainable use of the Range for multiple missions and programs. Depending on the proposed action and the level of documentation needed, the process duration ranges from weeks (e.g., Record of Environmental Consideration), to months (e.g., Environmental Assessment), to years (e.g. Environmental Impact Statement).

### CUSTOMER SUPPORT FOR NEPA COMPLIANCE:

Range Customers should work directly with the Range Sponsor to initiate the NEPA process and complete required NEPA planning and documentation. Sponsors can assist customers to develop a detailed Description of Proposed Action (DOPA) to submit for NEPA review. WSMR provides assistance to customers and sponsors during the NEPA planning process. An interactive NEPA form is under development that will assist the Range Sponsor in preparation and auto-generation of the DOPA. This will reduce cost and time resources and auto-route the DOPA to environmental personnel for reviewing and approval. Currently, information on federal, state, DoD and Army Regulations, WSMR instructions and policies, Geographic Information Systems (GIS), and siting location assistance is available and can help to ensure that legal and other required reviews and approvals are met.

The **WSMR NEPA Process Guide** assists Range Sponsors and Customers with environmental planning by facilitating well-informed decisions and accurate and high-quality environmental analysis from the input of a coordinated interdisciplinary group of subject matter experts.

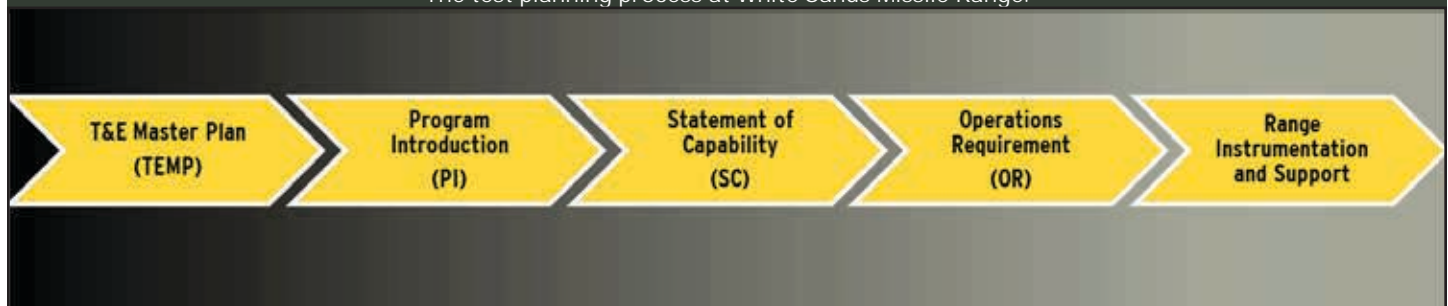
In addition, The Integrated Training (and Testing) Area Management Program (ITAM), AR350-19, provides siting support and is capable of supporting military projects with finding suitable, accessible, and sustainable locations to conduct project activities. The ITAM program bridges environmental considerations with operational requirements, attempting to find reasonable solutions while minimizing environmental degradation.

ITAM staff can assist Test Officers with identifying environmental considerations and integrating mission requirements into the environmental documentation process. ITAM assists with the development of mitigations, and on a case-by-case basis implementing mitigation measures.

### NEPA GUIDANCE:

Projects will comply with all applicable federal, state, county and municipal laws, ordinances and regulations where operations occur. Planning and implementation will require proper evaluation under the National Environmental Policy Act of 1969, 42 U.S.C. 4321 to 4370d (NEPA). Any changes to location or modification of the proposed action must be reviewed for environmental impacts. Use of existing environmental documentation is permissible for analysis. The proponent will furnish environmental analysis and documentation, to include any natural, cultural or

The test planning process at White Sands Missile Range.



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unexploded ordnance surveys, at their own expense using standard Army NEPA guidance (Army Environmental Command. 2007. NEPA Analysis Guidance Manual) to obtain approval for any changes or modifications. Relevant environmental references for establishment or proposed activities on WSMR includes, but is not limited to the following:

- National Environmental Policy Act of 1969, 42 U.S.C. 4321 to 4370d National Historic Preservation Act as amended 1966
- Endangered Species Act of 1973
- Migratory Bird Treaty Act of 1918, 16 U.S.C. 701 to 715
- Bald and Golden Eagle Protection Act of 1940, 16 U.S.C. 668-668d
- Memorandum of Understanding (MOU) between the U.S. Department of Defense and the U.S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds

Certain environmental conditions of use will be identified through the NEPA process. Initiation of the NEPA process begins with the WSMR Range Sponsor submitting a description of proposed action to the Test Center Environmental Office. The WSMR Range Sponsor should be familiar enough with the process to provide guidance or further contact with the Test Center Environmental Office as needed.

Examples of environmental conditions of use that may need to be addressed include the following:

### Compliance:

- If generators are to be used, then WSMR Garrison Environmental Compliance will be consulted to determine permitting requirements.
- The proponent will be responsible for storm water runoff and erosion repairs associated with proposed actions.
- Further environmental compliance requirements such as hazardous waste management, solid waste disposal, etc. may be identified through the NEPA process.
- Language in scopes of work will follow Environmental Management System guidance.

### Cultural Resources:

- To protect cultural resources and prevent damage to known and unknown sites the proponent will ensure that archaeological surveys are completed within the area proposed to be disturbed.
- All boundaries of proposed ground disturbance will be adequately flagged prior to construction.
- The proponent will adjust project design in consultation with WSMR staff archaeologists to eliminate adverse effects to identified archaeological sites if feasible. If design modification is not possible and the potential for adverse effects remains, consultation with the State Historic Preservation Office in accordance with the National Historic Preservation Act may be required prior to execution of the project. Consultation may take several months to complete, depending on the nature of the project and cultural resources at risk.
- Archaeological monitoring may also be necessary and will be funded by the proponent.
- Construction and maintenance crews, contractors or subcontractors, will need to attend an environmental briefing that addresses protection of cultural and natural resources.

### Natural Resources:

- When the proponent are assessing impacts of towers, they will consider cumulative impacts of all towers over 149 feet or various forms of energized equipment (utility lines, power poles, transformers, etc.) located within WSMR on migratory birds, species at risk, threatened and endangered species, as well as the impacts of each individual structure.
- If mitigations to towers or energized equipment is not feasible, and the proponent is required to deviate based on operational requirements, the proponent may be asked to monitor and report any dead or injured migratory birds to WSMR at their expense.
- Towers will not be located in or near wetlands, other known bird concentration areas (e.g., San Andres National Wildlife Refuge, or Malpais Springs), in known migratory or daily movement flyways, or in habitat of threatened or endangered species.

Windmill Village, WSMR. (Photo by WSMR DPW)







Prehistoric rock walls at WSMR, one of over 5,500 recorded archaeological sites on the installation. (Photo by WSMR DPW)

- Any proponent, company, applicant or licensee proposing to construct a new communications tower will co-locate the equipment on an existing communication tower or other structure (e.g., billboard, water tower, or building mount) providing the structure has no cultural significance, can support the weight of the equipment and can be removed for periodic maintenance. It is expected that six to ten providers will be able to collocate at an existing communication tower, depending on tower structural features.
- Towers and appended facilities should be placed, designed and constructed to avoid and minimize habitat loss within and adjacent to the tower "footprint." A larger tower footprint is preferable to avoid the use of guy wires. Road access and fencing should be minimized to reduce or prevent habitat fragmentation, injury of wildlife and disturbance, and to reduce above ground obstacles to birds in flight.
- Operations will be designed to prevent entrapment of wildlife.
- Seasonal restrictions for construction, particularly if nesting habitat is removed, may be imposed to avoid disturbance to nesting migratory bird species.
- Tower construction is preferred to be less than 199 feet above ground level with no guy wires, such as a lattice structure, or monopole.
- Tower designs using guy wires will have daytime visual obscurant markers to prevent collisions by diurnal species. (For guidance on markers, see Avian Power Line Interaction Committee (APLIC). 1996. Suggested Practices/or Raptor Protection on Power Lines. Edison Electric Institute Raptor Research Foundation, Washington, DC; 128 pp.).

- Security lighting for on-ground facilities and equipment will be down-shielded to keep light within the boundaries of the site.
- It is preferred that towers are unlighted, if Federal Aviation Administration (FAA) regulations permit. When towers require aviation safety lighting, the minimum amount of pilot warning and obstruction avoidance lighting required by the FAA will be used. Unless otherwise required by the FAA, only white (preferable) or red strobe lights will be used at night. These lights will use the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. The use of solid red or pulsating red warning lights at night will not be avoided.
- If migratory birds establish a nest on towers, facilities or equipment and the nest is an obstruction, then WSMR Garrison Environmental will need to determine the course of action. Any injured or dead wildlife in the area should be reported.
- Towers and equipment no longer in use or determined to be obsolete will be removed within 12 months of cessation of use at the proponent's expense.
- To protect ecological diversity and prevent degradation to critical habitat or populations of known and unknown threatened, endangered, at risk or of concern species, the proponent will ensure that biological surveys are completed within the area proposed to be disturbed.

### Safety Policy

It is important to factor in safety measures during the planning phase of your mission. Safety policies at WSMR ensure a successful, safe mission and ensure the integrity of the land and airspace at WSMR for future testing. Safety guidelines have been put in place at the installation for the following test areas: Ground Safety, Flight Safety, Laser Safety, Explosive Ordnance Disposal, and Industrial Hygiene. Safety precautions for Unexploded Ordnance (UXO) are addressed later in this document.

#### GROUND SAFETY:

The WSMR Senior Mission Commander administers responsibilities for ground safety through the WSMR Director, Installation Safety Office. Operational safety during ground launch operations is best suited as the customer's responsibility. The customer should inform The WSMR Safety Office of the name of the Project Safety Officer.

#### FLIGHT SAFETY:

Flight Safety Officers are responsible for the safety of the public and range personnel during weapon test flights, laser operations and other unmanned flight vehicle testing that could be hazardous. They also provide approval of any required flight termination systems, information requirements for flight safety planning, and details on safety policies and approvals.

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### **LASER SAFETY:**

The Test Center Safety Office and the Flight Safety Branch have distinct responsibilities for managing range operations involving lasers. The Test Center Safety Office establishes procedures for the safe use and handling of the laser system. Flight Safety establishes procedures to ensure protection of Range personnel and the general public during laser operations, such as operating limits, exclusion areas (ground and airspace), and personal protective equipment requirements. Flight Safety ensures a predictive avoidance plan is in place to prevent unapproved laser illumination of space platforms.

### **EXPLOSIVE ORDNANCE DISPOSAL (EOD):**

The EOD office is managed by White Sands Test Center Range Operations and executed by a commercial organization contracted to the U.S. Army or Material Test Directorate, Warheads Branch. The disposition of hazardous material in association with conducting a test as well as Range clearance and recovery of radioactive materials is covered by these entities. Plans should be collaborated for disposal of these materials through the EOD office.

### **INDUSTRIAL HYGIENE:**

The WSMR McAfee Health Clinic Industrial Hygiene (IH) Department works to provide a safe and healthful workplace for all soldiers, civilians, and contractor personnel at Army installations throughout WSMR by anticipating, recognizing, evaluating and controlling health hazards where military and civilian personnel work and serve.

The IH Department provides services such as Chemical, Biological, Radiation, Nuclear and Explosive (CBRNE) support. IH conducts respiratory fit testing for all Soldiers and Civilian personnel who support the surety missions here at WSMR. They also provide training related to incident preparedness and response.

In addition, the IH Department provides workplace evaluations and health and safety training. Recommendations are made based on the evaluation to implement administrative, engineering or personal protective equipment controls or combination of these controls to ensure a safe and healthy work environment.

The Garrison Safety Office manages and conducts respiratory fit testing for all soldiers and civilian personnel who require respiratory protection here at WSMR.

### **HAZARDOUS MATERIALS:**

The WSMR Hazardous Communication (HAZCOM) Program applies to all work operations at WSMR where personnel have the potential to be exposed to hazardous materials under normal working conditions or during emergency situations. HAZCOM is specifically applicable to the use of hazardous materials. A material is defined as hazardous if it exhibits either a physical or health hazard. A physically hazardous material is a material for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive. Health hazardous materials are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants,

corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. All visitors must be trained on site-specific hazards prior to entry into a location that contains hazardous materials. Visitors that will be at a site for longer than one week shall be trained in accordance with all HAZCOM requirements.

### **SAFETY DATA SHEETS (SDS) & HAZCOM STATIONS:**

An SDS provides specific information on the material used. A HAZCOM Station is an information station immediately accessible to employees and visitors as they enter a facility and accessible to employees during their normal workday. Each program work area that uses hazardous materials shall have a prominently displayed HAZCOM Station with the following documentation on-hand:

- A file or binder that contains the hazardous material inventory and an SDS for each identified hazardous material for your program. All SDS Sheets should be arranged in alphabetical order with the name of the chemical highlighted in a yellow or red binder with the word SDS prominently displayed.
- Current inventory of Hazardous Material (HM); HM must be approved prior to arrival on WSMR.

## **Range Operations Mission Scheduling Policy**

### **MISSION SCHEDULING PRIORITIES:**

The White Sands Missile Range (WSMR) Mission Scheduling process for the open air test range is a careful balance of ensuring efficient Range utilization, taking into consideration program and mission priorities, and managing the external factors that affect our mission and our neighboring communities. The process is also an iterative process because as one area is optimized it affects other areas or as one test program is accommodated it affects other programs on the range schedule.

### **EFFICIENT RANGE UTILIZATION:**

In order to make efficient utilization of range resources, utilization of resources as well as range support element limitations must be considered. For example, if two missions could be scheduled with extensive optics support back to back in the south portion of the range, that might be more efficient use of the Range's resources than scheduling a south range mission, moving optics up-range for another mission and then moving them back downrange for another mission. Other range support limitations include length of day and turnaround time. Our bargaining unit personnel are not permitted to work longer than 16 hours without Command approval and are required to receive a minimum of 10 hours turnaround time to support the next day.

### **PROGRAM PRIORITY LIST:**

A WSMR Program Priority list will be developed at the beginning of each fiscal year to identify program priorities for purposes of getting on the Range Schedule. This process allows for WSMR to consider Department of Defense



(DoD) and other service priorities in assigning a priority. The designation of a high priority does not automatically guarantee a place on the Range Schedule. Utilization of Range resources, program and specific mission priorities, and other external factors must be balanced to provide the best support to all customers. The Service Sponsors (Army, Navy, and Air Force) will provide input to the WSMR Program Priority List and the Range Operations Control Division will be responsible for consolidating the lists, obtaining the White Sands Test Center (WSTC) Commander's approval, and publishing the list. The WSMR Program Priority List will be updated at mid-year. In addition, a program (through their Service Sponsor) may request their program priority be increased via email coordination with the WSTC Commander.

### PRIORITY DEFINITIONS:

The service sponsor will use the following definitions for purposes of assigning their programs into priority bins:

- Priority 1: Documented Force Activity Designator (FAD) 1 and Global War on Terror (GWOT), rapid deployment
- Priority 2: Major RDT&E, full range support, multiple missions, supporting near term milestone or acquisition decisions
- Priority 3: Minor RDT&E, Foreign Military Sales (FMS), fixed or limited test windows (or campaign), full to minimal range support
- Priority 4: Stockpile reliability, field surveillance, short duration test series or campaigns, research and development, laboratory, full to minimal range support
- Priority 5: Limited to minimal range support, mostly reimbursable
- Priority 6: Minimal or no range support, little or no reimbursables, training, VIP tours, hunts, environmental activities

### MISSION-SPECIFIC PRIORITIES:

Service sponsors at WSMR will conduct their own internal prioritization meetings prior to bringing their requested missions to the Weekly Scheduling Meeting. Programs may request special consideration for specific missions by using the Mission Priority Request Form (found on the WSDM portal). This form allows a program to request special consideration based on very specific and unique mission requirements, such as mission must be completed within certain windows, VIP missions with little room for itinerary changes, etc.

### EXTERNAL FACTORS:

There are several factors that are beyond the Range's control or agreements that are in place with our neighbors or other agencies that must be considered in executing the scheduling process. A few of the major factors include:

- **Highway Roadblocks:** WSMR has agreements with the states of New Mexico and Texas to block Highways 70, 54, and 380. The highways may only be blocked for a maximum of 1 hour. Only with the Commanding General's approval can they be blocked for an additional 20 minutes.
- **Fort Bliss Evacuation:** with the increase of training activities at Fort Bliss, evacuation of Fort Bliss ground or airspace requires early coordination.
- **Off Range Evacuations:** Initial request for off-range evacuations must be made NLT T-30 calendar days. Off-range evacuation of the Western Extension and the north FIX area are typically not permitted from 15 Oct-15 Nov of any year based on agreements with local ranchers, unless specifically waived by the ranchers. The customer will incur cost of the evacuation based on the agreements with the local ranchers, once they are notified of evacuation at T-3 even if the mission is cancelled.

M2 Bradley Fighting Vehicles and M1 Abrams tanks from the 1st Armor Division support maneuvering paratroopers of the 2nd Battalion, 325th Airborne Infantry Regiment during a live-fire exercise near WSMR, N.M., in 2015. (Photo by J. Hull)



# MISSION PLANNING 2018 RCH



WSMR has established a cooperative agreement with ranchers living in the northern and western parts of the Range and can evacuate one or more call-up extensions for test programs as needed, up to 25 times per year. (Photo by D. Salanitri)

- **White Sands National Monument (WSNM) Evacuation:** The WSNM is essentially in the middle of our range and usage must be negotiated with WSNM personnel for the ability to evacuate them. Most missions requiring evacuation of the WSNM are done in the mornings, prior to 1000 hrs., especially during the summer months to mitigate impacts to the WSNM.
- **Off Range Airspace:** Off Range airspace does require coordination with the Federal Aviation Administration (FAA) and requirements for this should be defined as soon as they are known.

## WSMR SCHEDULING TOOL:

WSMR has implemented a new electronic Scheduling Tool called the Test Resource Management System (TRMS). Missions may be requested via the Service Schedulers. WSMR is attempting to "lock down" the schedule for at least 60 days, so the sooner missions are requested the better. Every effort will be made to honor the requested date. However, there may be circumstances beyond the Range's control which may require the relocation of the mission from the requested date. In this case, priority will be given to the next available date.

## WEEKLY SCHEDULING MEETING:

A formal Weekly Scheduling Meeting will be held Wednesday of every week to review the "locked down" schedule for the following four weeks, not including the current week. Three weeks will have already been scheduled and one additional week will be added. Missions scheduled for the entire four weeks may require some adjustments to the schedule dates and/or time depending on updated/modified mission requirements and/or availability of range resources. Every attempt will be made to schedule missions on the date requested. However, the final assignments of the scheduled date and times will be made to ensure turnaround times, length of workday, and the most efficient usage of support resources i.e. radar, optics, etc.

## SCHEDULING ON WEEKENDS/HOLIDAYS:

In order to be more efficient and keep our institutional costs down, we must utilize to the fullest extent possible normal working days during the week for scheduling of range operations. Weekends are not considered normal working days and should only be used 1) as a backup in the event a mission cancels or aborts during the week, or 2) for scheduling missions

that require significant airspace and almost no other resources; these missions prevent other customers from getting on the range schedule during the normal work week. The sponsor is required to submit form "Scheduling Request for Weekends and Holidays."

## CANCELLATION CHARGES:

At this time, there are no cancellation charges; however, unavoidable direct costs that have occurred prior to the customer cancelling or aborting the test are charged to the customer. These costs include time and materials required to get personnel and instruments back to their deployment point or other location to support another test. A policy is currently being looked at that could result in cancellation charges.

## SCHEDULING RANGE SPECIAL ACCESS PROGRAMS:

Project personnel should contact the White Sands Test Center Commander for scheduling information on special access programs.

## OFF RANGE EVACUATION (CALL-UP) AREAS:

WSMR has a cooperative agreement with Ranchers at the northern and western areas of the Range. These land areas, known as the Call-Up Areas, can be called-up for usage for



projects requiring additional land space. Common call-up areas are known as FIX, A350, Abres 4A, and Abres 4A Extension.

## **RANCHER REQUIREMENTS:**

- Evacuation duration of no more than 12 hours
- Limited to 25 firings per year, 6 firings per month
- Minimum of 48 hours between evacuation periods
- Evacuations unavailable during cattle shipping season (15 Oct-15 Nov) unless waived by ranchers
- Evacuations unavailable on Thanksgiving or the day prior; limited on outside work week and on holidays
- Permission required from Rancher for recovery operations
- Range notifies Rancher of requirement at T-15 days and Range Rider hand delivers final notice (go ahead) at T-3 days

## **EVACUATION CANCELLATIONS:**

- Cancellations must be done no later than T-4 Working Days (WD). At T-3 WD the project will incur the costs of the evacuations as if the mission had completed.
- The ranchers may allow back-to-back evacuations via the waiver process.
- If one rancher says no to the reschedule, there is a possibility the area will not be evacuated.

## **Frequency Utilization & Management Policy**

The Test Center Frequency Management Office has the responsibilities for managing frequency allocation and authorization for requested frequencies by customers testing on the range. The Frequency Management Office follows the procedures and policies for coordinating frequency allocation for research, development, acquisition, fielding and operation of Army material requiring frequency spectrum support. The Frequency Management Office adheres to the Army spectrum management functional

processes necessary to implement the National Telecommunications and Information Administration (NTIA) Manual of Regulations and Procedures for Federal Radio Frequency Management and the provisions of Department of Defense Directive (DoDD) 4650.1.

## **AIRSPACE POLICY:**

Air traffic over the skies of WSMR is managed by the Air Force Air Combat Command, 49th Wing, 49th Operations Support Squadron, in support of the Commanding General of White Sands Missile Range. The Air Force detachment is located on the Range and provides air traffic control services 24 hours a day, 365 days a year. They support the customer by working with WSMR Range Control to provide aircraft monitoring and airspace surveillance during missions, and maintaining air safety. WSMR has full FAA control and command of our airspace. It is restricted from outside air traffic and commercial air traffic is routed around our airspace.

## **RESOURCE MANAGEMENT POLICY:**

Customers are charged Direct Costs associated with the planning, scheduling, and execution of their test program at White Sands based on DoD Financial Management Regulation 7000.14-R. Cancellation and abort charges are applicable where support costs have been incurred in scheduling or execution, or for incidents that result in unforeseen Range equipment damages. The above mentioned regulation states the following:

- "Direct Costs: DoD Component users shall reimburse Major Range and Test Facility Base activities for direct costs readily identifiable with a particular program. Direct costs are those costs that are directly attributable to the use of the facility or resource for testing under a particular program, over and above the institutional and overhead costs with respect to the facility or resource. Chargeable direct costs include labor, contract labor (which includes a portion of G & A and overhead),

A special Tactics Airman assigned to the 26th Special Tactics Squadron communicate with aircraft in their airspace during a Full Mission Profile exercise at WSMR, N.M., Oct. 12, 2016. (Photo by M. Martinez)



## Developmental Test Project Examples:

- **Modeling and Simulation (M&S) and Engineering used to verify:**
  - Design Risks
  - System Safety
  - System Technical Performance
  - Readiness to enter Operational Test and Evaluation (OT&E)
- Generally require instrumentation and measurements
- Normally accomplished by engineers and technicians
- Are designed to be repeatable
- May be environmentally controlled
- Covers the complete spectrum of system capabilities

material, minor construction, utilities, equipment, supplies, items damaged or consumed during testing, and any resource or item maintained for a particular program.”

- Non-DoD customers are also charged an amount of indirect costs associated with their testing on WSMR as deemed appropriate by the installation commander and per the National Defense Authorization Act of 2003.

### TEST PROGRAM MANAGEMENT SYSTEMS:

White Sands uses the Army Test and Evaluation Command (ATEC) Decision Support System along with the VISION Digital Library System as a single source for processing and managing test programs from inception to completion. The ADSS supports the Army Test Schedule and Review Committee (TSARC) process discussed in AR 73-1, Test & Evaluation Policy. The process is designed to efficiently resource operational testing and minimizes interruptions in military operational preparedness and mission execution. The Test Officer can assist you with filling out required information for Requests For Test Services (RFTS).

- **ATEC DECISION SUPPORT SYSTEM: (ADSS):** The ADSS is considered the ATEC tool for management of T&E activities and is the database in which ATEC documents all T&E efforts that are planned and executed. Data includes planned and actual milestone dates, costs and other resources, points of contact, notes, and Executive Summaries (EXSUM) to name a few. It is your single source for Request for Test Services (RFTS). All efforts are organized by Systems and ATEC headquarters to WSMR, has its own separate module. ADSS supports the Test Schedule and Review Committee (TSARC), the Army's process for tests that require

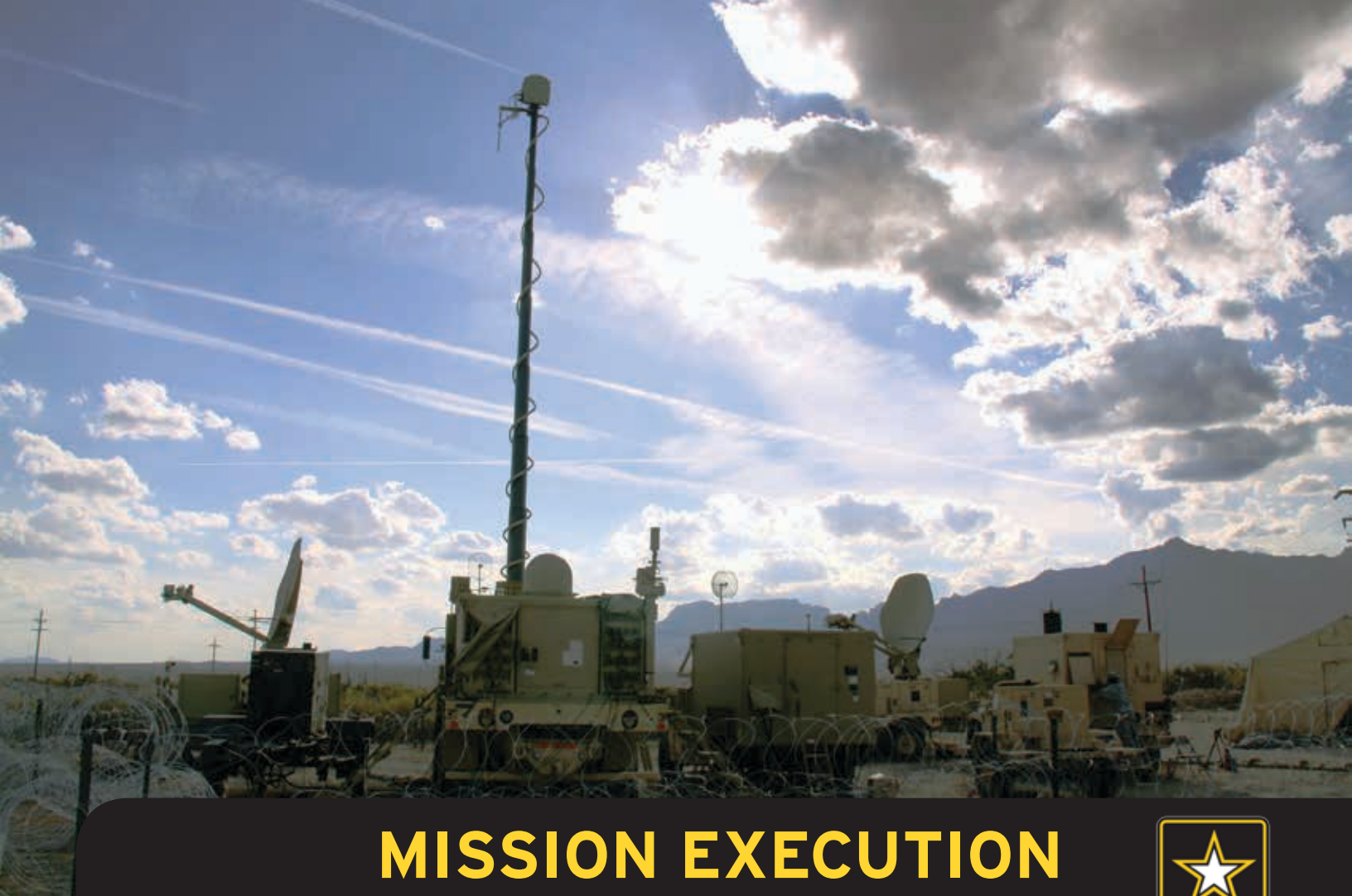
Soldiers, and is central to the ATEC Enterprise Application Interface Capability which links to financial information and digital media. ADSS is accessible via a worldwide web interface and an account can be requested at the following URL: <https://adss.atec.army.mil/Public/>.

- **VISION DIGITAL LIBRARY SYSTEM (VDLS):** The VDLS is ATEC's primary business tool for collection, management, and timely dissemination of data and information. It is a knowledge management web-based system that provides distributed information management capability, supporting information fusion and services user information needs. It can authorize and authenticate users so that information is protected and provided only to those with the proper permissions. It creates a folder in ADSS when the project is initiated (not activated). It also provides access to Test Incident Reports (TIRs) and is available to support all ATEC classified projects through Secure VDL (SVDL). Access is provided to the VDLS/SVDL project and the customer is the ultimate authority as to who has access to the data. The Test Center Test Officer is responsible for ensuring entry of the names of individuals that are given access. An account on VDLS, can be requested at the following URL: <https://vdlc.atc.army.mil>.
- **REQUEST FOR TEST SERVICES (RFTS):** Test Officers will assist you by ensuring that the requested service is in accordance with the Developmental Test Command Test Center's 10-Series mission and major capabilities regulations. They will also ensure the RFTS is submitted as soon as customer requirements have been validated and can prepare the RFTS if requested by the project sponsor. The graphics show guidelines to apply in determining if the requested service is a test project versus a non-test project.

## Support Project (Non-Test) Examples:

- Instrumentation Support
- Range Support
- Fabrication
- Consultation
  - ATEC System Team Support
  - Technical Expertise
  - Paper Studies
- Non-Test support will not require a Test Directive or Plan, Environmental Documentation, or a Safety Assessment Report (SAR)





# MISSION EXECUTION ON THE RANGE



**W**hite Sands provides all the capabilities necessary to ensure the success of your test during the execution phase. These capabilities are routinely utilized by the Army, Navy Air Force and other customers to support their diverse test requirements. It is the goal of White Sands Missile Range (WSMR) and White Sands Test Center (WSTC) to ensure that technological capabilities, in support of the Army and other service acquisition programs, are of such high quality that key acquisition decisions can be made to ensure the Warfighters have the best military hardware and software possible.

WSMR continually strives to maintain and modernize current technologies and design, develop and acquire future technologies that improve the quality of test data acquisition, transmission, processing, display, and storage of all key elements of the acquisition decision process.

The future of WSMR rests on the current technologies that have been the backbone of this world-premier test facility. These technologies will continue to be upgraded and modernized to support the vision of DoD decision makers in transitioning into the land, sea, and air battle fields of the future. WSMR continually designs, develops and acquires new technologies to meet the transformation of testing of the latest military hardware and software.

Many of our nation's allies use the Range to prove out their systems. This support helps fund improvements that other range customers can use as well.

## Data Collection Systems

Primary data collection systems are telemetry, radar, global position systems, timing, optical, meteorology, and other support services. In addition, WSMR provides mobile range, Army aviation, flight safety, and target control capabilities.

### TELEMETRY INSTRUMENTATION:

The Range is heavily instrumented with many types of sensors and data gathering equipment. The telemetry system is one such system that collects information from the test system. The contractor/customer typically instruments the system, such as a missile at the factory with numerous data sensors and a transmitter. WSMR telemetry tracking stations receive the information and relay it to the primary data processing station at WSMR, the Telemetry Data Center (TDC).

The data is processed and displayed for use by both external range customers, such as the missile contractor, project office representatives, and internal customers, such as Flight Safety. There is a vast array of instruments in the WSMR Telemetry (TM) Suite. These digital and analog systems combine fixed and mobile site acquisition and relay capability for received telemetry signals and a telemetry processing center. The fixed systems consist of five fixed TM acquisition systems and comprise the primary leg

## MISSION EXECUTION 2018 RCH



WSMR operates the Transportable Range Augmentation and Control System (TRACS), Transportable Telemetry Systems (TTS) [pictured], and mobile telemetry systems available for mission support, both for on range instrumentation and safari missions. (Photo by G. Palombit)

of the Telemetry Acquisition and Relay System (TARS). The mobile systems consist of a mix of mobile telemetry acquisition systems known as Transportable Telemetry Acquisition Systems (TTAS) and Mobile Telemetry System (MTS) tracking systems. The mobile relay systems are known as Transportable Telemetry Acquisition and Relay System (TTARS) and Relay and Recording Van (RRV) systems. In addition, the Telemetry branch fields supports and maintains the Remote Data Acquisition System (RDAS), a radio interferometer consisting of the Single RDAS and Dual RDAS. The branch also supports several launch and impact area support vans known as the MD-series vans. A separate system called Translated GPS Ranging System (TGRS) utilizing S-band telemetry for generating position information is operated and maintained by the Telemetry Branch.

The Telemetry Data Center (TDC) is the central processing and display facility for reception of data from all the above acquisition systems. The Transportable Range Augmentation and Control System (TRACS) is a mobile central processing and display center for use on safari missions. The Transportable Telemetry System (TTS) primary mission is for Midcourse/Terminal phase telemetry. Its secondary mission is for range telemetry augmentation. The TTS functions in a standalone mode to collect and record telemetry. Additionally, TTS has strip and ship capability, collecting, processing, and transmitting pre-selected telemetry for mission monitoring and/or flight safety.

The group also operates and maintains equipment for telemetry data acquisition, including receiving, recording, and relaying signals, along with electronic tracking, processing and display equipment. They operate and maintain WSMR telemetry off-Range support equipment, to include the Transportable Range Augmentation and Control System (TRACS), Transportable Telemetry Systems (TTS), and mobile telemetry systems. The group also manages

budgets, engineering support, configuration control, and modernization tasks for telemetry, electronic tracking, and timing telemetry processing and display. They provide marketing, technical, operational, and logistical consultant services on telemetry, and electronic tracking, processing and display instrumentation. In addition, they manage and provide systems managers, CORs, and technical liaison officers for the Support Services Contract (Telemetry Processing and Display/Electronic tracking portion), equipment modernization programs, and ancillary support services contracts.

### **RADAR INSTRUMENTATION:**

The Radar group at WSMR operates radars for data collection and provides track files for targets display, control vectoring, and coordination in support of Range tests. In addition, the group manages operational engineering, relocation, and maintenance of instrumentation radar, and Weibel radar. The group also generates technical requirements and prepares proposals for purchase, development, and modification of radar instrumentation. In addition, they provide technical, operational, and logistical consultant services on instrumentation, surveillance, and Multiple Object Tracking Radar (MOTR) and Weibel radars. They also provide systems managers, CORs, range managers, and technical liaison officers for the Instrumentation Radar Support Services agreement with the U.S. Air Force, logistics support contracts, and ancillary support services contracts.

The Radar Branch operates twelve instrumentation tracking radars throughout the Range. Three phased AN/MPS-39 Multiple Object Tracking Radars (MOTR) and ten AN/FPS-16 radars form the basic radar instrumentation network. These are supplanted by a special purpose CW Doppler radar.



- **THE AN/MPS-39 MULTIPLE OBJECT TRACKING RADARS (MOTR)**

are White Sands Missile Range's most modern instrumentation radars. WSMR operates three MOTR systems. They are phased array radars, each capable of simultaneously tracking up to 40 objects within a scan volume of 60 degrees by 60 degrees. Each MOTR phased array antenna is mounted on an azimuth over elevation pedestal so that full hemispheric coverage is possible. The precision of the radar is 0.2 mils (approximately 0.2 milliradians) in angles and 1.5 yards in range. The peak power of the radar is one-megawatt, but a mix of six different waveforms provides for a total average transmitted power of 5000 watts, the highest of any of the WSMR radars. The MOTR is capable of tracking a six-inch sphere to a range in excess of 120 km.

- **AN/FPS-16 INSTRUMENTATION TRACKING RADARS:**

WSMR also operates up to ten AN/FPS-16 instrumentation tracking

radars. The FPS-16 is a pulsed radar that operates at C-Band frequencies. It is capable of tracking a single target as small as a six inch sphere with a precision of better than 3 yards to a distance of almost 100 kilometers. The radar can track in two modes: echo, where the radar locks onto the reflected energy from a target, and transponder mode, where an active on-board device is used for the tracking signal.

- **THE CONTINUOUS WAVE CW "WEIBEL" RADAR:**

The Continuous Wave CW Doppler Radar is a special purpose radar designed to record the Doppler Signature of a target. It is used primarily for measuring the exit velocity of ground launched missiles and muzzle velocity of direct fire weapons. It is a highly portable radar and can be moved to a new site, set-up, calibrated and ready for mission support within a few hours, typically operated by a two-person crew. Post flight data analysis can derive information such as events, coning motions

(spin, nutation, coning angle) radial velocity, direct acceleration estimates, and debris cloud growth.

## TRANSPONDER INSTRUMENTATION:

Radar transponders are an integral part of the Range's radar system. To meet critical safety requirements, it is essential that the transponders provide the highest quality performance. Radar transponders provided by the Range are acceptance tested, satisfying most test requirements. The nominal lead time for transponder procurement is one year. Some test environments, however, require special environmental testing and possibly unique transponders. In these cases, the lead time for transponder procurement could be longer.

## GLOBAL POSITIONING SYSTEM INSTRUMENTATION:

The Global Positioning System (GPS) and Timing Branch operate and maintain GPS assets and ancillary equipment in support of Range missions. The group also develops procedures and directives to test GPS systems and equipment and validate data outputs. They develop and implement tests and procedures relative to GPS systems. They also develop strategy and implement initiatives for transition and integration of GPS technologies into the WSMR Support and Instrumentation Complex (SIC). They provide Timing support to Range support elements and Range users. In addition, the group analyzes program test requirements; determine support capability; and prepare operations and instrumentation plans for systems. They also provide technical inspection of operations and instrumentation plans for systems, and ensure conformance to configuration control and calibration. They ensure correct operational and maintenance procedures are established and followed. The Branch operates and maintains fixed and mobile stations. They also ensure maintenance contractors perform as required.

The GPS and Timing Branch operate GPS sensor equipment that collects Time Space Position Information (TSPI) for various Test platforms, both ground and airborne. The

One of three Multiple Object Tracking Radars (MOTR) in use at WSMR. These radars are capable of tracking up to 40 objects simultaneously.



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A Kineto Tracking Mount (KTM) sets up for an early morning mission at White Sands. WSMR operates a fleet of these high-precision optical instruments. (Photo by G. Palombit)

Branch is also responsible for operating and maintaining the Range Timing equipment that is GPS timing based. GPS sensors that are utilized include:

- Advanced Range Data System (ARDS) ARDS Lite
- Differential Corrections Broadcast
- L1/L2 Reference Receiver Data Collection

### **TIMING INSTRUMENTATION:**

The WSMR timing system generates and distributes time-code formats that conform to the Inter Range Instrumentation Group (IRIG) standard time formats as described in the current Range Commanders Council (RCC) Document 200.

The timing system master station is located in the south range. Its time standard is referenced to the Universal Time Standard (UTS) maintained by the US Naval Observatory. Radio systems transmit timing signals throughout WSMR to avoid the propagation errors of long wire lines. Secondary timing stations are located at optimum sites. The majority of these stations are fixed. Mobile secondary timing stations serve isolated areas on a temporary basis. The secondary timing stations are referenced to the master station time standard and generate timing signals, translate timing signals, distribute the signals by wire line or radio, and serve as RF distribution system relays. A single station usually performs several of these functions. Customer requirements are met through the terminal equipment to buffer or reconfigure the timing signals.

### **OPTICAL INSTRUMENTATION:**

White Sands is home to one of the largest and most diverse matrix of photo-optical instrumentation in the Department of Defense. The optics organization establishes and implements policies for Optics instrumentation operations including executing optical instrumentation field deployment, relocation, set-up, non-day of test checks, and day of test real time operation in support of Range customers. WSMR provides technical, logistical, and operational consultant services to Range customers regarding optical instrumentation systems including the following tracking systems: Remote Instrumentation Control System (RICS), Optics Remote Control and Acquisition (ORCA), Kineto Tracking Mount (KTM), Distant Object Attitude Measurement System (DOAMS), Mobile Infrared Telescope (MIRT), FLIGHTFOLLOWER; and the following non-track systems: Virtually Integrated System for Optical Replay (VISOR), high-speed digital cameras, video cameras, Video Relay Facility (VRF), remote vans, and Battlespace Video towers.

In addition, WSMR executes Life Cycle Management (LCM) of optical instrumentation systems. LCM includes system concept, requirements definition, design approval, acquisition, testing and verification, and operation. LCM also includes preventative and corrective maintenance, quality assurance, sustainment, engineering upgrades, modernization, and ultimate disposal/recycle/repurpose of systems.



### METEOROLOGY INSTRUMENTATION:

The White Sands Meteorology Branch (Met Branch) provides a wide range of technical meteorological support for WSMR test operations and related activities. Along with its primary purpose of mission support, the Met Branch issues public service-type weather forecasts and warnings.

The Met Branch Field Unit collects and distributes meteorological data, consisting of surface and upper air observations of standard and exotic meteorological measurements from permanent and mobile sites for all range and base activities. They prepare support for all meteorological requirements from various support locations. They also determine requirements, develop specifications, and establish performance criteria for meteorological equipment. In addition, they execute scheduled support for all meteorological data collection requirements from various support locations. The group also determines requirements, develops specifications, and establishes performance criteria for meteorological equipment.

The Met Branch has an extensive array of facilities and instrumentation to provide these services, along with the skilled personnel needed to conduct Met operations.

Customer support includes written responses to customer requirements, development of support plans and cost estimates. Functions include, but are not limited to:

- Coordinating and scheduling all meteorological assets required.
- Analysis and delivery of "Quick Look" data to customer to ensure that the data are accurate, consistent, and timely for the mission.
- Preparation of standard post-mission meteorological reports.

The Forecast and Data Sections operate as required to support all missions coded by the Range Scheduling Office. Customers can be provided the following:

- Mission specific weather forecasts for site specific five day outlooks with customer designed threat matrix, depending on mission sensitivities.
- Upper air soundings up to 100,000 feet MSL.
- Severe weather warnings and lightning watches are provided range-wide. Forecasts of hazardous weather such as, severe thunderstorms, heavy snow warnings and wind and dust storms are issued to give enough lead time to prepare and prevent injury to personnel or infrastructure.
- Impact prediction for partially guided and unguided rocket: Launcher elevation and azimuth angles are calculated in real time to predict rocket impact as required by Flight Safety.

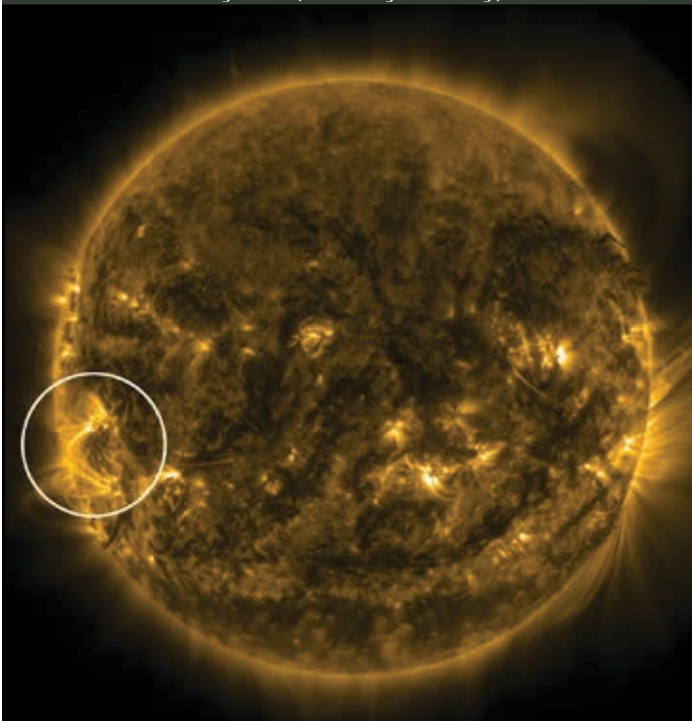
Climatology records including 50 years of surface observations are used to plan for specific customer requirements. The following reports are available to the customer:

- The "Quick Look" Report includes surface and upper air data and is available within minutes after completion of the measurement. This is often provided directly to the project at the remote field site for go/no-go decisions and to expedite mission requirements. These data are not completely quality controlled.
- The Upper Air Sounding Report is quality controlled and consists of several formats:
  - **SH1:** Standalone that contains significant level upper air data geometric height, pressure, temperature, relative humidity, dew point temperature, mixing ratio.
  - **SH2:** In 1,000-foot layers to required altitude provides altitude, wind speed and direction, wind shear, temperature, dew point temperature, relative humidity, absolute humidity, density, velocity of sound, vapor pressure, perceptible water.
  - **SH4:** In 500-foot layers to required altitude provides altitude, wind speed and direction, wind shear, temperature, dew point temperature, relative humidity, absolute humidity, density, velocity of sound, vapor pressure, perceptible water. In addition, computer and ballistic aiming meteorological messages are products available from the upper air surrounding.

The Meteorology Branch operates sixty fixed systems consisting of surface tower mesonets, upper air measurement systems, radar wind profilers, WF-100 wind-finding radars, and lightning detectors across the Range. There are approximately twenty mobile systems comprised of towers, trailers and tether sondes. The branch has the latest technology in weather modeling, rocket impact prediction, and object drift prediction.

This instrumentation allows the technicians to measure and calculate critical atmospheric parameters in real time. The meteorologist can then provide the customer with mission-specific weather forecasts, warnings, advising, rocket impact prediction, chaff drift predictions and climatology.

A solar flare imagery captured by Navy Research Rocket Payload. (Photo by US Navy)



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An Army Air UH-60 Blackhawk and crew transporting radio equipment to a Goat Mountain in October 2016. (Photo by B. Drexler)

### FIELD INTEGRATION INSTRUMENTATION:

The Field Integration group provides scientific and engineering services for Range support to test programs. They provide analysis and programming services in support of Range programs and Range data support activities. They also provide hardware, software, operation, and maintenance of scientific and engineering systems, digital networks, and display systems supporting Range data support activity. Lastly, they integrate improved procedures and techniques for Range data support systems and activities.

### MOBILE RANGE INSTRUMENTATION:

**TRANSPORTABLE RANGE AUGMENTATION AND CONTROL SYSTEM (TRACS):** The TRACS is a self-contained transportable system to support mission preparation, execution, real-time data collection and processing, mission control, flight safety, and Quick Look post-mission data analysis. A TRACS system includes a flight termination system and two telemetry tracking stations.

TRACS can be used in two mission configurations: The Augmentation Configuration, which allows augmenting existing range capabilities, and the Standalone Configuration which provides complete autonomous support at remote locations. There are two control vans designated as TRACS 1 and TRACS 2. TRACS 2 has enhanced capability features and expandable sides. TRACS systems have supported safari operations at the Fort Wingate, N.M., launch facility and at Kodiak, Alaska.

### ARMY AVIATION INSTRUMENTATION:

Army Air flight crews have the experience you need to accomplish your test support in a safe and professional manner. Our specialty is aircraft test support. The bulk of our services are provided routinely to WSMR customers in the desert and mountains that encompass WSMR, N.M., and throughout the southwest United States. Our expert

maintenance staff is capable of adapting your test equipment to our aircraft. Structures, avionics, and quality assurance technicians specialize in interfacing project electrical and structural components with aircraft systems. Special equipment and components can be mounted both internally and externally to meet customer requirements.

### TYPICAL SUPPORT MISSIONS:

- Aerial tracking flights and test platforms
- Recovery and sling load operations
- Cargo and hazardous cargo transport
- Mission essential personnel transport

### AIRCRAFT FLEET:

- One Beech King Air 200 (C-12) Fixed Wing Aircraft
- Aerial reconnaissance and photography Sensor Package Test Platform
- Expendables Platform (Flare/Chafe)
- Helicopters

### OBTAINING AIRCRAFT SUPPORT:

When considering aviation support for your project on White Sands, your Test Officer can contact our Operations Division. They can answer your questions concerning aircraft utilization. Early coordination for aircraft support is encouraged.

### TARGET CONTROL INSTRUMENTATION:

Aircraft systems are flown as tests of air defense weapons systems and can simulate attacking aircraft in close formation. This enables weapons systems to perform friend or foe target discrimination among multiple targets. In addition, Unmanned Aerial Vehicles (UAV) and Unmanned Ground Systems (UGS) are remotely operated for use as weapons systems and targets. Software development enables flight/ground-pattern generation for Unmanned Aerial Systems (UAS) to follow.



## **DRONE TARGET CONTROL SYSTEM (DTCS) and DRONE FORMATION CONTROL SYSTEM (DFCS):**

WSMR uses two types of systems to control targets: The Drone Target Control System (DTCS) and the Drone Formation Control System (DFCS). The DTCS is used with specially equipped radars that provide a link to the drone. The DTCS can be used with a radar, a mobile van to support take-offs and landings, and a transportable system for off-range support. These systems can control sub-scale, full-scale, rotary, and fixed-wing aircraft. The DTCS can control two aircraft. It is a continuously manned control system and it has the advantage of quick target presentation without rehearsal requirements. The DFCS is used for ground vehicles and sub-scale and full-scale fixed-wing drone operations. The DFCS can track and control up to 48 ground vehicles or six aerial targets simultaneously in formation or in precise synchronized flight patterns, while tracking four additional targets. The DFCS has an automatic takeoff and landing capability for most full-scale aerial targets. It can provide a 90 second interval between target launches from Holloman Air Force Base to maximize on-station time for multiple target

formations. This system is capable of manual or automatic track and the control of single or multiple aerial or ground target presentations. The DFCS can currently control domestic and foreign ground vehicles (i.e T-72 tanks), and BQM-34, MQM-107, QF-16 small and full-scale drones equipped with transponders. Time-Space-Position Information (TSPI) is available in real time on all targets.

Systems are remotely controlled from the Cox Range Control Center and their data is transformed by the Real time Data Processing System (RDTPS) into required formats. The processed data can then be distributed via Defense Research and Engineering Network (DREN) to locations internal or external to the Range.

## **Data Distribution Systems**

White Sands has state-of-the-art data distribution capabilities to support your mission including the Inter-Range Control Center, Test Support Network, telephone and radio systems, and network communications. In addition, the Range is fully equipped with first-rate hardware and software systems to analyze system performance and provide post test data reduction.

## **NETCENTRIC COMMUNICATIONS:**

### **INTER-RANGE CONTROL CENTER (IRCC):**

WSMR is home to the Inter-Range Control Center, established as the Army Test and Evaluation Command's (ATEC's) master control facility for distributed test support. The IRCC is a state-of-the-art control facility built and operated through the teamwork of hundreds of technical experts from throughout ATEC's developmental test, operational test, and evaluation communities.

IRCC is designed to support network-centric system-of-systems testing in a live, virtual and constructive (LVC) environment for emerging programs such as the Assistant Secretary Of The Army For Acquisition, Logistics And Technology (ASAALT) System Of Systems Integration (SoSI) Directorate testing. History has shown that technology can act as a major force multiplier. The 21st century warfighter is looking to exploit technology wherever possible to speed up the delivery and implementation of systems. To test, train and experiment within the increasingly complex battlefield environment, the ability is needed to manage, synchronize and distribute large amounts of information arriving from a diverse

WSMR's Cox Range Control maintains remote control facilities to support both aerial and ground targets. (Photo by G. Palombit)



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(and often geographically disparate) collection of sensors deployed on a variety of platforms. The joint nature of the modern battlefield also demands rapid multi-Service integration of systems.

To meet these requirements, ATEC established Distributed Test Control Centers (DTCCs) at each of its test centers, with the IRCC serving as the WSMR DTCC and as ATEC's master control facility. The IRCC has established connections with emerging T&E developments such as Joint Mission Environment Capability (JMETC/SDREN) and Defense Research Engineering Network (DREN) and partnerships both inside and outside the Army community such as Fort Hood's Central Technical Support Facility (CSTF), the Interoperability Test and Evaluation Capability (InterTEC), Air Ground Integrated Layer Exploration (AGILE) Fires, and many others. Distributed T&E testing has the promise to reduce Temporary Duty (TDY), increase the frequency of testing while reducing costs, provide improved tools, and provide greater opportunities for interoperability by connecting labs, test/training facilities, and developers. The IRCC is fulfilling that promise.

**TEST SUPPORT NETWORK:** The White Sands Test Center has a Test Support Network. This system consists of a digital fiber optic network that supports transmission of analog and digital voice, data, telemetry, and video signals and can accommodate up to 600 simultaneous voice conferences. It also includes a network management system that provides automated network management and control.

All White Sands range assets utilize one common digital transport system. The network ring architecture provides a high-speed, secure, range-wide information transport system that will support instrumentation testing of weapons, space systems, subsystems, and components, from 3000 surveyed sites and the synthetic environment.

The Test Support Network, has the capacity to connect to any other range through a Norton SL-100 switch gateway provided the other range is



U.S. Air Force combat controllers from the 23rd Special Tactics Squadron perform air traffic control radio transmissions to an A-10C Thunderbolt II approaching an austere landing strip during training at WSMR in 2014. (Photo by C. Massey)

similarly connected to a gateway via long haul commercial telecommunications carriers.

The range possesses extensive capabilities and infrastructure used by the Army, Navy, Air Force, NASA and other government agencies as well as universities, private industry and foreign militaries. In order to meet the needs of its customers and comply with the Army Transformation directives to provide a ubiquitous net-centric environment, WSMR has a requirement to implement and migrate to a Global Information Grid (GIG) network model. The model employs the GIG view of Enterprise Services (GIG-ES) that are defined by system of systems views and network of networks.

The TSN is GIG compliant. Range instrumentation systems is network capable and on the TSN. Based on GIG compliance, the network is capable of supporting users that exercise their network services during testing and in joint exercises.

### TELEPHONIC COMMUNICATIONS:

The WSMR telephone system can provide all standard PBX features. Although the telephone system is

government owned and operated, the WSMR system interfaces with the commercial telephone network via trunks to Las Cruces, N.M., for inter-range and worldwide DISN/DDN connections. Also, the WSMR telephone system has trunking to the Digital Switched Network (DSN); Federal Telephone System, Fort Bliss, Texas; Holloman Air Force Base and surrounding communities. A fixed communications plant provides data transmission and voice communications service to over 1,500 Range stations. Commercial communications facilities are leased for information transfer between WSMR and off-range sites.

### RADIO COMMUNICATIONS:

- **VHF AND UHF COMMUNICATIONS:** VHF and UHF ground-to-air communication radios are located at Salinas Peak, Clark Site, C-Station, Stallion, and North Oscura Peak. This radio system uses the air traffic control standard aircraft radios. This capability provides WSMR with voice communications to all aircraft involved in range activities.



- **LAND MOBILE RADIO SYSTEM:** Land mobile radio systems are used extensively at WSMR for coordinating the efforts of Field personnel, optimizing the use of vehicles and mobile instrumentation, and for range customer communications. There are mobile units, base stations, repeaters, and portable radios. The radios are programmed with talk groups based on user requirements, allowing users to communicate across the entire range. A portable radio pool is maintained by the IM Directorate, allowing personnel temporary use of radios for the duration of their mission.

### NETWORK COMMUNICATIONS:

Information Assurance (IA) requirements such as LAN and SIPRNET usage are approved by the IM Directorate.

- The **LOCAL AREA NETWORK (LAN)** is the primary information system for the organizations and personnel assigned to WSMR. The WSMR LAN is a United States (US)-only system used for processing of unclassified sensitive information. The WSMR LAN may never process classified information of any kind. Sensitive information may include (but is not limited to) research, development, and engineering data; logistics; personnel management and Privacy Act data; contractual data and certain categories of financial data (such as payroll data); For Official Use Only (FOUO) information; and export-controlled information in accordance with the Arms Export Control Act.
- The **SECRET INTERNET PROTOCOL ROUTER NETWORK (SIPRNET)** is the primary classified administrative information system used by organizations and personnel assigned to WSMR. It is a US-only system used and approved for processing Secret collateral information. SIPRNet is not authorized for processing of Top Secret or Top Secret/SCI information and/or data, nor is it accredited for transmission of NATO material.

Access to the WSMR network is for official use and authorized purposes and as set forth in DoD 5500.7-R, "Joint Ethics Regulation," or as further limited by the WSMR Acceptable Use Policy. This policy further applies to all federal government communication systems, equipment (including telephones, facsimile machines, electronic mail, Internet systems, and commercial systems), and other communication resources when the federal government pays for the use of these resources. Policy applies to all information systems, stand-alone information systems, restricted enclaves, and networks at all information classification levels.

### FREQUENCY UTILIZATION AND MANAGEMENT COMMUNICATIONS:

WSMR performs frequency surveillance, evaluation, and radiation analysis, and control of the use of all radio frequencies. Frequency scheduling is performed on a daily basis. All frequencies used in connection with range missions are monitored. Transmitter, receiver, and antenna frequency spectrum usage and electromagnetic propagation are analyzed to develop interference tolerances, interference reduction and prevention programs, and to identify radiation hazard distances from emitters. Frequency surveil-

lance (both fixed and mobile) is provided within 150 miles radius of WSMR Headquarters and in portions of Colorado and Utah. Additional services include operational electronic countermeasures control and resolution of interference problems.

### Data Analysis Systems

As the complexity of the testing continues to grow, our range instrumentation and support elements keep up with state-of-the-art technology by upgrading systems, test equipment and test processes. The Range is fully equipped with first-rate hardware and software systems to analyze system performance including Reliability, Availability and Maintainability (RAM), Manpower and Personnel Integration (MANPRINT), Human Factors Engineering (HFE), and warhead assessment. WSMR has an exceptional post-test data reduction capability to meet our customers' needs.

### RELIABILITY, AVAILABILITY AND MAINTAINABILITY (RAM):

A major factor that determines the sustainability of a system is Reliability, Availability and Maintainability (RAM). Performance of today's military mission depends on the synergy of net-centric aggregated subsystems. These systems and the personnel that operate them are being asked to perform at op-tempos not seen before. To meet mission availability goals, threshold RAM requirements must be levied on a proposed system with data collected during development in order to provide a quantitative analysis. RAM analysis determines whether equipment performs its intended functions for a specified time interval under controlled conditions. Integrated Logistics Support (ILS) is the process of acquiring the necessary system support package to provide the user with operational support at the least possible cost for the system when delivered to the soldier in the field. WSMR has the expertise to meet RAM and ILS customer requirements.

Weapons system performance is assessed at the SANDS Technical Data Center (STDC), a state-of-the-art computing facility that provides hardware and specially developed software applications. A complete spectrum of analysis from video capture and telemetry data reduction needed in target characterization to the detailed analysis of discrete network traffic is available for determination of the overall integrated system performance.

### MANPOWER AND PERSONNEL INTEGRATION (MANPRINT):

MANPRINT capabilities include test and evaluation of the three domains of Human Factors Engineering (HFE), system safety, and health hazards during the conduct of developmental testing and operational testing of weapon systems including: air defense systems; land combat weapon systems; communications, command, and control systems; and tactical fire control systems.

### HUMAN FACTORS ENGINEERING (HFE):

HFE evaluations include an assessment of the conformance of the weapon system under test to the applicable provisions of MIL-STD-1472, "Human Engineering Design

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Criteria for Military Systems, Equipment, and Facilities.” HFE tests are performed in accordance with Army-approved Test Operation Procedures (TOPs), such as TOP 1-2-610, “Human Factors Engineering Test Procedures.”

Our capabilities include performing system safety evaluations of weapon systems and providing safety release recommendations. These recommendations are documented and provided to headquarters, permitting soldiers to participate as operators and maintainers in the testing of a weapon system and delineating safety limitations to the test activities.

In addition, WSMR has extensive experience in test and analysis of systems containing mission critical system software.

### **WARHEADS:**

Warhead testing support ranges from Test Officers responsibilities, and conduct and reporting of specific tests, to planning and coordination, test set-up and preparation, test conduct, data collection, data analysis and evaluation, and test reporting.

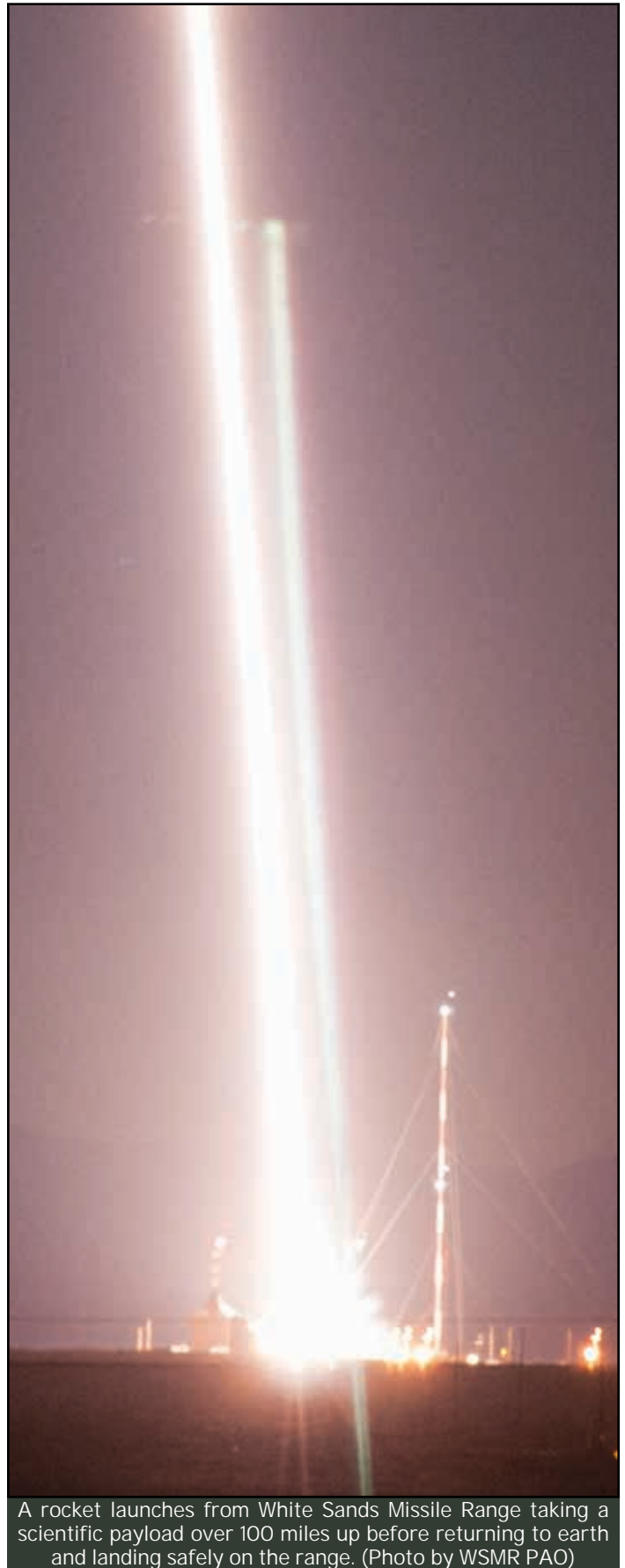
Testing capabilities include but are not limited to a wide range of technical tests, insensitive munitions tests, specialized one-of-a-kind tests, and special studies pertaining to explosive safety hazards. The Branch also has extensive expertise in the areas of explosive materials behavior: shaped charge, acoustics and pressure measurements, fuzing, safety and arming devices, conventional and self-destruct submunition technology, and environmental impact concerns and special studies.

The majority of the test and evaluation effort is geared toward determining the safety, functional reliability, and performance characteristics of warhead sections and their associated components for a variety of systems. The types of tests and operations conducted include impact area data collection operations, safe and arm device centrifuge certification tests, high-explosive detonations, bullet impact, conflagration, 40-foot drop tests, sympathetic detonation, slow and fast cook-off, arena and other specialized tests related to safety testing. WSMR also conducts diagnostic testing which includes explosive train propagation, downloading of warheads and explosives, remote control cutting and steaming of explosive components, and assembly/disassembly/modification or inerting of fuzing both foreign and domestic checkouts of warhead sections and their associated components.

The WSMR Test Ammunition Storage Point (ASP) is available and performs all actions to receive, store, safeguard, issue, ship, and deliver inventory and report ammunition and explosives. The ASP also provides technical advice and assistance to all Test projects, units, and activities. The WSMR ASP maintains the ammunition stock record account recording all receipts, issues, inventory adjustments, turns, suspensions and out shipments of ammunition.

### **POST-TEST DATA REDUCTION:**

There are a variety of standard data products available at WSMR. The primary post-test data product categories include Trajectory and Attitude, Miss Distance, Surface Miss Distance, and Target Motion Resolution. Video data and limited flight data are also available in near real time. Non-stan-



A rocket launches from White Sands Missile Range taking a scientific payload over 100 miles up before returning to earth and landing safely on the range. (Photo by WSMR PAO)





Spaceport America is located adjacent to WSMR.

dard product types are available, but must be coordinated through the Test Officer with sufficient lead time for product development.

The Data Reduction group performs software integration and maintenance services to enable post-test reduction of open-air range instrumentation data. They provide computer engineering support to integrate and optimize information technology used in the data reduction process. They also perform specialized data reduction, analysis and modeling and simulation (M&S) activities. In addition, they manage and operate the Data Reduction Facility (DRF), Optical Data Measurement Systems (ODMS) and Media Transfer Facility (MTF) for post-test data reduction, analysis, modeling and simulation. The group performs methodology investigations to improve post-test data reduction process and methods. They process optical and electronic data from open-air range instrumentation. They also perform data reduction and analysis to provide knowledge to assist in managing the risks involved in developing, producing, operating, and sustaining systems under test, and confirm that all operations are conducted safely. Lastly, the group integrates emerging T&E technologies into data reduction operations and capabilities.

#### **VISUAL INFORMATION (VI) PRODUCTS:**

The VI organization provides audiovisual support services for your mission and general support requirements. Services include still digital media for documentation, high definition digital and analog video for documentation and production, digital/HD online editing, media reproduction, graphic arts, and imaging and photo printing. VI also operates a DISN video teleconference center, performs video teleconferencing installation and maintenance, and provides mobile video teleconferencing services.

#### **FACILITIES AND LABORATORIES:**

WSMR maintains highly specialized range technical facilities and laboratories to support the continuing testing of

tri-service, DOD, NASA, foreign and commercial systems.

The Survivability, Vulnerability, and Assessment Directorate (SVAD) at WSMR is a recognized center of expertise for testing and offers a one-stop capability by providing facilities/laboratories, project engineering, test execution, analysis and documentation. The major nuclear weapon effects test facilities have laboratory suitability certifications and the ionization facilities are ISO 9000 certified. The following paragraphs explore the SVAD nuclear weapons effects, electromagnetic environmental effects (E3), directed energy (DE) effects, space effects, high power (HP) electromagnetic environments, effects, life-cycle management, and applied environments. SVAD also operates the High Energy Laser Test Facility (HELSTF). In addition, information is provided on the Climatic Test, Dynamic Test, and Aerial Cable Facilities, and the Metallurgy and Chemistry Laboratories.

#### **NUCLEAR WEAPONS EFFECTS:**

- **WHITE SANDS SOLAR FURNACE (WSSF):** The WSSF simulates the nuclear thermal radiation environment by producing high-fidelity, intense thermal pulses (1 kT to 3 MT). It can also produce a steady state thermal radiation exposure of very long durations (i.e. daylight hours for experimentation). At full power, the energy generated by the WSSF can penetrate a half-inch stainless steel plate in 40 seconds. In addition to the Solar Furnace, SVAD has the Quartz Lamp Facility (QLF) and the Solar Thermal Test Facility (STTF) thermal simulators.



White Sands Solar Furnace (WSSF) uses mirrors to concentrate sunlight and achieve temperatures of 5000 degrees F. This intense heat can be pulsed to duplicate the thermal effect of a nuclear weapon detonation. (Photo by G. Palombit)

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Electromagnetic testing of a tactical unit on SVAD's 80-ton, 33-foot turntable.

- **PULSED GAMMA SOURCE:** The Pulsed Gamma Source (PGS) arriving in 2021 and PI 538 (4.2 MeV) are high-energy, pulsed, field emission electron beams or Bremsstrahlung x-ray sources. The PGS and PI 538 Facilities represent Flash X-ray simulators that produce the gamma dose rate environments of a nuclear weapon detonation. Both provide an energy source of short duration for determining electronic equipment and system responses to rapid and in-depth energy deposition. These two facilities will be able to provide instrumentation for real-time data acquisition of the test item response and environment, and is a particularly cost-effective means of testing relatively large items.
- **COMPACT FLASH X-RAY SIMULATOR (CXS):** The CXS is a mobile simulator that provides three different pulsed, Bremsstrahlung sources of gamma photons (~750MeV), (500-650 MeV) and (450 MeV) for gamma dose rate testing of equipment and small systems.
- **LINEAR ELECTRON ACCELERATOR:** The Linear Electron Accelerator (LINAC), currently under upgrade to 50 MeV, is designed to simulate the high-intensity gamma spike associated with a nuclear weapon detonation by producing high-intensity, short-duration pulses of high-energy electromagnetic radiation for threat level exposures. It is normally used to gamma dose rate test electronic devices and components, and to evaluate detection thresholds of power removal circuits.
- **GAMMA RADIATION FACILITY:** The Gamma Radiation Facility (GRF) is designed to provide the total gamma dose and residual gamma dose environments needed for nuclear effects testing of virtually any size item. The GRF has sources that can be used in any combination to provide an environment for transient radiation effects on electronics (TREE) experiments as well as verification tests of systems for gamma dose survivability. However, the uses of the GRF are diverse, including radiography and shielding experiments, as well as calibration and operational testing of military radiac instrumentation.
- **RADIATION CORRELATION LABORATORY (RCL):** The RCL provides gamma environments (Cobalt-60 and Cesium-137) for realistic evaluation of performance of radiation detectors and sensors. It is also used to determine shielding characteristics of vehicles.
- **FAST BURST REACTOR:** The Fast Burst Reactor (FBR) is an unmoderated and unreflected cylindrical assembly of uranium and molybdenum alloy that is centered inside a 50' x 50' x 20' high cell. The FBR, covered with a boron-lined aluminum shroud to decouple the core from experiments, produces high-yield pulses of microsecond ( $\mu$ s) width, as well as long-term, steady-state radiation to simulate the neutron radiation environment produced by a fission weapon.
- **SEMICONDUCTOR TEST LABORATORY:** The Semiconductor Test Laboratory (STL), through a complete array of state-of-the-art test equipment and the capabilities of the people behind that equipment, is able to exercise virtually any semiconductor component or piece-part in the military's inventory. The STL enables all types of discrete, active and custom semiconductors to be characterized and then tested by exposure to the appropriate initial nuclear radiation (INR) environment. Due to a rapid transfer system between the four INR facilities and STL, detailed post-exposure characterization of test samples can be initiated within two minutes of exposure. More than a dozen experienced engineers have characterized and tested more than 5,000 different types of electronic devices during the past 13 years. Parametric characterizations are performed on the following mainframe testers: Teradyne A575 (2 each Teradyne FLEX); Teradyne A580 (2 each Teradyne J750); and Teradyne MicroFLEX (3 each Credence Testers).
- **RAPID RESPONSE LABORATORY (RRL):** The RRL consists of five bench-top stations that enable most types of active semiconductors and components, circuit card assemblies, small system characterization, testing to appropriate INR environments, and post-test analyses.



### ELECTROMAGNETIC ENVIRONMENT EFFECTS:

Survivability/Vulnerability (SV) Directorate operates extensive Electromagnetic (EM) Environmental Effects (E<sup>3</sup>) Test Facilities on a 16-acre test complex to meet the requirements of MIL-STDs 461 and 464, and ADS-37. SV E<sup>3</sup> test and evaluation capabilities include: External RF EME, Intra-system, and Inter-system; Electromagnetic Compatibility (EMC); Electromagnetic Interference (EMI); Personnel Electrostatic Discharge (PESD); Helicopter Electrostatic Discharge (HESD); Precipitation Static (PS); Electromagnetic Radiation Hazards (fuel, ordnance and personnel), and Electronic Attack (EA).

- **ELECTROMAGNETIC RADIATION (EMR) FACILITIES:** Using any or all of nine permanent and mobile transmitters at its EMR facilities, WSMR can provide both EXT RF EME and HERO whole-body, open-air testing. Frequencies range from 100 kHz to 50 GHz, at power levels to 50 kW, depending upon the specific transmitter and test environment. Ext RF EME testing ensures that weapon systems will perform their intended missions while exposed to electromagnetic energy. HERO testing ensures that electrically initiated devices will not unintentionally detonate from current induced by an electromagnetic field.
- **ELECTROMAGNETIC INTERFERENCE (EMI) FACILITIES:** WSMR Survivability/Vulnerability Directorate conducts EMI testing to precisely measure the EM emissions from a system and to subject the test item to external RF signals to determine the item's susceptibilities to EMI. At either of the two facilities,

the WSMR Survivability/Vulnerability Directorate can perform entire batteries of EMI testing, including radiated emissions, radiated susceptibilities, conducted emissions, and conducted susceptibilities, to applicable military standards (MIL-STDs).

- **ELECTRONIC ATTACK (EA) EFFORTS:** In the area of electronic attacks (EA), SV/WSTC can perform threat system characterization and electromagnetic compatibility of those system threats.
- **ELECTROSTATIC DISCHARGE (ESD) FACILITY:** Electrostatic discharge (ESD), or static electricity, as it is commonly known, can be potentially devastating to sensitive electronics. To ensure that weapon systems are hardened against damage from ESD, the WSMR Survivability/Vulnerability Directorate has the capability to perform both personnel-level (25,000 volts direct current [VDC]) and helicopter-level (350,000 VDC) ESD testing. Both tests are performed in accordance with TOP 1-2-511:

The personnel-level ESD simulator is hand portable, which allows for discharge at any point on a system under test. Helicopter-level tests are performed by placing the item under test on nonconductive blocks, attaching one pole of a DC power supply to the item, and bringing a ground wand near enough to the test item to discharge the electrical charge. Both personnel-level and helicopter-level ESD testing are done on a go/no-go basis; i.e., a system passes if it remains operational and safe after exposure to the ESD; otherwise, the system fails.

SVAD operates extensive Electromagnetic Environmental Effects (E<sup>3</sup>) Test Facilities to support the requirements for test and evaluation of weapons systems while being subjected to electromagnetic environments (EMEs). WSMR's EMRE facilities shown below during a recent test.



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### DIRECTED ENERGY WEAPONS EFFECTS: LASER FACILITIES:

- **PULSED LASER VULNERABILITY TEST SYSTEM (PLVTS):** PLVTS, the largest pulsed CO<sub>2</sub> laser in the U.S., is designed to support susceptibility and vulnerability testing of electro-optical/infrared (EO/IR) tactical weapon systems. Fully transportable and self-contained, PLVTS is capable of providing tactical threat environments at virtually any test range in the world.
- **THREAT LASERS:** Agile and eye-safe lasers are available for component or system level testing.
- **ADVANCED POINTER TRACKER (APT):** The APT is instrumented with a 60-cm diameter optical tracker or beam director. It is mobile with two optical benches and enables dynamic testing at the system level and at great distances.
- **SEA LITE BEAM DIRECTOR (SLBD):** The SLBD is a beam director that can be used as an optical tracker for very high energy lasers.

### HIGH-POWER MICROWAVE FACILITIES:

**NARROWBAND (NB):** a complete suite of NB environments is segmented into five major capabilities:

- One 32-MW Very High Frequency (VHF) system at 300 MHz.
- 36 1-MW magnetrons, 50 selectable frequencies each, providing continuous frequency coverage from 1.2 to 39 GHz.

Testing at SVAD's Near Strike Lightning Facility in 2016.



- One 175-240 kW three-tube system providing continuous frequency coverage from 140-1000 MHz.
- Six 70-350 MW SuperReltron Tubes providing 50 kV/m @ 15 meters between frequencies of 670-3000 MHz.
- One 1000-1600 MHz narrow pulsewidth system providing narrow pulsewidths and high energy for testing digital systems.
- One 1700-3000 MHz narrow pulsewidth system.

**WIDEBAND:** Wideband is available in two major capabilities:

- One portable 150-270 MHz bandwidth unit
- One 200-6000 MHz unit divided into nine bands.

**ULTRA-WIDEBAND:** Ultra-wideband is available in one large system level test facility that can provide 35kV/m at 50 meters across a tank-size system. The frequency coverage is 670-4300 MHz.

### SPACE EFFECTS:

- **COMBINED RADIATION ENVIRONMENT (CRE) FACILITY:** The CRE facility consists of two simulators (PI 538 and reactor) that provide a time-tied radiation environment to simulate different upper atmospheric radiation scenarios.
- **ELDORADO IRRADIATOR FACILITY (EIF):** The Eldorado Irradiator Facility is used for gamma dose simulation testing of electronic devices and circuits. The facility is capable of providing dose rates between 50 and 0.01 Rad-Si/sec in the direct beam with no attenuation. The Eldorado can also operate in an extended operation mode 24/7 to fulfill the unique requirements of Enhanced Low Dose Rate Sensitivity tests for space irradiations or aluminum attenuators; lower dose rates are achieved.

### HIGH POWER MICROWAVE ELECTROMAGNETIC ENVIRONMENT EFFECTS:

- **ADVANCED FAST ELECTROMAGNETIC PULSE SYSTEM (AFEMPS):** A 3.5 MW pulser paired with a wire spread antenna provide system-level testing and meets MIL-STD 2169B Early-Time HEMP Waveform.
- **VERTICAL EMP FACILITY (VEMP):** A VEMP using a 2.0 MW pulser was developed to provide the Early-Time HEMP waveform. This facility began operation in 2016.
- **LIGHTNING TEST FACILITY (LTF):** The Lightning Test Facility (LTF) is comprised of two different co-located capabilities that simulate both the direct and indirect effects of lightning strike characteristics. For a direct strike, a high current capacitor bank capable of producing Component A (218 kAmps) and Component D (50 kAmps) is available to test systems. A second facility with a 2.4 MV capacitor bank is available to simulate the environments of a near strike environment for system testing. Direct effects of lightning include burning, eroding, blasting, and structural deformation caused by lightning arc attachment, as well as by the high-pressure shockwaves and magnetic forces pro-



duced by the associated high currents. Indirect lightning effects are predominantly those resulting from the interaction of the electromagnetic fields accompanying lightning with electrical devices. Engineers have developed a lightning effects test capability in accordance with MIL-STD-1757A, which establishes standards for the waveforms used to determine direct and indirect effects of lightning strikes.

- **PULSED CURRENT INJECTION FACILITY (PCIF):** The MIL-STD 188-125 PCIF is fully capable of meeting required specifications for EMP testing of all types of systems.
- **RS 105 FACILITY:** The RS 105 Facility is available to provide the transient environments of MIL-STD 461E of equipment and small systems.

## HIGH ENERGY LASER SYSTEMS TEST FACILITY (HELSTF):

The High Energy Laser Systems Test Facility (HELSTF) is a Department of Defense Major Range Test Facility Base (MRTFB) activity. HELSTF's experienced workforce, test areas, access to extended land and air range space at WSMR, and infrastructure provide a one-of-a-kind capability for a wide variety of laser propagation, lethality, survivability, vulnerability, and dynamic engagement testing and evaluation. The Test Facility represents an approximately \$800 million investment in high energy laser research and includes the following capabilities:

- **SEA LITE BEAM DIRECTOR (SLBD):** A high-precision pointer-tracker system built by Hughes Aircraft Company for the U.S. Navy, the Sea Lite Beam Director provides the capability to track highly maneuverable tactical targets. The infrared optics on the beam director also serves as a high-resolution infrared imaging system that can record data from missile tests conducted at WSMR.
- **PULSED LASER VULNERABILITY TEST SYSTEM (PLVTS):** Operational since June 1992, the PLVTS is a surrogate laser device capable of duplicating many tactical laser threat systems.
- **THE HAZARDOUS TEST AREA (HTA)** is located 900 meters downrange from the laser test cells. The Hazardous Test Area is used for large targets or targets that explode or release large quantities of gas/liquid. Extensive instrumentation is also available at this site.
- **THE OPTICAL MAINTENANCE FACILITY (OMF)** provides an on-site capability to characterize, clean, and install optics of virtually any type; from windows to the new uncooled optics.
- **THE LARGE VACUUM CHAMBER (LVC)** is a 50-foot diameter sphere that can produce a vacuum equivalent to a 600,000 foot altitude. It is the only large vacuum chamber in the country capable of allowing the entry of full-power, high-energy laser beams.

Civilians from SMDC and HELSTF conduct a test of the HEL-MD system at WSMR. (Photo by J. Salazar)





An SM-6 launches to engage an over-the-horizon threat as part of the U.S. Navy's first live fire demonstration to successfully test the integration of the F-35 with existing Naval Integrated Fire Control-Counter Air (NIFC-CA) architecture. (Photo by D. Hamilton)

- **TARGET REFLECTED ENERGY MEASUREMENT (TREM) SYSTEM:** The The Large Vacuum Chamber at the High Energy Laser Test Facility TREM Capability measures in-band laser radiation reflected off a stationary ground target (static or spinning to emulate a dynamic target) used for testing a high energy laser weapon. This capability was developed in response to a high-priority shortfall identified by the 2004 Tri-Service Study (T-SS), which developed, scoped, and prioritized directed energy T&E infrastructure shortfalls. The shortfall represented a need for a capability to measure in-band laser radiation reflected off a ground target. This capability was developed by the Directed Energy Test and Evaluation Capability (DETEC) project and is owned and operated by HELSTF.
- **GROUND TARGET IRRADIANCE MEASUREMENT (GTIM) SYSTEM:** The GTIM capability measures, at the target, the irradiance distribution of an incident continuous wave (CW) laser beam in the near-infrared (NIR) portion of the spectrum (1.0  $\mu\text{m}$  – 1.6  $\mu\text{m}$ ). This capability was developed to resolve a high-priority shortfall identified by the 2004 DETEC Tri-Service Study. This shortfall represented the need for a capability to provide time dependent spatial distributions of CW laser irradiance in the NIR portion of the spectrum at the target surface. The GTIM capability was developed by the Directed Energy Test and Evaluation Capability (DETEC) program and is owned and operated by HELSTF.
- **20 KW SOLID STATE FIBER LASER:** HELSTF owns and operates a 20 kW fiber laser welder device as part of a high energy laser capability for solid-state laser testing. The device is housed in a container, with its ancillary equipment, that can be transported to any location to support high energy laser testing.
- **THEL STATIC TEST SITE (TSTS):** A fully instrumented site with remotely controlled diagnostic equipment, the TSTS is located approximately 700 meters downrange from THEL and allows for safe testing of multiple full-scale tactical and explosive targets.

### Life Cycle Management

#### RADIATION TOLERANCE ASSURED SUPPLY AND SUPPORT CENTER (RTASSC):

The RTASSC is an ISO 9002 certified service-oriented supply and support center dedicated to assist military and space system program offices with diminishing manufacturing sources and material shortages, proactive and reactive management and solutions and radiation tolerance (RT) "cradle-to-grave" life cycle management and solutions.

#### APPLIED ENVIRONMENTS:

Applied Environments are used to determine if systems can effectively operate in diverse real world conditions. The Survivability/Vulnerability Directorate can subject an entire system to extreme low and high temperature environments in climatic test facilities. Four large test cham-



bers, with the largest being 105' long X 40' wide X 60' high, are available for hazardous climatic testing of very large systems. Temperature tests can be run on complete systems or individual components. A very large solar heating chamber (70' long X 40' wide X 40' high) is available for solar loading of large systems. The capability also exists to expose both the system and its components to rigorous dust, wind, fungus and other phenomenon. Shock and vibration facilities that duplicate typical life cycle environments are on-hand as well. Launcher dynamics are accessible to instrument large missile launchers at the launch site.

### CLIMATIC TEST FACILITIES:

The WSMR Climatic Test Facilities operates IAW MIL-STD-810 (14 Jun 1962), Military Standard Environmental Test Methods for Aerospace and Ground Equipment. This standard establishes uniform methods for environmental tests for determining the resistance of aerospace and ground equipment to the deleterious effects of natural and induced environments peculiar to military operations. The test methods contained in MIL-STD-810 are intended to specify suitable conditions obtainable in the laboratory which give test results similar to actual service conditions, to obtain reproducibility of the results of tests, and to serve as a guide for those engaged in preparing the environmental test portions of detail specifications.

- **TEMPERATURE TEST FACILITY (TTF):** The Temperature Test Facility, two miles from the main post area, has three permanent temperature conditioning chambers: The Large Test Chamber (LTC), The Small Test Chamber (STC), The Salt Fog/Humidity Chamber, where extreme temperature testing, temperature shock testing, and solar radiation testing are per-

formed. When required, and if the test items are safety compatible, all three chambers can conduct testing simultaneously. The TTF is approved for hazardous testing of explosive items up to 30,000 lbs. of Class 1.1.

- **ENVIRONMENTAL TEST AREA II (ETA-II):** ETA-II, located 1.5 miles from the main post area, has multiple environment test facilities. ETA supports the following types of testing: fungus, high temperature, rain, wind, sand/dust, and small item temperature, humidity, salt and fog testing. Multiple tests can be conducted simultaneously.
- **HOT CHAMBER:** The Hot Chamber, located on the main post, has the ability of conducting high temperature, solar radiation, humidity, and salt fog testing on non-hazardous test items.
- **ALTITUDE CHAMBER:** The small multipurpose Altitude Chamber can generate altitude environments from 500 feet below sea level to 150,000 feet above sea level. Large test items are tested under natural conditions at locations at WSMR approaching 10,000 feet in altitude. The locations and chamber are certified for explosive test items.
- **IMMERSION TANK:** A transportable four-foot cubed leakage (immersion) tank is available for immersion depths of one meter.
- **FIELD CONDITIONING EQUIPMENT:** Portable conditioning equipment, power generators and shrouds are available for temperature testing anywhere on WSMR or off-post if required. Permanent temperature test chambers (two each) are located at LC-33 site to support pre-fire extreme temperature conditioning requirements.

Stars fill the sky above the ground-based electro-optical deep space surveillance telescope located on White Sands Missile Range-- the location of Detachment 1, 20th Operations Group and their space surveillance mission. (Photo by D. Hoffman)



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A Standard Missile 3 (SM-3) test launch at White Sands in 2005.

### DYNAMIC TEST FACILITIES:

WSMR personnel assess and evaluate warheads and explosive devices to determine their lethality, reliability, vulnerability and hazards associated with handling and transportation.

- **DROP TESTS:** Tests include drop tests (up to 40 lbs.), detonation propagation tests; slow cook-off tests; fast cook-off tests using JP-4, diesel or wood; insensitive munitions tests; and bullet impact tests.
- **CENTRIFUGE TESTS:** Centrifuge tests are conducted on safe and armed devices to measure arming devices and electrical parameters. Centrifuge tests emulate acceleration forces encountered during test flights.
- **WARHEAD ARENA TESTS:** Special Warhead Arena Tests are performed for pattern distribution, density, velocity, blast overpressure and fragment size and weight. Inspection and failure analysis of damaged or question-

able rounds are accomplished by remote explosive disassembly, including cutting, coring and steaming. Technical consultation for customized explosive testing is also available.

- **DYNAMIC TEST FACILITY:**

The Dynamic Test Facility is approved for hazardous testing and consists of electro-dynamics and electro-hydraulics test areas. The electro-dynamics area includes three bays. One bay has four 18,000 lbf exciters which can be configured in push-push or push-pull arrangements. Up to eight exciters can be controlled simultaneously with the Multi-Axis Vibration Control System. A second bay contains the 3-D Exciter System. This system is capable of motion in three axes simultaneously with an output of 1000 lbf or it can be used as an 18,000 lbf single-axis system. The third bay is dedicated to shock testing with 60" x 60" and 12" x 12" machines. Loose cargo testing is performed on a 6000 lb. capacity Package Tester. The Electro-Hydraulics building contains three 4" and four 10" actuators capable of 40,000 lbf (dynamic) and 70,000 lbf (static). This system is currently under development and is designed to test entire vehicles by providing six degrees of motion.

- **WARHEAD IMPACT TARGETS:**

Launch sites are strategically placed both on and off WSMR to provide flight distances ranging from approximately 7km to 300 km. The Warhead Impact Targets (WITs) are specifically designed and instrumented to support smart munitions/smart submunitions (SM/SSM) programs in addition to a large variety of multiple cargo submunitions programs. WITs are circular, vary in size from 4,200 ft. to 10,000 ft. in diameter and are grouped in two distinct categories. One category is used exclusively for tactical munitions configuration and the other category is used exclusively for munitions that might contain live detonators in fuzing

system, but not contain an inert main charge. WSMR operates 11 Warhead Impact Targets (WITs) used for air-to-surface or surface-to-surface test missions.

### AERIAL CABLE FACILITIES:

Located in the north central area of White Sands Missile Range, the Aerial Cable Range (ACR) is a tri-service DoD test facility managed by the Range Operations Directorate. The three-mile long Kevlar<sup>®</sup> cable suspended between two mountain peaks at the ACR is the longest unsupported cable span in the world. The cable, which can support up to 20,000 pounds, serves as a path for captive vehicles that can be rocket propelled or gravity accelerated at controlled speeds and predetermined altitudes above ground level. The ACR provides suspended cable testing in a controlled area with restricted airspace to support a variety of test programs including: missiles; missile signature; missile simulator; flare countermeasures; small arms up to 20 mm; prototype aircraft electronics; submunitions; bombs; sensors; electronic countermeasures; static tests; radar; electronic scoring systems; aircraft signature characterization; background clutter characterization; hazardous fire indicator tests; warning sensors and devices.

### METALLURGY LABORATORY:

The Metallurgy Laboratory is one of several non-destructive test laboratories available to perform specific evaluations of systems. The lab conducts metallurgical inspections to assess corrosion prevention and control, health hazards assessment and conformance, environmental testing and failure analysis of explosive components. It is capable of supporting the following analyses of explosive and non-hazardous test items:

- Nondestructive evaluation (x-ray radiography).
- Scanning electron microscopy (SEM).
- Energy Dispersive X-ray analysis (EDX).
- Corrosion of materials.
- Heat-treating.
- Failure analysis.
- Technical consultation.



### Team White Sands Missile Range (Team WSMR)

As shown on the organization chart in the Range Organizational Structure section of this handbook, a number of organizations, which fall outside the WSMR Test Center, have established laboratories on the Range or at Holloman Air Force Base. These organizations are known as Team WSMR organizations.

These resident organizations include: Naval Surface Warfare Center Port Hueneme Division Detachment White Sands (NSWCPHD - Det WS), the Air Force 96th Test Group Detachment 1 (Det 1, 96th TG), Assistant Secretary Of The Army For Acquisition, Logistics And Technology (ASAALT) System Of Systems Integration (SoSI) Directorate; National Aeronautics and Space Administration (NASA), Training & Doctrine Command (TRADOC) Analysis Center (TRAC), Defense Threat Reduction Agency (DTRA), Army Research Laboratory (ARL), Center for Countermeasures (CCM), and National Geospatial-Intelligence Agency (NGA).

A description of the support available from these agencies is included here as part of the overall WSMR capability.

#### NAVAL SURFACE WARFARE CENTER PORT HUENEME DIVISION DETACHMENT WHITE SANDS (NSWCPHD - DET WS):

The Navy Detachment sponsors all Navy test programs tested at WSMR. The Navy has many unique test facilities supporting surface-to-air and surface-to-ground weapon testing, missile assembly, missile all-up round testing, and research rocket build-up and launch operations. These facilities are described in the following paragraphs:

- **LAUNCH COMPLEX 34 (LC-34)** was established as the land-based test site for the Rolling Airframe Missile (RAM). This is a semi-hardened site used to flight test RAM against subscale and subsonic targets. The site is used to test various configurations of RAM missiles, weapon systems, support systems, and launchers.
- **LAUNCH COMPLEX 35 WEST (LC-35W)** LC-35W is known as the LLS-1 Desert Ship. All versions of Standard Missile (SM) have been tested at the Desert Ship including SM-2 Block II (Terrier, Tartar, AEGIS, and Vertical Launch AEGIS), SM-2 Block III/IIIA/IIIB (Terrier, Tartar, and Vertical Launch AEGIS), SM-2 Block IV (Extended Range Vertical Launch AEGIS), and SM-6. The SM-6 Fire Control System is located at LC-35W and the missiles are remotely Launched from Launch Complex 35 North (LC-35N), allowing for increased hazardous missions such as Point Defense with targets flown directly at the launch complex. The Desert Ship is being upgraded and rather than a missile test platform, will be more tactical like and perform Engage On Remote (EOR), Over the Horizon missions. With the addition of near Tactical Aegis Fire Control System (AFCS) and Cooperative Engagement Capability (CEC) is now a System of Systems (SoS) Test Facility. Other Navy systems that have been tested here include Sea Lance, NATO Seasparrow Missile (NSSM), and Vertical Launch ASROC (VLA). The Desert Ship functionally duplicates the fire control requirements of a surface ship and houses dedicated telemetry, target monitoring, data extraction, and reduction systems.

Chief of Naval Operations Adm. John Richardson toured and reviewed new technologies being developed and tested at the High Energy Laser Systems Test Facility (HELSTF) and USS Desert Ship (LLS 1). (Photo by E. Fabrizio)

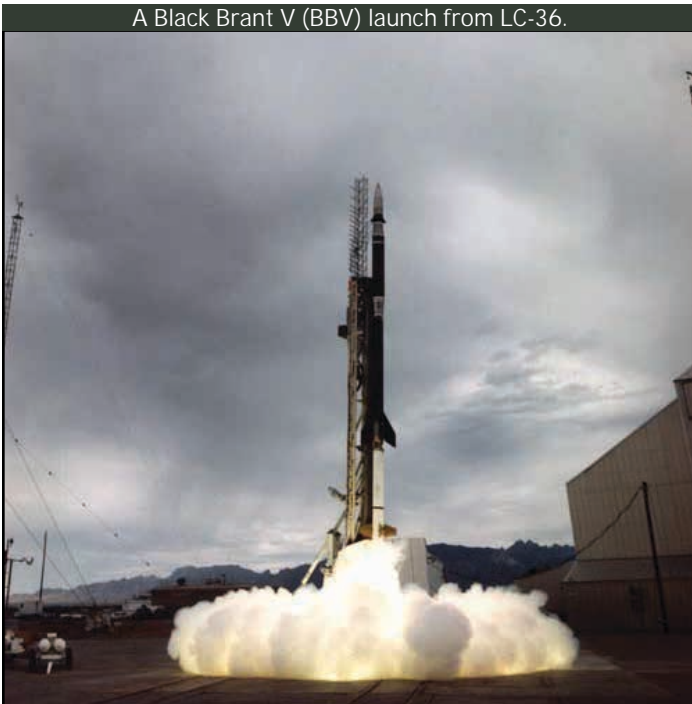


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- **LAUNCH COMPLEX 35EAST (LC-35E)** is a Research Rocket facility that includes a block-house, launch control equipment, and a payload assembly building. Current use of this facility is for NASA payload build-up, telemetry pre-launch and launch support, and uplink control of rocket payloads.
- **THE MISSILE ASSEMBLY FACILITY (MAF)** is located south of Launch Complex 35. The main building is 26,000 square feet and has four assembly bays; two of which are configured with Type I 300-pound Net Explosive Weight Test Cells. This facility permits test and assembly operations on four different missiles at a time. In 2003, an addition was added to the MAF providing additional office and storage space, and transfer, shipping and receiving bays. The MAF provides first article through Limited Production (LP) missile round build-up and proofing of handling and restraint equipment. The MAF recent missile assembly has involved SM-3 and SM-6.
- **LAUNCH COMPLEX 36 (LC-36)** is used for launching suborbital rockets. The complex includes a block-house, launch control equipment, and four active launchers with environmental shelters. These launchers are; a 37 ft. rail with 8,000 lb. capacity; a 48 ft. rail with 25,000 lb. capacity; a 160 ft. rail (tower) with 8,000 lb. capacity; and a 48 in. diameter stool with 50,000 lb. capacity (Aries class). In addition, a mobile launcher can support operations at other WSMR or off-range locations. The mobile launcher has a 30 ft. rail with 15,000 lb. capacity.
- **LC-37 ADVANCED GUN MUNITIONS TEST SITE (SQUIRT SITE)** includes a concrete structure for housing various advanced gun systems, a permanent bunker and a concrete pad. The site has been used for Vertical Launching System restrained firings.

A Black Brant V (BBV) launch from LC-36.



- **THE SULF SITE LAUNCH FACILITY COMPLEX** is located at the northwest end of the Range and is equipped with a blockhouse and ordnance assembly building, three active launchers, and a 65 ft. environmental shelter. The launchers include a 40 ft. rail with 50,000 lb. capacity, a 48-in diameter stool with 50,000 lb. capacity (Aries class), and a dual-rail Vandal launcher. The complex is used to launch targets to support missile intercept testing and to launch technology demonstrators or unique science and engineering payloads into sub-orbital trajectories.
- **WEST CENTER 50 (WC-50)** is located in the central portion of the Range near Rhodes Canyon. This facility includes a hardened blockhouse that is used to support Navy and Army testing. The central location of this facility maximizes the ability to accommodate testing of short-range systems without a Flight Termination System (FTS).
- **THE INDUSTRIAL COMPLEX** includes a full range of industrial and construction support with sheet metal, welding, electrical, and electronic shops. All services are available throughout the missile range. A full line of material handling capabilities is available including 40-ton and 60-ton mobile cranes.

### AIR FORCE 96TH TEST GROUP DETACHMENT 1 (DET 1, 46TH TG):

The 96th Test Group is composed of the following organizations: Detachment 1, 746th Test Squadron, 846th Test Squadron, National Radar Cross Section (RCS) Test Facility, 586th Flight test Squadron, and Operating Location (OL-AA) at Kirtland Air Force Base. The 96th Test Group is under the 96th Test Wing, Air Armament Center, Eglin Air Force Base, Florida.

- **46TH TEST GROUP DETACHMENT 1** serves as the Air Force's liaison with WSMR, interfacing with the U.S. Army and Test Center organizations. In addition, the unit provides test sponsorship for all Air Force programs testing on WSMR, assisting test program customers in preparing the documentation necessary to execute tests as well as obtaining logistic and test support resources. Detachment 1 also schedules airspace for all Air Force tests and Air Force tactical training on WSMR.
- **746TH TEST SQUADRON (TS)**, also known as the Central Inertial Guidance Test Facility (CIGTF), is the DOD's designated Responsible Test Organization (RTO) chartered to test and evaluate GPS user equipment (UE) and integrated GPS-based guidance and navigation systems. With over 36 years of experience, CIGTF has established itself as a leader in Inertial, GPS, and blended GPS/Inertial components and system testing. By coupling our years of experience and expertise with state-of-the-art test and evaluation tools, CIGTF is ready to take on any test challenge. In addition, CIGTF's inclusive ground, field, and flight testing capabilities offer the customer a cost-effective means to evaluate their guidance and navigation systems.





An F-16 Fighting Falcon sits in a hangar prior to departure at Holloman Air Force Base, N.M., May 2015. During night operations, F-16 students train wearing night vision goggles while performing combat training missions. (Photo by E. Kenney)

In support of GPS testing, the 746th TS also manages the tri-service GPS Test Center of Expertise (COE) comprised of Army, Navy, and Air Force test agencies chartered to support GPS test and evaluation initiatives. The 746th TS is located at Holloman AFB and is adjacent to WSMR in southern New Mexico.

- **846TH TEST SQUADRON/TGTD, HOLLAMAN HIGH SPEED TEST TRACK (HSTT):** The Holloman High Speed Test Track is a rocket test and aerospace test facility which provides an efficient and safe means of testing customer test items while minimizing risks and reducing cost for a wide variety of test hardware in a near-operational environment. Specific advantages are: the test items are recovered for post-run analysis; the sled provides sustained linear and dynamic acceleration and velocity with superimposed, tailored vibration; and the sled track provides extremely accurate test article positioning and time correlation. Repeated tests of the same test item provide an independent evaluation of modifications made during a development program.

The Holloman High Speed Test Track is the longest (50,788 feet) and most precisely aligned and instrumented facility of its kind in the world. The track is used to simulate selected trajectories of aircraft and missiles under stringent conditions. Sled speeds up to 7,000 ft./sec are routine, while speeds above 8,900 ft./sec have been demonstrated. Depending on mission needs, sled weights range from 100 to 30,000 pounds; however, heavier sleds can be operated as required. Also, depending on payload size, accelerations above 200 g's have been demonstrated. The Holloman High Speed Test Track is organized as a squadron under the 46th Test Group, a tenant organization on Holloman Air Force Base, N.M. It is physically located near

the eastern boundary of WSMR, virtually unaffected by environmental and encroachment problems. While operated primarily for the needs of the Air Force Materiel Command, its test capabilities are also available for other government agencies and their respective contractors.

- **NATIONAL RADAR CROSS SECTION TEST FACILITY:** The National Radar Cross Section (RCS) Test Facility (NRTF) is the premier DoD facility for RCS testing. Formerly known as RATSCAT, which began measuring radar scattering in 1963, it is comprised of two complementary sites: Mainsite and RATSCAT Advanced Measurement System (RAMS). Assigned to the U.S. Air Force's 781st Test Squadron, NRTF is located west of Holloman Air Force Base in a rolling gypsum region of WSMR. NRTF specializes in the RCS characterization of full-scale, aerodynamic vehicles and antenna radiation pattern development. Due to its remote, secure environment, it can also accommodate customers requiring specialized testing of developmental electronics systems. NRTF products directly support weapon system development programs, vulnerability assessment studies, and mission planning efforts throughout the DoD.
- **586TH FLIGHT TEST SQUADRON:** The 586th Flight Test Squadron (586 FLTS) performs flight tests of the most advanced aircraft systems in the world. The squadron has aircraft parking and administration facilities to provide a high level of security to its customers. It owns and operates three highly modified AT-38B aircraft equipped to support a wide variety of flight test operations. Capabilities of the squadron's AT-38Bs include: chaff, flares, GPS navigation and precision data recording and telemetry, ECM, Air Com-

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Soldiers from Special Troops Battalion, 2nd Heavy Brigade Combat Team, monitor the brigade's tactical communication in order to track troop movement from Fort Bliss, Texas, to Tobin Wells during NIE 12.2 in 2012. (Photo by J. Thomas)

bat Maneuvering Instrumentation (ACMI) pods, and multiple format photographic coverage (including helmet-mounted video cameras). The squadron owns and operates a highly modified C-12J (Beech 1900 Airliner) with multiple antenna and pod configurations for guidance/navigation, avionics, and electronics testing. The 586 FLTS has access to both full-scale and sub-scale unmanned aerial targets as well as one of the world's most elaborate ground impact ranges. The 586th Flight Test Squadron is the world's leading authority on overland firings of the Air Force's primary medium range air-to-air missile (AMRAAM).

- **NORTH OSCURA PEAK:** The Air Force Research Laboratory (AFRL) is headquartered at Wright-Patterson Air Force Base, Ohio. The AFRL Directed Energy Directorate is headquartered at Kirtland Air Force Base, Albuquerque, N.M., and manages the North Oscura Peak facility located at WSMR. The facility is located at an elevation of approximately 8000 feet and includes a one-meter telescope capable of negative elevations settings and 360 degree rotation laser transmission. The facility has been used to support the Airborne Laser (ABL) program.

### ASSISTANT SECRETARY OF THE ARMY FOR ACQUISITION, LOGISTICS AND TECHNOLOGY (ASAALT) SYSTEM OF SYSTEMS INTEGRATION (SoSI) DIRECTORATE:

System of Systems Integration (SoSI) Directorate utilizes the Family of Systems approach to ensure integration and interoperability between Army Programs of Record (PORs), current force systems, urgent need systems, and other Doctrine, Organization, Training, Leadership, Personnel and Facilities (DOTL-PF) elements to achieve integrated unit capabilities for a full-spectrum force. This integration approach will be implemented through development, acquisition, testing, product improvement and fielding while ensuring total ownership cost reduction. SoSI provides system engineering, integration and test/evaluation expertise to field fully-integrated and tested Capability Packages composed of vehicles, network elements, equipment, and supporting infrastructure to modernize Brigade Combat Teams (BCTs) to achieve unprecedented joint combat capability in conjunction with the Army Force Generation (ARFORGEN) process.

**AGILE PROCESS:** SoSI, under ASAALT, supports the Army's Agile Acquisition Process:

- The Army is transforming its current acquisition methods through the new A 2nd Brigade, 1st Armored Division Soldier demonstrates a Joint Battle Command-Platform handheld (JBC-P), which is used with the Joint Tactical Radio System Rifleman Radio. The handhelds and radios were evaluated during the Army's Network Integration Evaluation (NIE) 12.1 event at White Sands Missile Range, N.M., and Fort Bliss, Texas, in October/November 2011. The handhelds and radios enable lower-echelon Soldiers to better communicate with one another and higher Headquarters.
- Agile Process designed to improve efficiency and effectiveness, and reduce the amount of time and resources necessary to respond to the rapid changes in Soldier requirements. By employing the Agile Process, the Army is able to keep pace with industry and technological advances, accelerating the pace of network modernization to a rate unachievable by traditional strategies. This process allows the Army to incrementally improve the network over time and provide deployed units with better capabilities, quicker, and in a more cost-effective manner.
- SoSI leads three of the six phases in the Agile Process: Phase 1 (Solicit Potential Solutions), Phase 2 (Candidate Assessment) and Phase 4 (Network Integration Rehearsal).

**NETWORK INTEGRATION EVALUATION/NETWORK INTEGRATION REHEARSAL (NIE/NIR):** SoSI provides critical support to the Army's twice-annual NIEs/NIRs:

- A key component of the Agile Process is **Network Integration Evaluation (NIE)**, a series of semi-annual evaluations designed to holistically integrate and rapidly progress the Army's tactical network, and improve the way networked technologies are delivered to Soldiers. These Soldier-led operational evaluations provide integrated, end-to-end capabilities from the static Tactical Operations Center (TOC) while on the move, and down to the dismounted Soldier at the tactical edge.
- SoSI serves as the lead network architect and systems integrator for NIE and the **Network Integration Rehearsal (NIR)**, synchronizing the effort across the



broader materiel development community. SoSI integrates and synchronizes services and support to all ASAALT and Industry participants, and provides the ASAALT single interface to the Army Test and Evaluation Command (ATEC) and the user – Training and Doctrine Command (TRADOC) Brigade Modernization Command (BMC), and the 2nd Brigade Combat Team, 1st Armored Division (2/1 AD).

### **SYNCHRONIZED FIELDING:**

- SoSI is synchronizing the implementation and fielding of a fully-integrated Capability Set, known as CS 13, composed of vehicles, network components, associated equipment and software that, for the first time, will deliver integrated voice and data capability throughout an entire Infantry Brigade Combat Team (IBCT) formation. CS 13 integration efforts and architectures are informed by the Army's NIE process, and was fielded to eight IBCTs started in fiscal year 2013.
- Synchronized Fielding is the output of the Agile Process. Synchronized Fielding takes prototype designs that have proven technical and operational merit during the NIE and matures them into producible products while ensuring final system integration and sustainment plans prior to fielding a Capability Set to an operational unit.
- Top SoSI Synchronized Fielding efforts include maintaining configuration management of the final Capability Set technical network baseline approved during the NIE process. SoSI will also coordinate with system Program managers for maturation of B-kit components and with platform Program Managers for maturation of A-kit components, seeking proper integration of both.
- SoSI will manage the Capability Set Integrated Mas-

ter Schedule (IMS) for production and deployment and coordinate individual fielding among PEOs/PMs, FORSCOM, G8 and the gaining BCT while maintaining sustainment planning and asset handoff to the gaining units. For additional information on ASAALT's System of Systems Integration Directorate, visit <https://www.bctmod.army.mil>.

### **NASA:**

NASA's Lyndon B. Johnson Space Center, White Sands Test Facility (WSTF), conducts potentially hazardous testing as an interface to, and in conjunction with White Sands Missile Range. WSTF works with WSMR in support of customer needs and test activities. WSTF also has experience developing procedures to meet customer-specified test requirements at WSMR. Procedures have been developed to reduce turnaround time and costs based on customer test requirements. Experience has included high and low pressure gas systems, hypergolic rocket propellant systems, decontamination and cleaning systems, and cryogenic systems.

The White Sands Space Harbor (WSSH) runways, currently in mothball status, accommodate NASA and military aircraft. Large aircraft including the C-17, C-5As, B-52s, Boeing 747 and the Space Shuttle Columbia have landed there. WSSH has three hard-packed gypsum runways. Two are 35,000 ft. (11,000 m) long by 300 ft. (91 m) wide including wide shoulders and mimic runways at Kennedy Space Center, Florida and Edwards Air Force Base, California. A third runway is 12,800 ft. (3,900 m) long by 150 ft. (46 m) wide and mimics the runway at Ben Guerir, Morocco. WSSH can be instrumented with a vast array of navigation and landing aids. ([www.nasa.gov](http://www.nasa.gov); <http://www-pao.ksc.nasa.gov/kscpao/nasafact/pdf/TALsites-06.pdf>)

Felix and Paul Studios filmed the NASA Mars Rover in 2017 at White Sands Missile Range using a new 360 degree virtual reality camera. The white sands dunes were used to create a "Mars" like environment. The Rover broke new ground descending slopes 33.5 Degrees from a previous recorded of 15 degrees. (Photo by Felix and Paul Studios)



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An MLRS kicks up clouds of dust while firing during a test at WSMR. (Photo by D. Hamilton)

### **NATIONAL RECONNAISSANCE OFFICE (NRO), AEROSPACE DATA FACILITY - SOUTHWEST (ADF-SW):**

The National Reconnaissance Office (NRO), Aerospace Data Facility - Southwest (ADF-SW) is a multi-mission ground station responsible for supporting worldwide defense operations and multi-agency collection, analysis, reporting, and dissemination of intelligence information. The ADF-SW provides data to defense, intelligence and civil agencies supporting the U.S. government and its allies.

### **TRAINING AND DOCTRINE COMMAND (TRADOC) ANALYSIS CENTER (TRAC):**

TRAC at White Sands Missile Range, N.M., (TRAC-WSMR) conducts a wide variety of analyses for TRADOC, HQDA, and DoD agencies, including the Office of the Secretary of Defense (OSD) and military system program managers. TRAC-WSMR is responsible for analysis of brigade operations and developing life cycle costs of new equipment. TRAC-WSMR develops, maintains, verifies and validates, and exports a suite of combat models and simulations to support analyses of battlefield functional areas and weapon systems, experiments, and training; and operational testing of new equipment under development.

#### **TRAC MISSIONS:**

- Conducting studies that inform key decisions made by TRADOC, Army, and Joint leaders.
- Developing and maintaining scenarios to underpin Army concepts and requirements.
- Developing, configuration managing and applying verified and validated Models and Simulations (M&S).
- Researching, developing, and sharing new analytic methods and modeling.

#### **TRAC KEY CAPABILITIES:**

- Serving as the Army lead for Ground Combat Vehicle (GCV) and precision fires analysis.

- Providing direct analytic support to the Brigade Modernization Command. (Agency charged with the conduct of brigade operational analyses.)
- Army developer and maintainer for Army's approved analytic combined arms combat simulation.

### **THE DEFENSE THREAT REDUCTION AGENCY (DTRA):**

DTRA is a combat support agency of the DoD, assigned the mission of safeguarding the United States and its allies from weapons of mass destruction (WMD-chemical, biological, radiological, nuclear and high-yield explosive weapons) by providing capabilities to reduce, eliminate, and counter the threat and mitigate its effects. DTRA's mission includes serving as the DoD focal point for the research, development, testing, evaluation and production of technology to support options against underground or hardened structures and other facilities. The agency provides end-to-end test event planning, management, safe execution, results analysis and threat-based operationally realistic targets supporting DoD, the Department of Homeland Security, the Department of State and various federal agencies and friendly nations' programs to counter proliferation of WMD.

DTRA Research and Development Enterprise's primary testing location is WSMR where it maintains a broad spectrum of target types on its test beds and directs the development and implementation of new weapons technologies against these targets. DTRA conducts a wide variety of research and development field tests to meet agency mission requirements. The agency headquarters is located at Fort Belvoir, Va. The DTRA Counter Weapons of Mass Destruction Technologies Directorate Test Support Division of the Research and Development Enterprise is located at Kirtland Air Force Base, Albuquerque, N.M. To learn more about DTRA, visit <http://www.dtra.mil>.

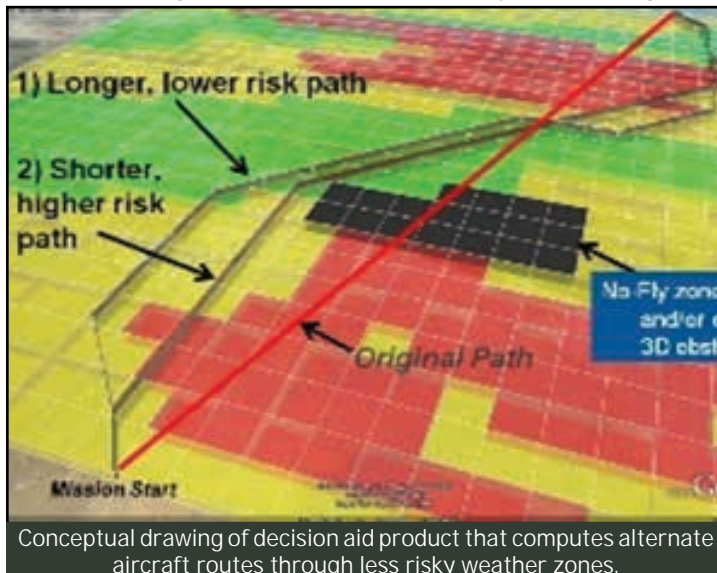


## ARMY RESEARCH LABORATORY (ARL):

The ARL of the U.S. Army Research Development and Engineering Command is the Army corporate, or central, laboratory. Its diverse assortment of unique facilities and dedicated workforce of government and private sector partners make up the largest source of world-class integrated research and analysis in the Army. As the nation's premier laboratory for land forces, ARL discovers, innovates, and transitions science and technology to ensure dominant strategic land power.

Elements of two ARL directorates are located on White Sands Missile Range: The Computational and Information Sciences Directorate (CISD), Battlefield Environment (BE) Division; and the Survivability/Lethality Analysis Directorate (SLAD), Cyber Electromagnetic Vulnerability Analysis and Assessment Division (CEMVAAD), and Cybersecurity Vulnerability Analysis and Assessment Division (CVAAD).

- **CYBER ELECTROMAGNETIC VULNERABILITY ANALYSIS AND ASSESSMENT DIVISION (CEMVAAD):** CEMVAAD serves as the principal activity in the Army for determining survivability, lethality, and vulnerability (SLV) of Army systems in all environments against the full spectrum of cyber electromagnetic activities (CEMA) and electronic warfare (EW) threats. The Division provides SLV analysis and evaluation expertise to acquisition Program Managers supporting a wide range of Army weapon, communication, navigation, and sensor systems. CEMVAAD Scientists and engineers provide laser vulnerability assessments as well as EW analyses and monitoring in laboratory, hardware-in-the-loop, anechoic chamber environments as well as Developmental Testing (DT) and airborne Operational Testing (OT). CEMVAAD researches, investigates, and recommends counter-countermeasures for Army systems to reduce their susceptibilities/vulnerabilities and to ensure the optimum survivability and lethality in threat environments. Additionally, CEMVAAD provides timely, accurate, and comprehensive SLV analysis, assessments, and advice concerning CEMA and EW threats to system managers,



The main test chamber in the Electromagnetic Vulnerability Assessment Facility, which is over 100 feet long, can test everything from computer networks to tanks and small aircraft.  
(Photo by D. Hamilton)

researchers, developers, users, decision makers, and independent evaluators. CEMVAAD and its predecessor organizations have carried out missions on WSMR since 1952. CEMVAAD has employees on WSMR, NM; and Aberdeen Proving Ground, MD.

- **CYBERSECURITY VULNERABILITY ANALYSIS AND ASSESSMENT DIVISION (CVAAD):** The CVAAD mission provides complete lifecycle Cyber survivability & vulnerability analysis to Army acquisition, operational units, and HQDA (CIO/G6 & G3/5/7) to secure the current force and prepare the future force. CVAAD provides penetration testing, vulnerability analyses, and vulnerability assessment to Government agencies, to include system developers, PEOs, PMs, and in support of the Army Evaluation Center and Operational Test Command during DT and OT, and for the CIO/G-6 during Army Interoperability Certification events. Additionally, CVAAD manages personnel and tools used to conduct cybersecurity penetration testing, vulnerability analyses, vulnerability assessments, and protect, detect, react, and restore analyses. Outside of the T&E construct, CVAAD supports multiple S&T initiatives local to the El Paso, TX and Las Cruces, NM areas. Currently, CVAAD has partnered with University of Texas El Paso to form the Center for Cyber Analysis and Assessment, which provides external researchers access to Army technology and needs. CVAAD is currently extending our physical foothold to partner with New Mexico State University for collaboration. CVAAD has employees on WSMR, NM; Aberdeen Proving Ground, MD; and Fort Hood, TX.
- **COMPUTATIONAL AND INFORMATION SCIENCES DIRECTORATE (CISD): BATTLEFIELD ENVIRONMENT DIVISION (BED):** The CISD-BED's mission is to enhance Warfighter effectiveness through environmental knowledge and technology; performing basic and applied research to advance the understanding of the atmosphere and its relationship to and impact on the performance of battlefield systems, personnel, and operations. BED's predecessor organization through the early 1990s was the US Army Atmospheric Scienc-

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The Legacy Warhead Improvement Program testing 2,000 lb. Penetrator Warheads at Holloman High Speed Test Track, N.M. The projectiles were fired at different velocities into various configurations of hardened concrete targets to assess the weapon's survivability. (Photo by HHSTT)

es Laboratory headquartered at WSMR. At that time, BED was integrated into the corporate U.S. Army Research Laboratory, headquartered in Adelphi, Md; with personnel and R&D functions on both sites. The current missions of BED's Atmospheric Modeling Branch and the Atmospheric Dynamics Branch on WSMR are to perform research required to help the Soldier, commander, and weapons system designer better understand and model atmospheric effects on performance and to maximize their success during battlefield operations, especially in the lower atmosphere and over complex terrain. To accomplish this, the branches characterize meteorology in the boundary layer at very high spatial and time resolutions through theoretical, basic research and the development of "Nowcast" weather prediction models providing highly-detailed, short term forecasts of atmospheric conditions over complex and urban terrain in three dimensions and in near-real-time. A diagnostic 3D wind field model characterizes the effects of streets and buildings on wind flow as well as the effects of mountain ridges and forest or jungle canopies. Weather decision aids provide planners and operators with intuitive warnings of many types of weather hazards on weapons systems, personnel, and operations, and can automatically find the best route for manned and unmanned aircraft around adverse weather. Methods are developed to provide meteorological correction data for artillery firing solution systems. To support these activities, BED is establishing an extremely high-resolution network of environmental sensors within and adjacent to WSMR called the Meteorological Sensor Array. Products are transitioned to a variety of Army entities and to the US Air Force 557th Weather Wing (formerly the Air Force Weather Agency) for support of forward-deployed troops. Weather impacts and Nowcasting models are exploited in command and control systems such as the Distributed Common Ground Station-Army (DCGS-A) and the Tactical Airspace Integration System (TAIS). Learn more about the Army Research Laboratory at: [www.arl.army.mil](http://www.arl.army.mil).

### THE CENTER FOR COUNTERMEASURES:

The Center for Countermeasures is a joint activity that directs, coordinates, supports, and conducts independent countermeasure/counter-countermeasure (CM/CCM) test and evaluation (T&E) activities of U.S. and foreign weapon systems, subsystems, sensors, and related components in support of the Director, Operational Test & Evaluation (DOT&E), Deputy Assistant Secretary of Defense (DASD) Developmental Test & Evaluation (DT&E), weapon system developers, and the Services. The Center's testing and analysis directly supports evaluation of the operational effectiveness and suitability of CM/CCM systems.

Specifically, the Center assists the Services in:

- Performing early assessments of CM effectiveness against threat and DoD systems and subsystems.
- Determining performance and limitations of missile warning and aircraft survivability equipment (ASE) used on rotary wing and fixed wing aircraft.
- Determining effectiveness of precision-guided weapon (PGW) systems and subsystems when operating in a CM degraded environment.
- Developing and evaluating CM/CCM techniques and devices.
- Testing new CMs as they are discovered on the modern battlefield in operationally realistic environments.
- Providing analysis and recommendations on CM/CCM effectiveness to Service Program Offices, DOT&E, DASD (DT&E) and the Service member.
- Supporting Service member exercises, training, and pre-deployment activities.
- Providing SME input to panels, task forces, program reviews and/or working groups.

**Services and Products:** CCM supports the Services with:

- Open air infrared countermeasure (IRCM) T&E.
- ASE T&E with an emphasis on rotary wing platforms. HF data collection and activity coordination.
- Threat injection during pre-deployment events PGW T&E in a CM/CCM environment.



## **Unique Capabilities** include:

- Mobile, self-sufficient T&E equipment that is deployed to any DoD range or military training facility as required by the sponsor.
- Institutionally funded workforce provides significant savings to the program.
- Independent CM/CCM assessments at any time in the program's acquisition cycle.

## **T&E Support Areas:**

- Aircraft Survivability equipment (ASE)
- Missile Warning Systems and laser warning
- Directed Infrared Countermeasure (DIRCM) systems Flare and flare sequence development
- MANPAD live fire test events
- Hostile Fire (HF)
- Ground truth data measurements, calibration and evaluation
- Hostile Fire Indication (HFI) T&E methodology and HF database
- HF modeling and simulation tools
- Precision Guided Weapons (PGWs) and Targeting Systems Foreign obscuration
- Lasers
- Captive flight test
- Camouflage, concealment and deception
- Warfighter Integration and Pre-deployment training
- Exercises and military schoolhouse training support

**T & E Products:** CCM produces the following documents depending on the support requirement to DOT&E and the sponsoring Service Office:

- Event Report (ER): For every event an ER is produced, providing a synopsis of the event and applicable initial findings of the activity (usually a 1-2 page document).
- Analysis Report (AR): The compilation of results, analysis and test findings on how the system under test performed in the CM/CCM environment.
- Technical Memorandum (TM): A technical data package, usually without assessment components, for the sponsor.

**Process for Requesting T&E Support:** Requests are submitted to the Center's Director. A written request must be received from DoD or other U.S. government agency specifying the requested support before the activity begins (ideally, at least 90 days or earlier). The request letter should be addressed to the Center's Director at:

Center for Countermeasures  
1407 Martin Luther King Jr. Ave  
White Sands Missile Range, NM, 88002

In summary, the Center's mission is to:

- Assist the system developer and the DT and OT agencies in CM/CCM testing
- Support the Warfighter in preparation for operating in current theaters of operation and training exercises
- Provide independent, timely, accurate information and recommendations on CM/CCM T&E.

For More information: [ccmrequests@ccm.osd.mil](mailto:ccmrequests@ccm.osd.mil).

## **NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY (NGA):**

The National Geospatial-Intelligence Agency (NGA) at WSMR acquires, analyzes, reduces, and furnishes precise geodetic and geophysical survey data to WSMR support personnel and outside customers. NGA provides astrogeodetic deflections, geoid heights, gravity values, precise distances, true azimuths, astronomical positions/azimuths and geodetic control to accuracies of one part per million. Increased accuracies can be achieved using state-of-the-art equipment and techniques to precisely locate the impact points of missile components and other test debris for flight safety, recovery, and post-test analysis. NGA provides geodetic and Universal Transverse Mercator (UTM) positions based on the World Geodetic System 1984 (WGS84) and mean sea level elevations based upon the Earth Gravitational Model 2008 (EGM08).

The mission of the National Geospatial-Intelligence Agency (NGA) is to provide accurate and timely expert analysis of worldwide gravity, satellite and positional information including imagery and mapping control for navigation, safety, intelligence, positioning and targeting in support of national security objectives. The White Sands Missile Range NGA Support Team acquires, analyzes, reduces, and furnishes precise geodetic and geophysical survey information to WSMR mission partners and other DoD customers outside WSMR. NGA provides ground truth verification for applications such as radar/telemetry calibration, operational test and evaluation, target data for weapons testing as well as various special applications tailored to customer requirements. No one customer requirement is identical to another and are subject to changes, as survey plans are fluid. For more information contact Chief, White Sands Missile Range NGA Support Team, Building 1621, White Sands Missile Range, N.M. 88002 or call (575) 678-2140.

DTRA prototype of the 30,000-pound Massive Ordnance Penetrator at a WSMR firing range.





## VISITING THE RANGE

### Directions to White Sands Missile Range

The range is located in the Tularosa Basin of south-central New Mexico. The headquarters area is 20 miles east of Las Cruces, N.M., and 45 miles north of El Paso, Texas. The range boundaries extend almost 100 miles north to south by 40 miles east to west. At almost 3,200 square miles, WSMR is the largest military installation in the country.

#### TO WSMR MAIN POST FROM EL PASO INTL. AIRPORT, TEXAS:

- When you leave the El Paso Airport area, turn right onto Airway Blvd. At the second stoplight, turn right onto Airport Rd. Airport Rd. becomes Fred Wilson Blvd.
- Immediately after the Fred Wilson overpass, turn right and enter highway ramp on the left). Continue on Highway 54 and exit on Martin Luther King, Exit 31.
- Turn left onto MLK Blvd. and stay on it (follow signage).
- It is approximately 34 miles from this point to the WSMR Main Post El Paso Gate entrance.
- After the cattle guard, note lower speed limit (55 mph).
- At the second yellow flashing light, the road makes a 90 degree right turn (speed limit on the turn is 15 mph). Stay on the highway; the mountains will be on your left hand side.

#### FROM LAS CRUCES, NEW MEXICO:

- Take I-25 north to Highway 70 East (Highway 70 is also called "Main Street").
- Turn right onto Highway 70 East towards WSMR/Alamogordo.
- Continue on Highway 70 East for about 25 miles over San Augustine Pass; exit just after mile marker 169.
- Turn right onto Owen Rd.
- The Las Cruces/Alamogordo Main Post Gate is approximately 3 miles ahead.

#### FROM ALAMOGORDO, NEW MEXICO:

- Take Highway 70 West.
- Proceed about 47 miles to the missile range exit labeled "Headquarters," mile marker 172. The exit ramp loops under Highway 70 onto Owen Rd.
- The Las Cruces/Alamogordo main post gate is approximately 3 miles.

#### WSMR VISIT REQUESTS:

##### **Personnel with DoD issued CAC and access to JPAS:**

- A valid CAC is sufficient to gain access to WSMR.
- Have your security POC coordinate the visit through your range sponsor. Any security clearance actions must be handled through the appropriate Security Manager or designated contractor Facility Security Officer. Only a single visit request is required.



**Personnel with access to JPAS, but do not have a CAC:**

- Have your security POC coordinate the visit through your range sponsor. Any security clearance actions must be handled through the appropriate Security Manager or designated contractor Facility Security Officer.
- A completed WAB badge request form will be required.
- Your JPAS data will be used to gain access to WSMR.

**Personnel with a security clearance, no access to JPAS, and no CAC:**

- Have your security POC coordinate the visit through your range sponsor. Any security clearance actions must be handled through the appropriate Security Manager or designated contractor Facility Security Officer.
- A completed WAB badge request form will be required.

**Personnel with no clearance/none of the above:**

- Have your security POC coordinate the visit through your range sponsor. Any security clearance actions must be handled through the appropriate Security Manager or designated contractor Facility Security Officer.
- A completed WAB badge request form will be required.
- Review the information needed per Form 5000-E.
- Access to WSMR will require an NCIC III background check.

African oryx also known as gemsbok (*Oryx gazella*) are sometimes seen in and around WSMR roads.

**NASA VISIT REQUESTS:**

- Visitors should coordinate their visit through their range sponsor. Any security clearance actions must be handled through the appropriate Security Manager or designated contractor Facility Security Officer.

**VISITING THE RANGE:**

Visitors are to remain within the cantonment area on the installation. Visitors can access the housing area, but can go no farther than Hughes Road (off Nike Road) with the following exceptions:

- When on official business with authorization by the activity being visited, to travel directly to and from that activity.
- Foreign nationals when on official business accompanied by a military or civilian employee, or by contractor personnel who have unrestricted travel authority to and from activities located outside the main post area. All such escorts must be "Foreign National Escort" trained by the Test Center Foreign Disclosure Officer.
- Commercial vehicle drivers will produce a Bill of Lading that indicates the location, agency, or building to be visited. Once verification is completed, a pass will be issued.

Visitors are required to provide their WSMR Point of Contact (POC) name and telephone (land-line preferred) number to assist the Reception Center personnel in verifying visitor's intended actions as they visit the range.

**VEHICLE REGISTRATION:** Individuals with Department of Defense (DoD) affiliated identification cards or individuals with RAPIDGate Passes can access the installation without stopping at the Reception Center for a vehicle pass. DoD affiliated personnel will still be able to vouch for visitors. Visitors with no DoD affiliated identification will still be required to obtain a temporary pass for their vehicle when entering the installation. Other government identification may be approved and authorized on a case-by-case basis. If a DoD ID card holder is riding in a vehicle not owned by the DoD ID holder, there will be no requirement for a temporary pass. Personnel who have vehicles that currently have a military registration sticker should remove and destroy the stickers once they expire.

In order to obtain a pass, the driver will have to show a valid driver's license, current vehicle registration, and current proof of insurance which is required by the State of New Mexico by all motor vehicle operators.

**BADGE REQUIREMENTS:** For other entrances, visitors must be able to provide authorization to be up-Range as is available through their Sponsor's Security Coordinator. News media representatives are required to be escorted while on range except at events open to the public.

**ROADBLOCK INFORMATION:** The missile range often sets roadblocks on public roads such as U.S. Highways 70, 54 and 380. The Highway 70 blocks are set at various points between White Sands National Monument and San Augustin Pass. The Highway 380 blocks are set east of the Rio Grande and west of Carrizozo. The Highway 54 blocks

# VISITING THE RANGE

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are set south of Oro Grande, N.M., and north of the N.M. and Texas state line.

To access the latest roadblock information, call the phone number below. The information is usually updated each weekday in the afternoon for the following day. Since the actual firings can slide due to any number of circumstances like weather or equipment problems, travelers should also check the recording right before leaving to ensure nothing has changed at (575) 678-1178.

**PHOTOGRAPHY RESTRICTIONS:** Generally, photography is prohibited; however, personal photography is authorized without prior permission in the following areas:

- North of Martin Luther King Blvd. to Highway 70 to include all of Owen Road, except in the area bordered by Headquarters Avenue, Aberdeen Avenue, Dyer Street, and Martin Luther King Blvd.
- West of Headquarters Avenue to the western range boundary, Area south of Nike Avenue to Martin Luther King Avenue east,
- Headquarters Avenue (otherwise known as Range Road 1 or El Paso Road) only to 500K access.
- These areas include the skeet range, JFK Parade Field, Missile Park, clinic, barracks, picnic and recreation areas.

All other areas require photo permits. Requests must be signed by an official of a Range or tenant element, and then forwarded to the Directorate of Plans, Training, Mobility & Security (DPTMS) Security Manager for approval. Photography of mission-related areas is limited to authorized official WSMR photographers. The absence of an official photographer's permit may result in confiscation of film and/or photography equipment.

### UNEXPLODED ORDNANCE (UXO):

The safety of the White Sands workforce, our visitors, and our families is our number one priority.

Unexploded ordnance is a complex problem and not unique to White Sands Missile Range. White Sands has initiated a very aggressive safety and remediation program and has published one of the most comprehensive plans in all of DOD for dealing with UXO, the UXO Hazards and Munitions Management Plan.

Visitors to White Sands Missile Range will be required

to have UXO safety awareness training. Visitors wishing to travel outside the White Sands Extended Cantonment Area on a non-escort basis shall:

- Read and sign the UXO Range Hazards Orientation Letter and provide a copy to their sponsor.
- View the seven minute long UXO Hazards Video or attend an EOD briefing (<https://www.atec.army.mil>).
- If requested by their sponsor, complete and submit the Record of Organizational Training on Unexploded Ordnance Range Hazards.
- For questions, Please contact the White Sands Test Center (WSTC) or your Range Sponsor.

### INSTALLATION HOURS OF OPERATION:

WSMR personnel are here to serve your testing needs. Based on your testing priorities, we will strive to meet your requirements on weekends and holidays as needed. Core working hours are from 0800 to 1630 Monday through Friday. Mission objectives may require shift work in which working hours are adjusted outside of the normal core hours to support your needs.

WSMR has an annual Range Shutdown period for specific maintenance that encompasses the Saturday before Christmas through the Saturday after New Year's Day.

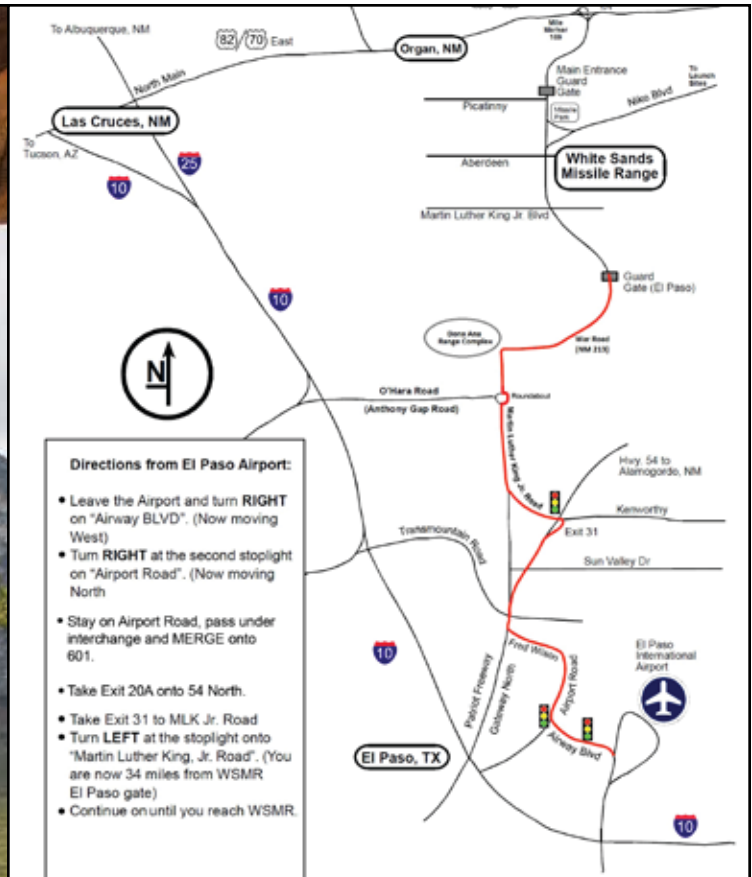
### SMOKING POLICY:

Smoking is prohibited inside all government facilities and vehicles at White Sands Missile Range. Smoking is permitted only in established designated areas and only in accordance with laws and current regulations. Smoking is allowed at a distance of at least 50 feet from government buildings.



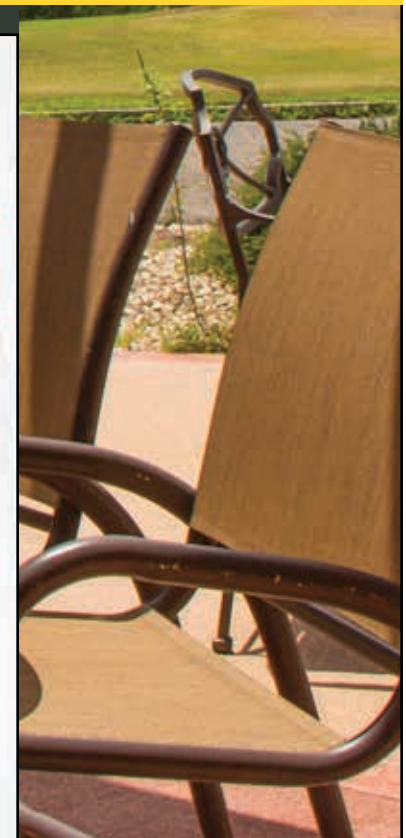
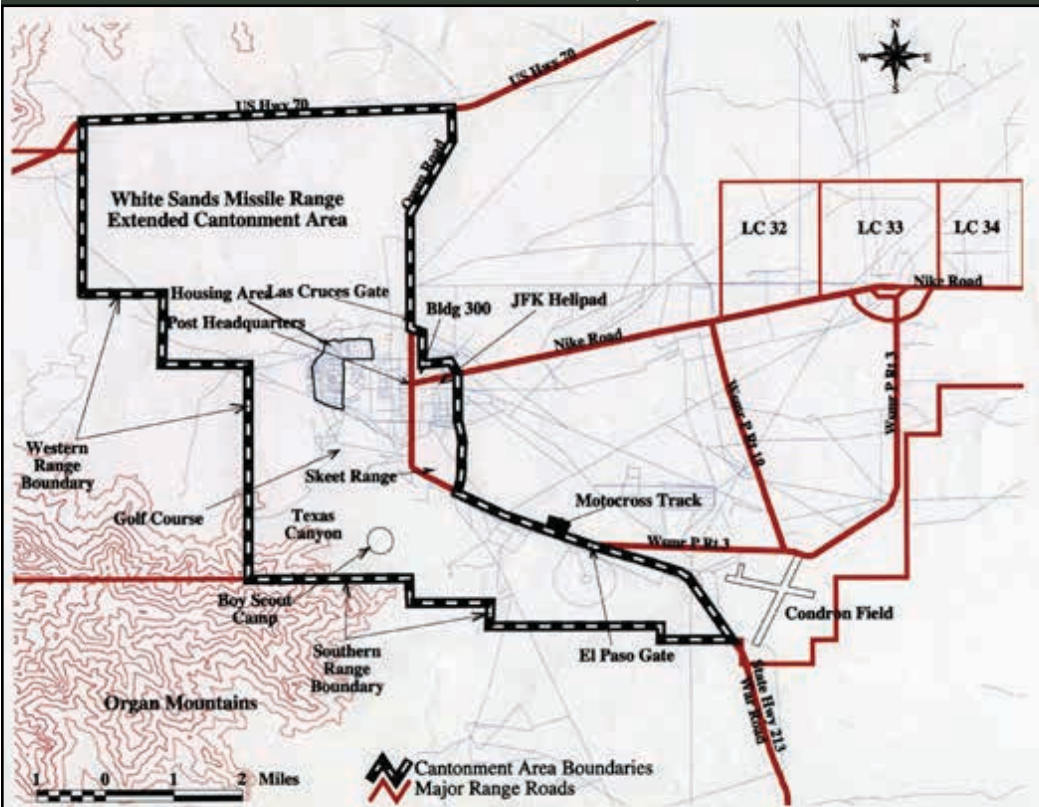


# VISITING THE RANGE 2018 RCH



Directions to WSMR from El Paso International Airport.

Extended Cantonment Area, WSMR.







## AT HOME ON THE RANGE

### **Family & Morale, Welfare and Recreation (MWR)**

**T**he Garrison Command's Family & Morale, Welfare, and Recreation organization would like to welcome you to our community. F&MWR offers a wide variety of recreational activities, hobby opportunities, innovative events and social gatherings for the White Sands community. If you enjoy bowling, or skeet shooting, F&MWR can help you. F&MWR also offers top quality child care and youth programs, discount tickets to area attractions, arts and craft classes, and much, much more.

F&MWR is also committed to providing support and leisure services that are as outstanding as the people that we serve. We believe that Soldiers and their families deserve the same quality of life as they are pledged to defend. F&MWR encourages the healthy balance of work and leisure that Soldiers need, by delivering state-of-the-art facilities, community event tickets, holiday functions, competitive and recreational sports, and family support services. F&MWR is for the entire military population, including active duty, Reserve, National Guard, retirees, DoD employers, contractors, their spouses and families. Additional information for all services can be found in the appendix. Some of our major services are listed here:

### **ARMY AND AIR FORCE EXCHANGE SERVICE (AAFES):**

AAFES facilities strive to provide both customer satisfaction and customer service. Their mission is to provide quality goods and services at competitive prices to support MWR activities. AAFES operates the following facilities at WSMR:

### **UNITED STATES POST OFFICE:**

A full service post office is located in the WSMR Main Post area.

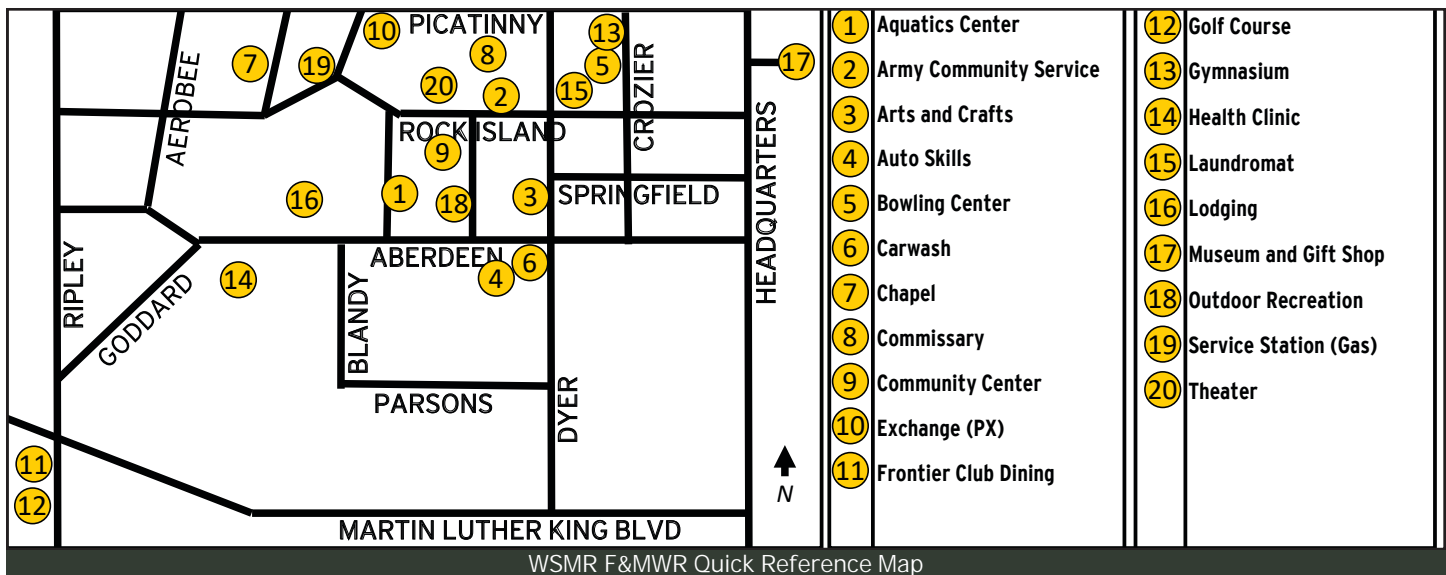
### **INTERNET ACCESS:**

The White Sands Post Library provides 18 computers with Internet access and is set up for wireless usage. Key codes are provided at the front desk for computer usage. Computers may be used for research and personal use. The Library is located in the Professional Development Center in Building 465.

In addition to the computer inventory, the Library houses over 48,000 fiction and nonfiction titles, subscriptions to 55 magazines, audio books, and a wide variety of other items that may be checked out or used in-house. New titles are regularly added and reference material is continuously updated. The Technical Section contains an extensive assortment of manuals, technical papers, and books.



# AT HOME ON THE RANGE 2018 RCH



## TELEPHONE:

White Sands Missile Range maintains a complex telephone network and operations system infrastructure supported with extensive platform expansions and network communications. Information on telephone services is available at (575) 678-2121 or operator assistance is available by dialing "0" from an on-post number.

Official telephone service is provided solely for transacting official government business and is available to all organizations and contractors designated as official. Official government users are referred to as Class A1 and official government contractors are referred to as Class A2. All official telephones have access to 800 long distance numbers and specific phones have access to commercial overseas numbers.

Three-way conferencing and call transfer is furnished. Other features such as call waiting, speed calling, call forwarding, are available. Conference calls, also known as "meet me" lines may be arranged for accommodating up to thirty parties. These calls may include a combination of WSMR, DSN, government or commercial long-distance numbers. Dial "0" for the WSMR operator, provide the

names and numbers needed, and the operator will establish the call for you. To add to an existing conference call, the initiator of the call should press and release the receiver button on the set, and the operator will answer. Please remain on the line while the call is being established.

**CELL PHONE USAGE:** Vehicle operators on a DoD Installation and operators of government-owned vehicles shall not use cell phones unless the vehicle is safely parked or unless they are using a hands-free device. The wearing of any other portable headphones, earphones, or other listening devices (except for hands-free cellular phones) while operating a motor vehicle is prohibited. Use of those devices impairs driving and masks or prevents recognition of emergency signals, alarms, announcements, the approach of vehicles, and human speech. DoD Component safety guidance should note the potential for driver distractions such as eating and drinking, operating radios, CD players, global positioning equipment, etc. Whenever possible this should only be done when the vehicle is safely parked.

Cell phones are prohibited in Building 335, the Cox Range Control Center.

## F&MWR Quick Reference List

Aquatics Center, Bldg. 462, (575) 678-1068/1341	Community Center, Bldg. 460, (575) 678-4134
Army Community Service, Bldg. 250, (575) 678-6767	Community Center, (ITR Office), Bldg. 460, (575) 678-4134
Arts & Crafts Shop, Bldg. 426, (575) 678-5321	Frontier Club, Bldg. 1330, (575) 678-2055/(575) 678-2057
Auto Skills Center, Bldg. 1430, (575) 678-5800	Lodging Operations, Bldg. 501, (575) 678-4559
Bowling Center-Roadrunner Lanes, Bldg. 234, (575) 678-3465/(575) 678-1394	Outdoor Recreation, Bldg. 445, (575) 678-1713
Business and Recreation Division, Bldg. 501, (575) 678-6105	Gymnasium Office, Bldg. 236, (575) 678-3374
Community Activities Coordinator (MWR), Bldg. 501, (575) 678-1256	

# AT HOME ON THE RANGE

## 2018 RCH



### Aquatic Center

The aquatic center was originally built as an outdoor pool, but eventually renovated into an indoor facility in 1997. The pool is a 25-meter, 8-lane pool with 1-meter and 3-meter diving boards, and a 24-foot diameter kiddie pool. The aquatic center offers programs such as basic swim lessons, water aerobics and family night flick-n-float. Specialty programs are also offered throughout the year.



### Frontier Club

The Frontier Club, Bldg. 1330 on Martin Luther King Drive, is the center for special events at White Sands Missile Range. The Club is open for breakfast seven days a week, serving "grab-and-go" breakfast items, fresh coffee, and made-to-order omelets and burritos. Lunch is Monday through Friday, 11 A.M. to 1 P.M., serving daily entree specialties, soup, deli items, plus your favorites from the grill.



### Outdoor Recreation

The facility was built in 1986 and was specifically planned for an outdoor recreation operation and is also responsible for the travel camp, lodge, outdoor pavilion, skeet and trap ranges, personal property storage area and RV storage facility. Outdoor recreation offers fishing and hunting licenses; 28-foot self-contained recreational trailer; pop-up campers that sleep 5 or 8 people; utility trailers in 8 or 16 foot; camping equipment (grills, ice chests, etc.); generators; sports equipment such as horseshoe sets, jumping balloons, and a dunking tank; retail sales of knives, guns, camping equipment, trailer accessories, various game calls and ammunition. Outdoor recreation offers special ordering at customer's request for long guns and handguns that are not sold on site.



### Army Community Service

ACS offers a full range of services to team WSMR to include our military, their families, retirees, and civilians. Programs offered include: family advocacy, exceptional family member program, relocation readiness, deployment and mobilization readiness, employment readiness, financial readiness, Army emergency relief, lending closet, Army family action plan, installation volunteer services, Army family team building and sexual assault prevention and response. ACS offers personalized proactive programs and services.





### Professional Development Center

The professional development center is a cutting-edge state-of-the-art model learning facility. The center provides a “one-stop” support for professional development with voluntary education, civilian training and library (general and technical) functions under one roof. The center provides the latest in distance learning and virtual library support.



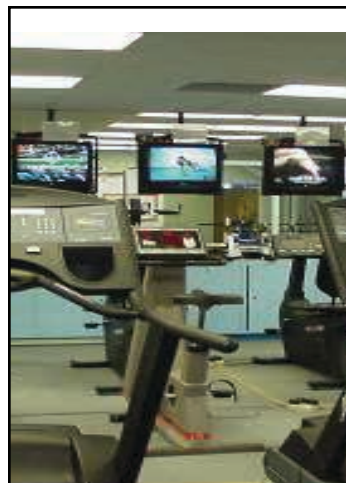
### Lodging Office

The Lodging Office provides guest accommodations comparable to a moderately-priced civilian hotel or motel found in one of the surrounding areas. The White Sands Lodging facilities are conveniently located on base, close to where you need to be. All rooms have cable and high-speed Internet.



### Roadrunner Lanes Bowling Center

The White Sands bowling center was built in 1964. The bowling center contains ten Brunswick lanes, automatic scorers, automatic pinsetters, a mechanic's workshop, pro shop, snack bar with dining area and a bar lounge. The facility provides a wide array of bowling programs aimed at making bowling a lifelong sport. These programs include open bowling, adult and youth leagues, coaching programs, military intramurals, sanctioned tournaments, private parties, lessons, school and Child Development Service programs and fundraisers.



### Sports and Fitness

Bell Gymnasium was built in 1956 and renovated in 1959 with a wood basketball floor. In 1981, the locker and weight rooms were added, and in 1985 two racquetball courts were built. In 1993, an extension was added that doubled the size of the weight room and the women's locker room. In 2009, a 4,500 ft<sup>2</sup> facility was added for aerobic equipment. Bell Gym supports a full indoor/outdoor sports program as well as special events such as decathlons and triathlons. The facility has softball/flag football fields and tennis courts within easy walking distance across the street. Bell Gym also offers certified trainers for spinning, aerobics, Functional Fitness, Crossfit and personal trainer services.



## AT HOME ON THE RANGE 2018 RCH



### Thomas J.P. Jones Child Development Services

The CDC facility was built in 1996 and is one of the finest child care centers in the Army. It also houses one of the best child care programs in the Army. The Child Development Services (CDS) program received its national accreditation in 1989 and received their 6th accreditation in 2016, being one of the first in the Army to receive this designation. The center provides care for children from 6 weeks to kindergarten.



### Alan Nord Youth and School Age Services Center

Child, Youth & School (CYS) Services is an essential family program that directly supports the military lifestyle and reduces the conflict between parental responsibilities and soldier-unit-mission requirements. Their mission is to provide a consistent, safe, nurturing environment that promotes the physical, social, emotional, cognitive and creative development of children and youth while responding to the unique needs of military families.



### White Sands Chapel

The White Sands Religious Support program provides religious services, rites and sacraments for the White Sands Missile Range community. These include but are not limited to weekend worship services, bible study, religious formation for children and adults, music programs, special education and fellowship events, memorial services, and weddings. Generally, Protestant services are held in the Main Post Chapel and Catholic worship services are held at Sierra Chapel. Educational programs for all groups are conducted in the religious education wing of the main chapel.



### Museum

At the White Sands Missile Range museum you can trace the origin of America's missile and space activity, find out how the atomic age began and learn about the accomplishments of scientists like Dr. Wernher von Braun and Dr. Clyde Tombaugh at White Sands. Displays also include the prehistoric cultures and the rip-roaring Old West found in southern New Mexico.





### Commissary

The Commissary was constructed in 1995 and has 32,000 ft<sup>2</sup> of displays, storage and office space. Providing the everyday staples, the Commissary has the ability to special order items, provide fruit, vegetable, and meat trays for special occasions, and will take special orders in the Meat Department. The Deli Department has an assortment of deli meats, cheeses and other goods for special occasions. The facility accommodates individuals with handicap access needs featuring a large entryway and electronic carts for shopping for those with special mobility needs.



### Post Exchange and Gas Station

AAFES Exchange is committed to providing the best customer service to the WSMR workforce while supporting active duty military, guard and reserve units, military retirees and family members. The gas station has installed state-of-the-art gas dispensers that allow for 24 hour re-fueling. AAFES partnership with the Morale, Welfare, and Recreation (MWR) programs reflect loyalty and dedication to the service member and civilians living and working on the installation. This facility also houses laundry, dry cleaners, family hair care, Vision Center and Subway.



### Medical Facilities

McAfee Health Clinic opened August 2013 and is over 35,000 ft<sup>2</sup> McAfee U.S. Army Health and Dental Clinic are both now housed within the same facility. McAfee features an automated pharmacy, a completely digital radiology, immunizations, Environmental Health, audiology, laboratory, optometry, Outpatient Clinic, TRICARE Service Center, Alcohol & Substance Abuse Program, Industrial Hygiene, Medical Records, Preventive Medicine and Adult Behavioral Health Services.



### Arts & Crafts Skills Development Center

The Arts & Crafts building was built in 1975; an addition to the woodshop area was completed in 1989. Another addition includes the frame shop and multi-crafts area. The facility achieved full ADA compliance in 1997. The facility is a "true" skills development center offering a complete woodworking area including assembly area, spray booth, ceramics, pottery, stained glass, jewelry fabrication, lapidary, frame shop, and assorted other crafts.

## WHITE SANDS MISSILE RANGE DIALING TABLE

WHITE SANDS MISSILE RANGE (WSMR)	AREA CODE (575)
	DEFENSE SWITCHED NETWORK (DSN) 258
POST LOCATOR	0 or (575) 678-2121
<b>LOCAL AREA ON-POST</b>	
LOCAL CALLING AREAS	678-XXXX; 679-XXXX; 674-XXXX
DSN FOR INCOMING CALLS	258-XXXX; 349-XXXX
<b>LOCAL AREA OFF-POST</b>	
ALAMOGORDO, NM	99 + XXX-XXXX
EL PASO, TX	98 + XXX-XXXX
FORT BLISS, TX	98 + 568-XXXX, 98 + 569-XXXX
HOLLOMAN AIR FORCE BASE, NM	99 + 572-XXXX
LAS CRUCES, NM	99 + XXX-XXXX
SOCORRO, NM	99 + XXX-XXXX
WILLIAM BEAUMONT ARMY MED CTR	98 + 568-XXXX
DSN FOR OUTGOING CALLS	94 + XXX-XXXX
<b>TOLL CALLS (CHARGES APPLY)</b>	
DIRECT DIAL	99 + 1 + AREA CODE + XXX-XXXX
NEW MEXICO INFORMATION	99 + 1 + 411
OPERATOR ASSISTED / COLLECT	99 + 0 + AREA CODE + XXX-XXXX
OUTSIDE NEW MEXICO INFORMATION	99 + 1 + AREA CODE + 555-1212
OVERSEAS	99 + 0 + 1 + country code + city code + phone number
<b>INFORMATION OPERATOR</b>	
FORT BLISS, TX	98 + 568-2121
HOLLOMAN AFB, NM	99 + 572-1110
WSMR AREA	678-2121 or 0 or 114
<b>TELEPHONE SERVICES</b>	
HELP DESK	678-1621 or 678-1111
<b>NON-EMERGENCY</b>	
POLICE	678-1234
<b>EMERGENCY NUMBERS</b>	
AMBULANCE/ FIRE/ MILITARY POLICE	678-1234 or 911
<b>PUBLIC PAY PHONE LOCATIONS</b>	
BARRACKS	Bldg. 128 (1st Floor, West End)
COMMISSARY	Bldg. 262 (Front of Bldg.)
MAIN POST EXCHANGE	Bldg. 260 (Front of Bldg.)
ROADRUNNER LANES/BOWLING CNTR	Bldg. 234 (Hallway)



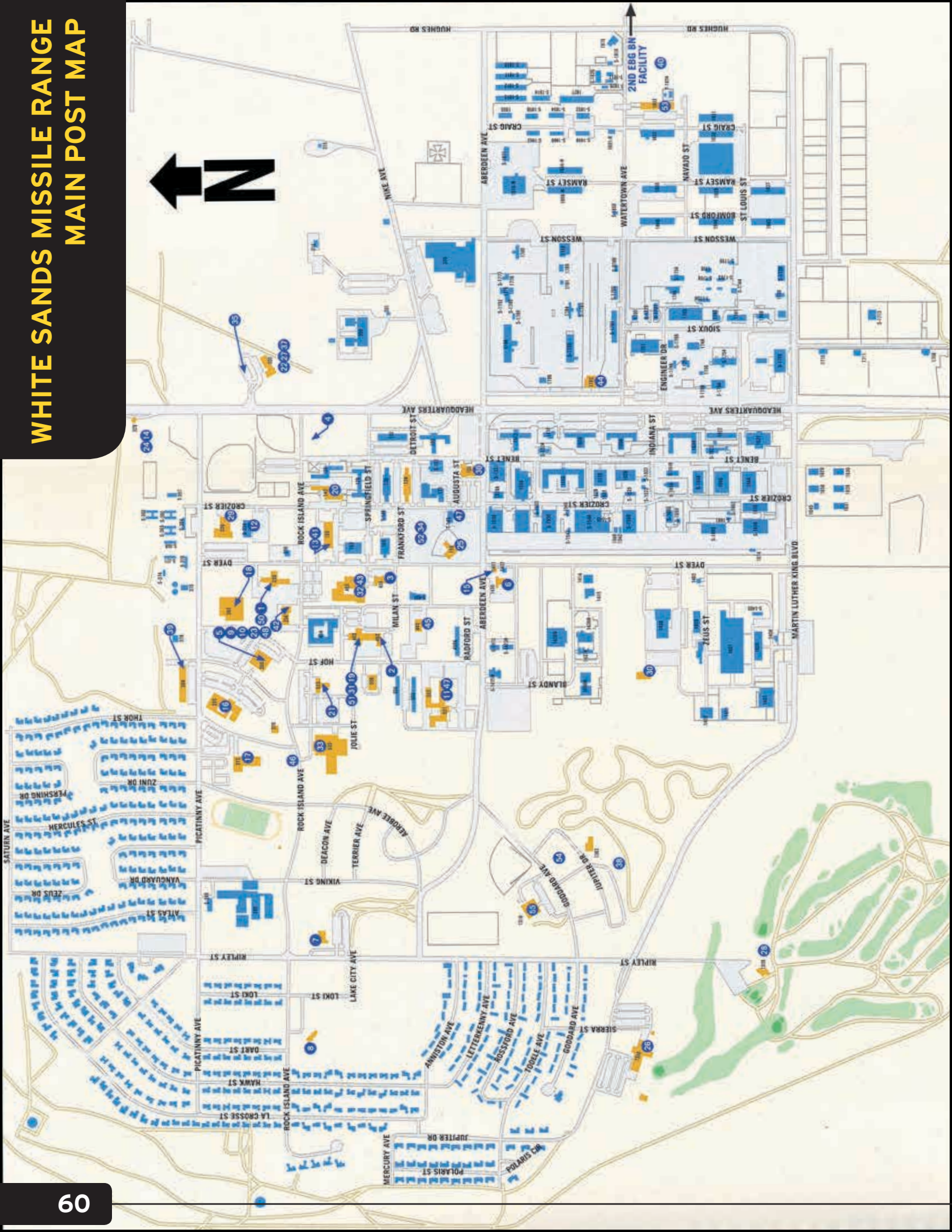
# AT HOME ON THE RANGE

## 2018 RCH

MAP	FACILITY	BLDG. #	PHONE
1	Army Community Services	250	678-6767
2	Aquatics Center	462	678-1068
3	Arts & Crafts	426	678-5321
4	ATM (WSFCU)		N/A
5	ATM (Wells Fargo)	260	N/A
6	Auto Skills Center	1430	678-5800
7	Balfour Beatty Facilities Self Help	882	678-4463
8	Balfour Beatty Communities Mgmt. Ole	1000	678-4463
9	Beauty Shop	260	678-2040
10	Barber Shop	260	678-6601
11	Billeting Office	501	678-4559
12	Bowling Alley	234	678-3465
13	Cable Company (Comcast)	153A	678-3440
14	Car Registration (Reception Center)	329	678-1099
15	Car Wash (Do It Yourself)	1431	N/A
16	Chapel	265	678-2615
17	Child Development Center	272	678-2059
18	Commissary	262	678-2313
19	Community Center	460	678-4134
20	Credit Union (WSFCU)	143	678-1217
21	Dental Clinic	525	678-1141
22	DMV	200	678-8824
23	Post Exchange (PX)	260	678-3270
24	Firearms Registration	329	678-1099
25	Fire Station	155	678-7658
26	Frontier Club	1330	678-2055
27	Gift Shop	200	678-8824
29	Gymnasium (Bell)	236	678-3374
30	Installation Operations Center	1417	678-8999
32	Library	465	678-5820
33	McAfee Health Clinic	530	678-0300
34	Military Personnel/ID Cards	124	678-5961
35	Missile Park	203	678-8824
36	Mountainview Cafe	120	678-2081
37	Museum	200	678-8824
38	Pavilion and Acoc Lodge	1362	678-1713
39	Police	384	678-1234
40	Post Kennels	T-1834	678-2683
41	Post Office	153	678-1257
42	Post Theater	254	678-2081
43	Professional Development Center	465	678-4211
44	Public Affairs Office	1782	678-1134
45	Recreation Equipment Issue	445	678-1713
46	Service Station	270	678-4877
47	Sierra Chapel	T-145	678-2725
48	Subway	260	678-7829
49	Temporary Housing	501	678-5110
50	Thrift Shop	250	678-2483
51	UPS		678-4134
52	Veterans Assistance	124	678-0213
53	Veterinary Clinic	1833	678-2683
54	Volunteer Park		N/A
55	School Age Care Center	1316	678-4140

**[Map on following page]**

# WHITE SANDS MISSILE RANGE MAIN POST MAP





**NOTES**

## NOTES

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



**WHITE SANDS MISSILE  
RANGE.  
DELIVERING TOMORROW'S  
READINESS.**

***WSMR, birthplace of America's missile and space activity, looks to the future as it continues to provide Army, Navy, Air Force, DoD and other customers with high-quality services for experimentation, test, research, assessment, development, and training in support of national security.***

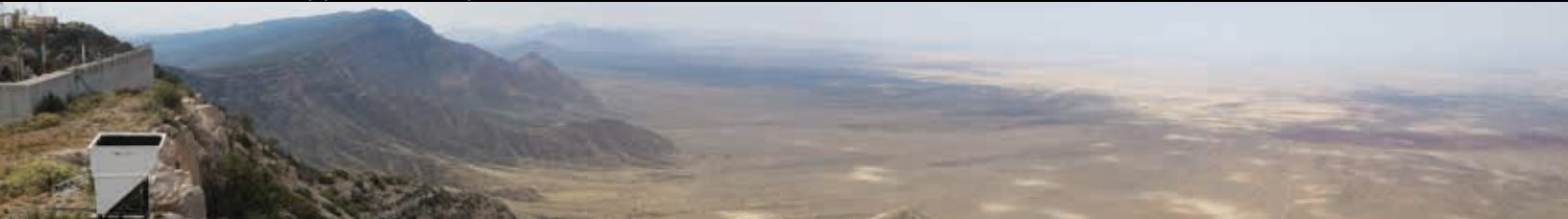
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**U.S. ARMY**  
**WHITE SANDS MISSILE RANGE**  
 2018 RANGE CUSTOMER HANDBOOK  
 WSMR BUSINESS DEVELOPMENT OFFICE  
[USARMY.WSMR.ATEC.MBX.TEAM-WHITE-SANDS@MAIL.MIL](mailto:USARMY.WSMR.ATEC.MBX.TEAM-WHITE-SANDS@MAIL.MIL)  
[WWW.ATEC.ARMY.MIL](http://WWW.ATEC.ARMY.MIL)  
 (866) 532-9767