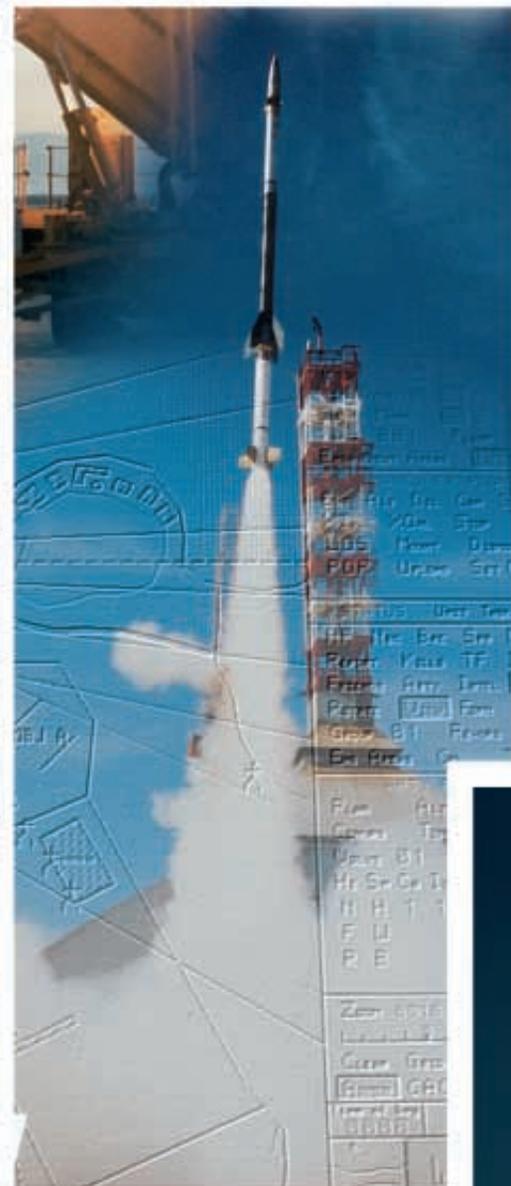


WHITE SANDS MISSILE RANGE



NEW MEXICO

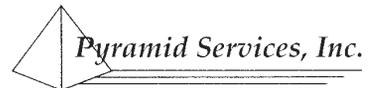
White Sands Missile Range Information Systems Operations & Support Services (ISOSS)



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Front cover: Systems fired at White Sands include (clockwise from upper left): the Patriot Advanced Capability 3 missile, the Hera target missile; the Theater High Altitude Area Defense system and the Terrier Back Brant sounding rocket.



V-2 photo by Martin Sauber. A scene of a V-2 rocket being prepared for launch back on May 10, 1946.



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MARCOA Publishing Incorporated
P.O. Box 509100
San Diego, California 92150-9100
www.marcoa.com

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Welcome & Checking In

Welcome to White Sands Missile Range. Whether you are coming for a duty assignment or job, as a test customer or as a visitor, we hope you find your stay with us both worthwhile and enjoyable. As a test installation, White Sands is unparalleled within the Department of Defense. As a community, it has that small town feel. There are many services and facilities on post to make life comfortable and entertaining.

People living and working here are warm and friendly. We encourage you get to know folks and explore the area's rich cultural and historical heritage.

The information in this guide will acquaint you with White Sands, its major activities, facilities and services.

Testing is Our Business

Testing is essential to product research, development and verification. Occupying 3,200 square miles in southern New Mexico, White Sands Missile Range is the largest overland test range in America. Once exclusively military, White Sands today attracts other government agencies, foreign nations and private industry to its world-class test facilities.

Found on this sprawling Army installation is an extensive array of sophisticated data collection and analysis equipment, including radar, telemetry, optics and computers, interlinked through a network of fiber optic rings and microwave relays. In White Sands' outdoor and indoor laboratories, test items are exposed to electromagnetic pulse, lightning or shock and vibration, as well as virtually any climatic condition.

Key among White Sands' many test attributes are:

- Dedicated airspace
- 100 percent overland flight corridors
- Ideal climate for year-round testing
- Off range launch capabilities
- Advanced data collection, analysis and presentation capabilities
- Detailed post-test reporting

White Sands' internationally recognized technical team is continually developing the next generation of test technology. Experienced scientists and engineers specialize in test instrumentation, modeling and simulation, data analysis, high performance computing and telecommunications.

In 2000, the J.W. Cox Range Control Center was completed. This unique \$28 million facility is the new nerve center for all test missions. It is designed to meet current and future mission



PHOTO BY STEVE ALRED

Mexican poppies color the desert floor beneath the Organ Mountains.

requirements with the latest networking, computing and communications for effective interaction between test operations and customers.

morning of the year you'll wake up to bright, cheery sunshine.

How to Get Here

- From El Paso: Take the Alamogordo/Highway 54 exit off Interstate 10. As you leave the off-ramp, you will be on the Patriot Freeway. Continue through the northeast part of the city until the freeway becomes War Highway. White Sands is straight ahead about 40 miles.
- From Las Cruces: Take the Highway 70 East exit from Interstate 10 or 25 and proceed through the city about 25 miles to the missile range exit.
- From Alamogordo: Take Highway 70 west. Proceed about 47 miles to the missile range exit.

Climate

White Sands headquarters is at an elevation of about 4,100 feet. With an average rainfall of only 10.8 inches, it is considered a dry area. The average summer high temperature is 92 with lows of about 69. During the winter months the average high is 57 degrees, with the mercury dipping to an average low of 36. Even with the relatively high summer temperatures, the area has quite a comfortable climate due to an average annual humidity reading of only 37 percent. Just about every

For Military Newcomers

Military personnel report to Building 143 for inprocessing during duty hours and to the Staff Duty/Security Directorate, Building 384 during nonduty hours. If you arrive in El Paso by plane, report to the Military Liaison NCO at the airport and arrangements will be made for transportation to White Sands. If you arrive by bus in Las Cruces, the depot attendant will assist you. Upon arrival at Building 143, report to the Personnel Service Center (PSC) on the first floor, room 131. The PSC services all units and tenant activities assigned to the range. If you do not have a sponsor, one will be assigned by your new unit to assist you during inprocessing and while getting settled at White Sands.

The Personnel Staff NCO will normally handle all other personnel matters. Identification cards are processed for military and family members and retired personnel by the PSC by appointment only.

For Civilian Employees

The Civilian Personnel Advisory Center (CPAC) is headquartered in Building 124. Its personnel advisors are part of the White Sands management team and provide assistance to the



commanding general, managers, supervisors and employees on all personnel management issues. Such areas include but are not limited to: labor-management negotiations, management-employee relations, employee benefits and recruitment strategies, position management and local training. Recruitment efforts to fill White Sands positions are the responsibility of the West Region Civilian Personnel Operations Center (CPOC) at Fort Huachuca, Ariz. A localized web-site is maintained by the CPAC and can be accessed at 155.148.19.222. For more information call 505-678-5808.

Employment information on positions at White Sands and other CPAC sites under the jurisdiction of the West Region CPOC is available at the CPOC website www.wcpoc.army.mil.

Temporary Lodging

There are 73 temporary quarters for rent. Guests in a TDY or PCS status are confirmed reservations; all others are in a space available category unless an exception has been made in writing.

The Lodging Office is in Building 501 on Aberdeen Ave. Hours are Monday-Thursday, 7 a.m.-4:30 p.m.; Fridays, 7 a.m.-3:30 p.m.; closed on compressed Fridays and weekends. Guests needing assistance when the office is closed, check in at the Staff Duty/Security Directorate, Building 384 on Picatinny Ave.

Foreign national visitors must carry a copy of their security clearances to be assigned transient facilities; or the security guards must have a written security clearance for the foreign national visitors in their office prior to assignment to quarters.

For more information, call the Lodging Office at 505-678-4559.

Living Here

White Sands Missile Range has family housing units and unaccompanied personnel housing (UPH) units. Of the 592 family units, 151 are for officers and 441 are for enlisted personnel. Of the 95 UPH units seven are for senior officers with 44 for officers and 44 for senior enlisted personnel. Civilian housing is also authorized on post on a space-available basis.

Housing for junior enlisted personnel consist of small three bedroom, and large three and four bedroom units. Senior enlisted will find themselves in large three bedroom units. Officer units are three or four bedroom housing. UPH units are one and two bedroom apartments, and two and three bedroom units, with or without furniture.

Military personnel with dependents, assigned permanently, are required to live on-post. Assignment to on-post housing is based on rank and date of application. Bachelors, E-7 and above are required to live on-post and must process through the Housing Office. Transient facilities are usually available for new families and



A lone V-2 stands guard in front of the range's Headquarters Building with the Organ Mountains towering in the background.

unaccompanied personnel, and may be occupied until permanent quarters are assigned. No pets are allowed in transient facilities. Reservations can be made at the Lodging Office, Building 501, 505-678-4559.

Military personnel must in-process through the Military Personnel Office before in-processing through the Housing Office. Military personnel are advised not to contract for rental or purchase of a home in a nearby civilian community before obtaining written approval to reside off post. Personnel approved to reside off-post may obtain assistance from the housing staff on available quarters for rent or for sale. The office phone number is 505-678-5110.

All quarters come equipped with a gas range and refrigerator. All units have central heating and evaporative cooling. Telephone and cable TV services are available to residents for a monthly fee. Residents are required to attend a self-help class. The Self-Help Program encourages residents to do their own minor repairs and take care of their yard. Garden hoses, sprinklers, lawn mowers, switches, tools and other similar items are issued at the Self-Help Shop, 101 Ravenna, diagonally across from the elementary school. Call 505-678-1850 for further information.

For more information, call 505-678-5110 or write to: Housing, Attn: CSTE-DTC-WS-CA-H, WSMR, NM 88002-5076.

Household Goods

Are you expecting household goods or baggage? If so, contact Inbound Personal Property, 505-678-6788, in Building 124 to advise where you may be contacted upon arrival of your household good.

When your shipment arrives, check your goods against the original inventory. If there is loss or damage in addition to the exceptions taken by the driver at origin, annotate such loss or damage on your copy and on the driver's copy of the inventory prior to signing for receipt of the shipment. The transportation officer and the claims officer will assist you in preparing and assembling documents necessary to process the claim.

For further information, please call 505-678-3202 for in-bound or 505-678-3506 for outbound. The mailing address is Transportation Office, Attn: CSTE-WS-IS-MT, White Sands Missile Range, N.M. 88002-5030.



Many White Sands housing units are newly renovated.

PHOTO BY MIRIAM RODRIGUEZ



House Checks

The White Sands police will check your quarters while you are on leave or on a temporary duty assignment if requested. For more information regarding quarters checks, contact the White Sands Police at 505-678-7675.

Operation Identification

This program is designed to encourage owners of high-value or theft-attractive property to mark their property with an identifying number. The system White Sands uses is your initials followed by your social security number. This deters theft and aids in the recovery of stolen items. An engraver is available for check out. For more information, call 505-678-7675.

Some Things To Know

The Work Week

Most White Sand organizations operate on a compressed work schedule. Compressed work schedule means working extra hours most days and working fewer days. During a two-week, 80-hour pay period, alternate Fridays are "compressed" or non-work days. Employees should check with their supervisors for details on this system.

Think Safety

The nature of the White Sands mission can create hazards to employees and visitors. White

Sands Missile Range has been used as an ordnance and explosives test facility since its inception in 1945. Prior to that some areas of what is now the southern part of the range were used as artillery impact areas by troops training at Fort Bliss.

As a tri-service Department of Defense range, nearly every type of deployable ordnance that has been developed in America since 1945, as well as many items from other countries, has been tested here. Quite a number of these were deliberately designed to blend in with the terrain, and their presence may not be immediately obvious to a casual observer.

In general, if you see something man-made while on the range, please avoid it. Do not disturb the item or the area immediately surrounding it. If it looks like an ordnance item, please report it by calling 505-678-1234. Unexploded ordnance training is provided for all employees by their organization and to visitors leaving the main post area by their sponsor or escort.

Traffic Regulations

Traffic regulations at White Sands are strictly enforced and safety is emphasized. Violators will stand trial before a U.S. Magistrate Court when violations involve federal laws. Incidents involving military regulations are referred to unit commanders or section chiefs for action.

All vehicles, including motorcycles, for permanently assigned personnel must be registered in the lobby of Building 384. Vehicles may be registered, 8-11:30 a.m. and 12:30-4 p.m., Monday-Friday, except compressed Fridays.

Proof of ownership and of insurance, plus a valid driver's license for the person registering the vehicle, are required. Three-wheeled all-terrain vehicles (ATV) cannot be operated on the range.

Visitor's Vehicle Pass

Visitors to the White Sands main post must stop at the Reception Center outside the Las Cruces Gate or at the El Paso Gate to get a vehicle pass. The driver of the vehicle must show driver's license, vehicle registration and proof of insurance. If driving a rental car, the rental paperwork is shown in lieu of vehicle registration. For more information call the Reception Center at 505-678-1099.

Security

Security is taken seriously at White Sands. All personnel must establish an official need for access to the range. If access to classified defense information is required, personnel must be properly identified and personal security clearances certified by their respective security office.

Access To Security Areas

Personnel requiring access to security areas must be properly identified and authorized access on a need-to-know basis in performance of official duties. Personnel security identification badges will be issued based on authorized official requests or on approved visit requests. All personnel requiring access to security areas will report to the lobby of Building 384 for issuance of a security badge. For more information call 505-678-3238.

Photography

Personal photography is authorized without prior permission in the following areas: north of Martin Luther King Avenue to Highway 70 to include all of Owen Road, west of Headquarters Avenue to the western range boundary, that 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, horse stables, JFK Parade Field, Missile Park, hospital, barracks, and picnic and recreation areas.

All other areas require photo permits. Requests must be signed by an official of a missile range or tenant element, and then forwarded to the Security Directorate for approval.

Photography of other post areas is limited to authorized official photographers. The absence of an official photographer's permit will result in confiscation of the film. For more information call 505-678-7102.



Comet Hale-Bopp over Missile Park.

PHOTO BY TED GASKINS



Organizations & Missions

White Sands Test Center

White Sands Missile Range (WSMR) is part of the Developmental Test Command (DTC), which reports to the U.S. Army Test and Evaluation Command (ATEC). White Sands is designated as a Department of Defense (DoD) major range and test facility base. 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 some foreign militaries.

The White Sands Test Center (WSTC) is responsible for planning and conducting tests at White Sands Missile Range. Six major directorates make up the test center. Their specific functions and responsibilities are as follows:

National Range Operations Directorate

The National Range Operations Directorate (NRO) manages range instrumentation, range operations, instrumentation, data collection and reduction and flight safety control for all missiles, rockets, munitions and other devices operated within White Sands controlled airspace.

Its Data Sciences Division (NRO-A) operates and maintains real-time and post-test computer systems. In addition, it provides real-time metric and telemetry data acquisition, processing and display services for range customers, while supporting missile range mission functions such as missile flight safety. The division's data acquisition, processing and display services support all scheduled missions and most advanced weapon systems test and evaluation efforts at the range. The staff includes recognized experts in mathematical analysis, real-time and post-test data processing, software development, system engineering and real-time missile flight safety decision strategies. The division is also responsible for certification of NRO instrumentation and data products.

The Operations Control Division (NRO-C) schedules and controls all range operations. NRO-C has project engineers who are assigned to each user program as the NRO focal point to provide overall program support. This includes scheduling, coordination and documentation of instrumentation, communications, safety, airspace, roadblocks/evacuations, pre- and post-test data reduction and other test requirements.

The division also is responsible for the safety of weapon test flights, laser operations and other



The first Hera missile test flight is captured on film at launch using high-speed photographic equipment. The Hera was first tested in April 1995 to be used as a target for new interceptor missiles being developed at WSMR.

unmanned flight vehicles that could be hazardous. This includes approval of any flight termination systems that might be required. Flight safety officers, responsible for assuring the safety of the public and range personnel, monitor tests. Data is gathered from range instrumentation including radar, optical tracking instruments and video. Telemetry data is also collected onboard the weapon and sent to ground receivers by radio. All information is used to evaluate the performance of the test and aid in the decision-making process.

NRO-C also provides ground control equipment for aerial and ground launched targets. These targets range from subscale drones to full-scale fighter aircraft modified to be flown by two remote control systems: the Drone Target Control System (DTCS) and the Drone Formation Control System (DFCS).

NRO-C manages the Aerial Cable Range, a three-mile long Kevlar cable strung between two mountain peaks. Large targets can be suspended and rocket-propelled down the cable at more than 200 knots. Additionally, drop tests can be conducted from the cable. NRO-C also manages off range launch complexes, including a site north of the missile range proper in one of the range call up areas and also at Fort Wingate near Gallup, N.M. Another NRO-C function is to provide render safe

and explosive ordnance disposal operations. Finally, NRO-C is responsible for physical security of the range's boundary, assistance in animal control and acts as the liaison with area ranchers.

The Data Collection Division (NRO-D) is responsible for test data acquisition. Various instrumentation systems receive, record and relay test data, which is then processed for real-time display at facilities where test conductors, flight safety officers and range controllers monitor and manage the test. The data is also recorded for post-test conversion and reduction. Types of instrumentation include radar, telemetry, global positioning system, remote tracking systems, non-tracking cameras, television systems and meteorology.

The National Range Operations Directorate also provides facilities for the National Imagery and Mapping Agency, which produces geodetic surveys for all instrumentation facilities, range-user equipment, launchers, impact areas and targets.

The Army Air Division (NRO-F) provides experienced pilots, flight engineers and aircraft technicians. Support provided includes missile search and recovery, sling load operations, passenger and cargo transport, aerial reconnaissance, aerial photography and search and rescue. The Army Air fleet consists of four OH-58A/C observation helicopters, eight H-1



The J.W. Cox Range Control Center is the new nerve center for test activities.



A target undergoes testing at the Aerial Cable Range.

(six UH-1s and 2 EH-1s) utility helicopters and one C-12 (Beechcraft King Air 200) utility airplane.

For more information, call 505-678-0800 or write to Director, CSTE-DTC-WS-NRO, White Sands Missile Range, NM 88002-5113.

Materiel Test Directorate

Through its history, the Materiel Test Directorate (MTD) has tested a wide variety of military hardware such as air defense missile systems ranging from the man portable Stinger to the Theater High Altitude Area Defense (THAAD) interceptor; surface-to-surface missiles including Pershing and the Army Tactical Missile System; the M1A1 main battle tank and artillery ordnance like Copperhead. MTD also conducts tests on aircraft equipment and command and control systems. These tests require special instrumentation, sophisticated laboratories, firing ranges and intricate computer networks.

The testing of today's complex weapon systems continues to dominate the MTD workload. A typical test program will include the review of system performance requirements, the development of detailed test plans and the conduct of tests ranging from shock and vibration to software verification and validation to human factors assessments and, when appropriate, missile firings. At each step data is collected and analyzed. Finally overall system assessments are made to assure that weapon systems are ready for the modern battlefield.

Team Approach

To accomplish the complex task of testing, a core team consisting of a project engineer, systems analyst and test conductor is formed. The project engineer is the focal point for all project related test activities. He or she is responsible for planning, coordinating, executing and reporting

test results and associated data analysis. The test conductor is responsible for accomplishing the test program and directs the actual test efforts.

A key activity to the successful development and execution of an effective test program is

system analysis. Systems analysts are assigned to each project to develop and implement a comprehensive test and evaluation program. Throughout a given program, analysts review the test requirements, develop detailed test plans and monitor the collection of data during test and simulation activities. Upon completion of the test program, results are assembled and performance and effectiveness of the system is quantified. These assessments, along with data accuracy and confidence level quality indicators, are presented in final test reports.

Test Capabilities

In order to determine if weapon systems can effectively operate in diverse real world conditions, MTD can subject an entire system to extreme low and high temperature environments in climatic test facilities. Temperature tests can be run on complete systems or individual components. The capability also exists to expose both the systems and their components to rigorous dust, wind, fungus and other phenomenon. Shock and vibration facilities duplicate typical life cycle environments are also available.

There are several non-destructive test laboratories available to perform specific evaluations of



PHOTO BY U.S. ARMY

Firings are conducted from the High Mobility Artillery Rocket System vehicle.



weapon systems. One lab conducts metallurgical inspections to assess corrosion prevention and control, health hazards assessment and conformance, and environmental testing as required. Explosive testing capabilities include facilities for safety tests such as fire, drop, bullet impact, sympathetic detonation and others. Warhead arena tests, warhead penetration tests and failure analysis of explosive components also are available. Maximum data collection for failure analysis on lethal weapon systems and submunitions can be conducted remotely using the robotic Remote Area.

MTD has a vast inventory of instrumentation used to measure and monitor the performance of weapons systems during firing and non-firing tests. Required measurements are made on ground support equipment, vehicles, targets, missiles and the environment induced on personnel and equipment by the weapon systems. Instrumentation systems are available for measuring basic physical properties including: mass, temperature, force, pressure, position, velocity and acceleration. Acoustic and electro-optics instrumentation are also available including imaging and non-imaging systems for visible and infrared. Sophisticated computer systems are available for real-time and post-test processing of test data in reportable formats. About 95 percent of the instrumentation capability is mobile to support testing efforts elsewhere in the United States and overseas.

In addition to the controlled environment testing, the actual operation of the system is tested, which in many cases involves the launching of a missile. Reliability, availability and maintainability (RAM) information, including manprint factors and safety data, is collected and evaluated during these tests. MTD provides knowledgeable reliability engineers and equipment specialists to develop test methodology, and plan customer reliability and maintainability test programs. Test data from the programs are processed in the Developmental Test Command (DTC) Standard Data Collection System and provide Test Incident Reports to assess overall system performance. These performance parameters indicate utility and effectiveness of the system so MTD can assure it is fielding the best systems possible for our fighting forces.

For systems that have embedded software, a unique requirement oriented software assessment methodology targeted at the system performance level can be applied. The approach is focused at the software requirements level and deliberately avoids further debugging of the contractor's computer code.

Simulation techniques are available for evaluation of systems under test. Mathematical models of systems, subassemblies and major components can be assembled and executed on digital computer systems. The results of simulations can be used in determining range safety boundaries, preflight and post flight analysis, environmental

effects on system functions and overall system performance in preparation for live firings.

In addition to providing support in test planning, test execution, data reduction, test analysis and test reporting for developmental or operational testing, MTD has experience in a variety of other technical activities which are test related. Some examples include: supporting the systems engineering process, performing software independent verification and validation, monitoring developer (contractor) testing, assisting in establishing the extent to which simulation could/ should be used, assisting in the verification and validation of simulations, and assisting in the identification of data collection and data reduction requirements.

When appropriate, the MTD coordinates requirements with the National Range Operations (NRO) Directorate to conduct live missile firings. This coordination determines the launch and

impact site, the use of targets and the type and accuracy of data required.

MTD has state-of-the-art computer systems to support post-test data reduction and analysis. These include the Simulation, Analysis and Data System (SANDS) Computer facility, the Secure Interactive Graphics System (SIGS), the Optical Data Measurement System and the Radar Graphics Laboratory.

Customer Support

Air defense, missile defense and fire support weapons systems compatibility and interoperability testing is a significant area for MTD. MTD's development of new instrumentation and data acquisition and reduction techniques provides up-to-date empirical test methods. This allows testing of the combined effectiveness of the High Medium Altitude Air Defense (HIMAD) systems



Cameras mounted near the launcher document a Patriot Advanced Capability 3 missile firing.

PHOTO BY U.S. ARMY



PHOTO BY U.S. ARMY

A composite photo shows a Theater High Altitude Area Defense System firing, the contrail created by the Hera target and the target impact.

such as Patriot, Hawk and AN/TSQ-73 Missile Minder with a new breed of air defense system driven by state-of-the-art technological advances.

Specific functional test areas include missiles, sensors, and Command, Control, Communications and Intelligence (C31) systems. New technology projects being tested and evaluated by MTD include Joint Tactical Ground Station and Advanced Field Artillery Tactical Data Systems, which both support Battlefield Digitization and Force XXI initiatives.

A new area with significant growth foreseen is Theater Missile Defense (TMD). Over the past several years, the Ballistic Missile Defense Organization (BMDO) has invested heavily in research and technology demonstration programs keyed to the development of systems to defend against ballistic missiles. MTD has conducted some of these demonstrations and has a staff of highly trained personnel assigned to conduct testing of TMD systems. These include the Patriot Advanced Capability (PAC) -3, and the Theater High Altitude Area Defense (THAAD) missiles.

Test and evaluation of these systems presents a significant challenge for WSMR, requiring target missile launches from off-range locations. WSMR has established additional instrumented launch sites in the northern call-up area and at Fort Wingate, N.M., to safely conduct these tests and collect required data. MTD has conducted several TMD missions from both locations and is capable of firing TMD target missile systems such as Hera and STORM. These missiles, which are fired from both within WSMR boundaries and from the off-range launch sites, are configured to simulate threat targets and test the effectiveness of the TMD interceptors.

On the land combat side of weapon systems, MTD is testing the Multiple Launch Rocket System (MLRS), designed to augment field artillery howitzers. This system is capable of launching 12 rockets sequentially in a short time with a high degree of accuracy. The warhead of each rocket contains submunitions, which are dispensed over a target area to blanket it with explosives. MLRS developed, and is producing,

short-range practice rockets used for troop training. In addition to a production lot acceptance program for the practice rockets, MLRS tests are being conducted for an extended range version of the current fielded MLRS, a guided system, and new warhead designs. Testing is also done for MLRS hardware produced by and for foreign governments.

A currently fielded system that is being further tested at WSMR is the Army Tactical Missile System. This inertially guided missile is fired from an MLRS launcher and carries an anti-personnel and materiel warhead. WSMR testing includes production missile, missiles from the stockpile and improved versions of the basic missile.

Several anti-armor submunitions are being tested at WSMR. Groups of these submunitions are carried by artillery rockets or missiles that release them in the vicinity of the targets: tanks, armored personnel carriers, armored artillery and other vehicles. The submunitions then seek and detect the targets with radar, heat or acoustic sensors. This testing requires large numbers of remotely controlled moving targets and remotely operated instrumentation to safely obtain performance data.

A weapon of the future will be the Line-of-Sight Anti-Tank (LOSAT) missile, which uses a non-explosive lethal device to impact at high velocities, penetrate and kill hard targets.

In the southern portion of the range there are launch complexes to support live firings. On occasion the remote launch complexes in the northern part of the range are used. In addition, the Small Missile Range, located north of Highway 70 is used for testing systems such as LOSAT. Testing at the Small Missile Range can be conducted without interfering with other tests on the main range.

MTD is also responsible for WSMR's participation in various space initiatives. MTD serves as the focal point for future space test programs and currently tests the space shuttle and the X-34. In addition, MTD is coordinating state, federal and private efforts determining the feasibility of a spaceport in the area. The spaceport will be designed to launch and recover various space vehicles, whether orbital or suborbital.

For more information, visit the MTD website at www.mt.wsmr.army.mil, or call the Office of Strategic Service, 505-678-0723/3016/1541. Write to: Director, CSTE-DTC-WS-MT-SS, White Sands Missile Range, NM 88002-5157.

Directorate for Applied Technology, Test & Simulation

Since its inception in 1957, the directorate has evolved into a recognized center of expertise for nuclear effects testing and evaluation, with the in-house capabilities for turnkey testing of virtually any system or component in any potential nuclear radiation environment. Its mission has been



expanded to include electronic warfare (EW), electro-optical/infrared (EO/IR) (including directed energy weapons), and electromagnetic (EM) effects (including high-power microwave) simulation, test, evaluation, and assessment programs. The Directorate for Applied Technology, Test and Simulation (DATTS) is an ISO 9000 organization.

DATTS EO/EM/EW test capabilities include:

Pulsed Laser Vulnerability Test System - The PLVTS is the largest pulsed CO₂ laser in the U.S., designed to support susceptibility and vulnerability testing of electro-optical/infrared (EO/IR) tactical weapon systems. Fully transportable and self-contained, the PLVTS can provide tactical threat environments at virtually any test range. This proven laser delivers moderate to high energy levels, with low maintenance and operating costs. Power is delivered to an intended target via the sophisticated Advanced Pointer/Tracker (APT).

EM Environmental Effects (E3) - DATTS operates several facilities for generating a comprehensive range of EM environmental effects including EM radiation (EMR), EM pulse (EMP) and EM interference (EMI) in which military and commercial systems can be evaluated.



Soldiers set up for a test in an anechoic chamber at EPG's Blacktail Canyon Test Facility.

Using up to five transmitters, DATTS' EMR facilities provide both EMR operational (EMRO) and EMR hazard (EMRH) whole body, open-space testing. EMRO testing ensures that weapon systems perform their intended missions while exposed to EM radiation. EMRH testing ensures that electro-explosive devices will not unintentionally detonate from current induced by an EM field.

DATTS EMP facilities provide high-altitude EMP test environment simulations of an exoatmospheric warhead detonation. The system combines elements of both bounded-wave and free-field generators in a



EPG's Antenna Test Facility and Compact Range at sunset.

unique array of 54 dihedral horn antenna modules arranged in a 3 x 18 configuration. The 50 cubic-foot test volume is especially suited to complete systems testing. In addition to fixed test sites at White Sands, DATTS has a mobile capability for generating EMP environments.

DATTS conducts EMI testing to precisely measure the EM emissions from a system and to subject the test item to external radio frequency (RF) signals to determine the item's susceptibilities to EMI. At either of two facilities, the directorate performs tests, including radiated emissions, radiated susceptibilities, conducted emissions and conducted susceptibilities, to meet applicable military standards (MIL-STDs).

Lightning Test Facility (LTF) - Property losses from lightning total in the hundreds of millions of dollars each year in the commercial and private sectors alone. Losses to military facilities and equipment are equally high and can only be expected to rise as semiconductor devices, which are inherently more susceptible to lightning effects, are increasingly used in military equipment. To facilitate the study and mitigation of this powerful natural phenomenon, DATTS engineers developed a lightning effects test capability, which establishes standards for the waveforms used to determine direct and indirect effects of lightning strikes.

Electrostatic Discharge Facility (EDF) - Electrostatic discharge (ESD), or static electricity as it is commonly known, can destroy electronics. To ensure weapon systems are hardened against damage from ESD, DATTS can perform both personnel-level and helicopter-level ESD testing. The personnel-level ESD simulator is hand portable, allowing for discharge at any point on a system under test. Helicopter-level tests are performed by placing the item under test on non-conductive 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.

Simulation, including computer and laboratory modeling, of the performance of a system or component in its intended operational environment is often a complementary part of DATTS test and evaluation program. Simulations can eliminate or reduce costly destructive testing, focus follow-on testing, and increase the effective scope of the overall test and evaluation process. DATTS has the expertise, laboratory facilities and the computing power to effectively simulate and/or model simple-to complex arrays of system/environment scenarios.

Special test facilities include the Solar Thermal Test Facility, which produces intense thermal pulses to perform high temperature material testing and to simulate the thermal radiation from a nuclear weapon detonation. At full power, the energy generated by the STTF can penetrate a 1/2 inch stainless steel plate in 40 seconds.

One of the most critical aspects of the DATTS mission is the test, evaluation and assessment of the semiconductor components in today's sophisticated military systems. The Semiconductor Test Laboratory (STL) can exercise virtually any semiconductor component in the military's inventory. It can verify complex software survivability models, the determine and document variations in semiconductor device responses to various nuclear environments and track and document changes in the manufacturing processes of various semiconductor devices used by the military.

DATTS developed the Radiation Tolerance Assured Supply and Support Center (RTASSC) to assist military and space programs in the procurement and storage of electronic piece-parts and in the development of engineering solutions for electronic piece-parts. Use of the RTASSC is especially effective for the procurement, storage and obsolescence reduction of radiation tolerant electronic piece-parts. It provides affordable radiation tolerant/radiation hardened (RT/RH) electronic piece-parts for systems throughout their life cycles.



PHOTO BY TOM MOORE

Personnel work at consoles in the Transportable Range Augmentation and Control System (TRACS) van. The TRACS allows for complete test support at any location.

Major nuclear weapon effects test facilities operated by DATTS include:

Fast Burst Reactor (FBR)- The FBR closely simulates the neutron radiation environment produced by a fission weapon.

Linear Electron Accelerator (LINAC)- The LINAC 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 EM radiation.

Relativistic Electron Beam Accelerator (REBA)- The REBA is a high-energy, pulsed, field-emission electron beam or bremsstrahlung x-ray source. It provides an energy source of short duration for determining material responses to rapid surface and in-depth energy deposition, and is a particularly cost-effective means of testing relatively large items.

Gamma Radiation Facility (GRF)-The 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 Directorate's Nuclear Dosimetry Laboratory (NDL) provides extensive dosimetry support for all radiation testing at DATTS, including routine nuclear dosimetry required to characterize the nuclear radiation fields provided by the FBR, the GRF, the LINAC, and the REBA.

For more information of any DATTS capability visit the web at 155.148.66.5. or call 505-678-1161. Write to: Director, DATTS, CSTE-WS-DT, White Sands Missile Range, NM 88002-5158.

Technology Development Directorate

The Technology Development Directorate (WS-TT) is responsible for the development and

acquisition of technology, range instrumentation systems, equipment and facilities for White Sands and other test centers to support test and evaluation of weapons systems and warfighter training.

WS-TT has a strong staff experienced in planning, concept formulation, research, development, engineering and acquisition as well as trained to maintain technology and range instrumentation to meet range users' requirements. This expertise is available to assist potential range users in defining the test instrumentation support they need to achieve their test objectives. In addition, WS-TT personnel can assist in customizing instrumentation and/or required interfaces.

Many advances in radar technology are becoming available through WS-TT efforts. New airspace surveillance radars are in place to ensure airspace safety. Several Multiple Object Tracking Radars (MOTRs) were acquired for White Sands and other test and launch facilities. A basic MOTR can track up to ten targets simultaneously. Two MOTRs have been modified to track up to forty targets simultaneously. Other radar developments, such as the Target Motion Resolution (TMR), allow extremely detailed information about target motions to be extracted from radar signals. A new Advanced Phased Array Radar System (APARS) is being developed, through the Central Test and Evaluation Investment Program (CTEIP) to augment the MOTRs and phase out single target tracking instrumentation radars.

WS-TT continues to develop and upgrade remotely controlled mobile optical mounts. Newly developed software and increases in computing power are making remote control easier and providing automated real-time tracking of multiple targets. Digital cameras, such as the

Complementary Metal Oxide Semiconductor (CMOS) camera, are being developed and acquired to eventually replace most of White Sands' video and film cameras and achieve a significant milestone in range digitization.

Target control is another area of development. Both multiple airborne and multiple ground targets can be computer controlled in formations to represent battlefield scenarios. WS-TT is improving the accuracy and flexibility of target control as well as expanding it to include modern high performance targets. WS-TT is also participating in the tri-service development of a Multi-Service Target Control System (MSTCS)

A Transportable Range Augmentation and Control System (TRACS) is under development for tri-service applications. TRACS is a self-contained mobile system, which will support test mission planning/execution, real-time data collection and processing, mission control/flight safety and post mission data analysis. It will augment existing range capabilities and/or provide complete support at remote locations, both stateside and abroad.

WS-TT led the Army initiative to implement the use of the Global Positioning System (GPS) at all Army test centers. GPS provides highly accurate time space position information (TSPI) to and from missiles, aircraft, ground vehicles and fixed station participants. The WSMR GPS suite is the first mobile system in the DoD. Housed in vans and trailers, including solar powered link stations to ensure full range coverage, it has been fielded with a powerful display and virtual reality presentation capability.

WS-TT is modernizing the telemetry acquisition and data processing systems. The development of the Mobile Telemetry System (MTS) will allow for the reception and processing of high speed/wide-band data from measurement devices aboard vehicles and missile during flight.

In modeling and simulation (M&S), the directorate has integrated live missile firings into a synthetic war game exercise and presented the scenario in a three dimensional depiction on a digital texture mapped representation of actual terrain. WS-TT is leading the Developmental Test Command initiative in live entity integration into the virtual world. As part of its Virtual Proving Ground (VPG) efforts, WS-TT has developed instrumentation planning tools and flight safety tools to assist the range and range users in planning and designing their test scenarios.

A High Performance Computing Distributed Center (HPCDC) is operated by WS-TT at White Sands and has a variety of application programs to directly support the test mission. Flight safety analysis is actively performed for both catastrophic failure and flight control failures for trajectories over populated areas. The center provides air blast and electromagnetic modeling and simulation capabilities for a variety of weapons systems.



PHOTO BY EARL HEATER

A Patriot missile is launched from McGregor Range.

WS-TT developed a Smart Munitions Test Suite (SMTS), which provides a new generation of instrumentation tracking systems able to track and provide test data on a multitude of dispensed submunitions and debris in realistic battlefield conditions. The autonomous SMTS provides a unique mobile capability for performing developmental and operational characterization of smart munitions and other missiles. It uses the latest technology, including staring array cameras, graphics visualization and supercomputer processing.

In the WS-TT optical lab, lenses, mirrors, telescopes, forward-looking infrared cameras and auto-focus units are tested in a temperature and vibration controlled environment. Flat and curved optical components can be fabricated, including flats, windows, beam splitters, filters, prisms, spherical and aspherical lenses, and mirrors for ultraviolet, visible, and infrared applications. Optics can be coated using state-of-the-art high techniques.

For more information visit www.adam.wsmr.army.mil or call 505-678-5523. Write to: Director, CSTE-DTC-WS-TT, White Sands Missile Range, NM 88002-5141.

Information Operations Directorate

The Information Operations Directorate provides real-time direct test support in infrastructure engineering, planning, modification,

installation, operations and maintenance for telecommunications and automation for White Sands and its test customers.

The Customer Service Branch (IO-RC) services include maintenance and management of information systems. This includes systems administration for various network servers, the Telecommunications Center AUTODIN system and post wide email. The branch also manages the computer help desk operations and provides technical assistance for personal computers and workstations.

The Plans and Programs Branch (IO-RP) provides installation-wide direction and operational coordination for development and implementation of computer and telecommunications hardware, software and services across all Automated Information Systems (AIS). IO-RP acts as the Information Systems Security Manager for White Sands, reviewing and approving all AIS accreditations for classified and unclassified systems for all of White Sands Missile Range, some tenants and contractors. They also provide expert advice to Installation Systems Security Officers (ISSO) and systems administrators on security issues. Other duties under Automated Systems Security include: monitoring and scanning networks to identify vulnerabilities, monitoring for viruses, investigating security incidents throughout WSMR and inspecting AIS (in buildings and vans).

The IO-RP COMSEC Office is the communications security (COMSEC) manager for White Sands.

IO-RP is also responsible for managing all WSMR commercially leased communications services and contracts including items such as high speed circuits, phone service and cellular phone use. They also develop comprehensive technical solutions integrating computer systems, commercial communications services, encryption systems, etc.

The Operations Division (IO-O) is comprised of the Range Operations and Installation branches. The Range Operations Branch (IO-OR) provides real-time direct test support to WSMR and its test customers, operating and maintaining specially configured circuitry and state-of-the-art fiber optic and digital microwave transport systems in order to meet the telecommunications needs of complex test projects.

IO-OR is divided into several sections that encompass the entire WSMR complex. Each section provides telecommunications support in their respective area, including voice and data nets, UHF/VHF radio support, telephones, computer and command destruct functions. The Range Interface Section, in the Range Control Center, provides communications support throughout the building and works hand-in-hand with Range Control on the day-of-test. All frequency coordination is also performed from this office to assure test customers a radio interference-free environment. The Frequency Surveillance Section is responsible for all frequency surveillance functions in and around White Sands, ensuring



Modeling and simulation are important aspects of the White Sands mission.

range safety and preventing radio frequency interference from impacting test missions operations. The Network Management Section has overall responsibility for the transmission backbone that transports all telecommunications between information management facilities and customer locations.

The Installation Branch (IO-OI) has two sections. Its Inside Installation Section's duties include central office installations, placement or removal of signaling, data, microwave, line treatment and patch facility cabling and equipment and pre-wiring of new or modified buildings. The Outside Installation Section installs, maintains and tests wire and cable facilities, ground systems and antenna systems. They also provide splicing and testing capability on all White Sands copper and fiber optic cable both on and off the range.

In the Engineering Division (IO-E) telecommunications services include development and integration of range voice and data transmission systems, radios, local and wide-area networks, frequency spectrum management and official and residential telephones. Additional services include: short range technical planning and resource estimates; installation, maintenance and bench repair of systems and component parts for equipment; installation, repair relocation, modification and fabrication support of communication equipment requirements.

Automation services include the full scope of capabilities in our software development and maintenance and computer center. For more information visit www.vger.wsmr.army.mil or call 505-678-4411. Write to: Director, CSTE-DTC-IO, White Sands Missile Range, N.M. 88002

Other White Sands Organizations

Environment and Safety

The Environment and Safety Directorate (ES) provides support and services to range customers through its operating divisions:

The Customer Support Division (ES-C) is the entry point for all range customers and their sponsors needing any environment and safety services. Based on the customer's needs, ES-C will be the single point of contact for all ES requirements or will direct the customer and sponsor to the appropriate division. Customer

Support can assist range customers in accomplishing their National Environmental Policy Act (NEPA) and Army Regulation 200-2, "Environmental Analysis of Army Actions" responsibilities, and if requested, provide Geographic Information System (GIS), biological survey and other support for siting purposes; ensuring legal and other required reviews and approvals of the customer's analysis and documentation

Based on the customer's requirements, ES-C, may seek assistance from the divisions in charge of the Range Environmental Program. These include: Environmental Stewardship Division (ES-ES), which is responsible for the Range Natural and Cultural Resource Programs and the Range Conservation Program; and the Environmental Compliance Division (ES-EC), which is responsible for the Range Cleanup and Restoration Program and Pollution Prevention Program, as well as the Environmental Compliance Program.

The Fire and Emergency Services Division (ES-F) has programs to prevent structural and catastrophic wildfires, support uprange operations



One of the new Theater Missile Defense interceptors, the Theater High Altitude Area Defense (THAAD) missile, makes its first flight on April 21, 1995 from Launch Complex 37.



with ambulance and emergency medical technician response and provide emergency containment and control of hazardous materials. This division has a fully equipped hazardous material response and command vehicle and is the primary emergency response agency for transportation incidents occurring on nearly 100 miles of public highway, which cross or are adjacent to the range.

The Radiation Protection Division (ES-R) establishes and implements policies, procedures and controls to protect personnel and the environment from the adverse effects of ionizing radiation, lasers and radio frequency radiation. They also are also responsible for the Nuclear Surety Program, which ensures the safety and security of the Fast Burst Reactor Facility and the reliability of the people who operate and secure it.

The Safety Division (ES-S) programs provide for the safety of civilian and military personnel, visitors and the public by ensuring compliance with the Occupational Safety and Health Act (OSHA) and DoD Explosives Safety Board requirements.

For more information call 505-678-8966 or write to: Director, CSTE-DTC-WS-ES, White Sands Missile Range, NM 88002.

U.S. Army Electronic Proving Ground, Fort Huachuca

The Electronic Proving Ground (EPG) at Fort Huachuca, Ariz., is a WSMR activity. Its area of operation includes more than 9,000 square miles of public and private lands in and around Fort Huachuca.

The EPG mission is to support materiel developers by planning, conducting and reporting on developmental tests of new electronic systems including command, control, communications, computers, intelligence (C4I), and electronic warfare (EW) equipment.



White Sands has a vast array of optical instrumentation.

EPG provides quality services to developers throughout the acquisition development cycle. Early in the cycle, EPG answers many questions through modeling and simulation. Developers can address questions concerning frequency assignment, potential electromagnetic compatibility and the effect of EW while the equipment is in the early design stage. Later in the development, extensive measurement capabilities are available to satisfy the developer's data collection needs.

EPG's C4I test facilities include: *Electromagnetic Environmental Test Facility (EMETF)*-The EMETF uses modeling and simulation to determine electromagnetic effects on test items. It includes the Virtual Battlefield Environment Facility and a hardware-in-the loop simulator that provides scenario driven communications and radar environments.

Instrumented Test Range (ITR)-The ITR provides time-space-position information and target signals for open air testing an extensive network of precision tracking instrumentation and surveillance radars measuring data on airborne and ground-based vehicles. The ITR can collect both airborne and ground telemetry from systems as far west as the Yuma Proving Ground, Arizona.

Antenna Test Facility (ATF)-The ATF provides large scale testing of antenna mounted on platforms and can determine radiation patterns in the high frequency to microwaves frequencies.

Electromagnetic Interference/Electromagnetic Compatibility/Testing Electromagnetic Propagation and Evaluation for Secure Transmission Test Facility (EMI/EMC/TEMPEST)-The importance of EMC and EMI testing is becoming more apparent with the increased number of electronic systems on the battlefield. EPG's EMI/EMC/TEMPEST test facility offers testing both at its Fort Huachuca chambers and in the field with portable test equipment.



PLVTS 50-cm static beam director for pulsed CO2 Laser.

PHOTO BY KEN SHULTZ



A Multiple Object Tracking Radar at C Station.

Environmental Test Facility (ETF)-The ETF can perform a full range of static and dynamic environmental testing on components and systems.

Besides test facilities, EPG has several test beds for specific kinds of equipment. The Tactical Radio test bed offers developers extensive capability and expertise to test new communications devices. The C4I Information System Test Bed at Fort Lewis, Wash., has a variety of equipment to test and experiment with the Army Tactical Command and Control System, battlefield functional area systems. The Global Positioning System test bed is part of Commercial GPS Receiver Test Program, and does tests for both government and private industry. The Satellite Test Bed offers developers the ability to test various military and commercial, ground-based platforms which access satellites. The Unattended Aerial Vehicle capability provides landing strips, flight tests instrumentation and safety support for the testing of service unmanned aerial vehicles.

EPG operates a field office at Fort Lewis for developing simulations to drive both war games and testing. This office has extensive experience in aggregate and entity level simulations such as the Corps Battle Simulation and EAGLE. The office developed interfaces with these simulations to drive battlefield functional area computer systems.

The EPG Meteorological Team supplies comprehensive meteorological support to all activities on Fort Huachuca. Services include climatology, upper air data support, solar/geographical activity, advising and forecasting, weather forecast and consulting services.

EPG continues to update and modernize its C4I test capabilities. The test methodology program is the research and development base improve test capabilities in support of EPG's test mission and its development of a virtual electronic proving ground. Investigative efforts cover

requirements analysis, development of advanced measurement techniques and instrumentation design. Current program emphasis is on the intensive application of simulation and automation technology to test large, complex and distributed computer-based C4I systems. These efforts are leading to development of a common hardware and software architecture for instrumentation to test digital systems of the future.

See additional information on the web at huachuca-www1.army.mil/epg or call 520-538-7110. Write to: Commander, CSTE-DTC-WS-EPG, Fort Huachuca, AZ 85613-7110.

Tenant Activities

High Energy Laser Systems Test Facility

The High Energy Laser Systems Test Facility (HELSTF) operates the nation's most powerful laser in support of Department of Defense laser research, development, test, and evaluation. The test facility represents an approximately \$800 million investment in high energy laser research and includes such unique capabilities as:

Mid-Infrared Advanced Chemical Laser (MIRACL)-Originally built by TRW, Inc., for the Navy, the MIRACL has proven chemical laser technology can be scaled to multimewatt power levels. The MIRACL is the highest power chemical laser in the Western Hemisphere.

Sea Lite Beam Director-A high-precision pointer-tracker system built by Hughes Aircraft

PHOTO BY SFC MIKE BERUBE



A fighter aircraft undergoes testing at the DATTS VPD-II high-power EMP facility.



Company for the Navy, the Sea Lite Beam Director can track highly maneuverable tactical targets and destroy them with the MIRACL. The infrared optics on the beam director also serve as a high-resolution infrared imaging system to record data of missile tests conducted on the missile range.

Beam Transfer Area-The BTA can switch the MIRACL beam between any of the numerous HELSTF test areas, thereby reducing the test costs to the individual customer by allowing a number of simultaneous tests during each laser firing.

Effects Test Area-Provides an indoor controlled laboratory test environment for evaluating laser effects on small (less than one meter) components and materials.

Hazardous Test Area-Located 900 meters downrange from the MIRACL, this 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.

Large Vacuum Chamber-In the chamber, a vacuum equivalent to a 600,000-foot altitude can be produced. It is the only large vacuum chamber in the country capable of allowing the entry of full-power, high-energy laser beams.

Pulsed Laser Vulnerability Test System-This system is a surrogate laser device capable of duplicating many threat tactical laser systems.

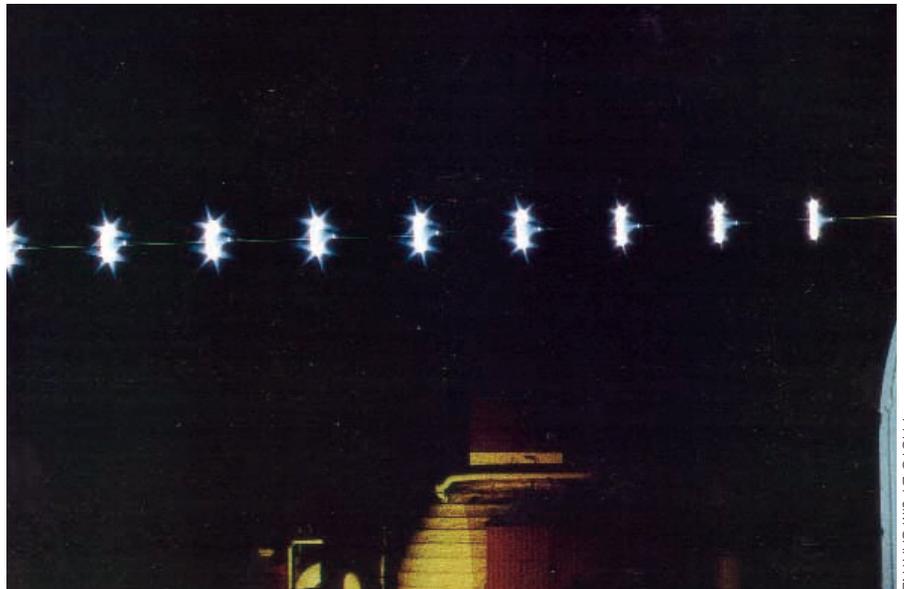


PHOTO BY JIM SHRINE

A time-lapse photo shows the pulse of a laser hitting the back of the Lightcraft.

Learn more about HELSTF at www.smdc.army.mil or call 505-679-5041 or write to HELSTF, ATTN: SMMA-AC-H, White Sands Missile Range, NM. 88002-5148.

Elements of two ARL organizations are located at White Sands Missile Range: the Information & Electronic Protection Division (IEPD) of the Survivability/Lethality Analysis Directorate (SLAD) and the Computational & Information Sciences Directorate (CISD) Battlefield Environment (BE) Division.

The IEPD's mission is to determine the survivability, lethality and vulnerability (SLV) of all Army missile defense systems, aviation systems, munitions systems, C3I/information systems, ground systems and technology demonstrations to the full spectrum of battlefield threats and atmospheric interactions throughout the system's life cycle. IEPD is the Army's lead organization for determining electronic warfare (EW) vulnerability and information operations (IO) vulnerability/survivability

Army Research Laboratory

The Army Research Laboratory (ARL) is the Army's primary source of fundamental and applied research. With more than 1,250 scientists and engineers, ARL is a key in-house repository of expertise in support of Army-unique requirements. The laboratory's mission is to provide key technologies and analytical support to ensure the Army decisive victory in future land warfare.



First laser lethality test on a second stage Titan I booster was conducted on Sept. 6, 1985.

Laser Demonstration Device-A 10-to-20 kilowatt mid-infrared chemical laser that provides low-cost laser test capability for customers who do not need the full power of the MIRACL.

Optical Maintenance Facility-Provides on-site capability to characterize, clean and install optics of any type, from windows to the new uncoated optics.

Emerging defense systems employing high-energy lasers, such as Tactical High Energy Laser, are tested and evaluated at HELSTF, together with testing of associated subsystems and materials.



A payload fairing in the large vacuum chamber prepares to undergo testing.



of Army systems, and provides technical support to other DoD activities. IEPD provides SLV and evaluation support to developers, decision makers



and the Army evaluator and provides technical judgements on complex SLV issues. IEPD researches, investigates and recommends counter-countermeasures for Army systems to reduce their susceptibilities/vulnerabilities and to ensure optimum survivability and lethality in threat environments.

Since 1952, IEPD and its predecessor organizations have carried out its mission at WSMR. Recent technological advances in information operations, electro-optics and directed energy provide new arenas for study, complementing work in the more traditional radio frequency and microwave areas.

IEPD has employees at WSMR, Fort Monmouth, N.J., and Aberdeen Proving Ground, Md.

The CISD BE Division's mission is to advance understanding of the atmosphere and its relationship to and impact on the performance of Army systems, personnel and operations.

The Weather Exploitation and Artillery Meteorology Branches of BE have been at WSMR since the mid-1940s. One of its first activities at the range dates back to 1946, when it provided radar and communications support for the V-2 rocket program. The current mission of the BE branches at WSMR is to "own the weather" by advancing the understanding of the atmosphere and its critical relationships to performance of Army systems and operations, and to develop, acquire and integrate new technologies that ensure land force dominance.

BE Division develops advanced technology and tactical decision aids for insertion into Army Battle Command Systems and develops the sensing and software technology to provide indirect fire meteorological aiming corrections to support Precision Strike. BE develops atmospheric modeling and simulation capabilities to represent battlefield atmospheric conditions. It uses these technologies to support advanced war fighting experiments that will permit war fighters to exploit weather as a combat multiplier and gain tactical advantage over the enemy. Products are transitioned to the Project Director, Integrated Meteorological System and to PM-Night Vision/RSTA.

The BE Division has personnel at WSMR; the Adelphi Laboratory Center, Md.; Ft. Sill, Okla.; Ft. Huachuca, Ariz; and Hurlburt Field, Fla.

For more information call 505-678-3652 or see the ARL website at www.arl.mil. Write to: Army Research Laboratory, Attn: AMSRL-PO-WS, White Sands Missile Range, N.M. 88002-5513.

U.S. Army TRADOC Analysis Center

The U.S. Army TRADOC Analysis Center (TRAC) at WSMR is one of the sub elements of the U.S. Army TRADOC Analysis Center at Fort Leavenworth, Kan., whose parent element is the U.S. Army Training and Doctrine Command at Fort Monroe, Va.

TRAC's primary mission is to conduct operations research studies of Army organizations and systems. Members of its military and civilian work force are trained in at least one of the disciplines of operations research, physics, mathematics,



engineering, statistics, computer science, psychology, economics or education. The center's personnel are responsible for high-resolution modeling of Army tactical organizations up to the brigade level and model the personnel, weapons, decision-making processes, threat and environments in which units operate. Models range in complexity from a few equations generated on a spreadsheet to large, highly complex, computerized, multi-station, interactive war games.

The organization's main computing capability is a network of computers able to perform more than two billion instructions per second. The network is used introduce random variability to the simulation of tactical operations. Analysis of these simulations provide valuable information about the effectiveness of conceptual, developmental and fielded materiel systems; various mixes of forces and equipment; and training programs and devices. Although most of TRAC's studies are conducted for the Army, the organization also participates in joint multi-service and combined multi-national projects.

For more information, contact 505-678-4512. Write to: Director, ATRC-W, White Sands Missile Range, NM 88002-5502.

Air Force

The Air Force Materiel Command's Air Force Development Test Center at Eglin Air Force Base, Fla., operates a fleet of high-performance jet aircraft in support of weapons systems and sub-systems tests. The center also conducts tests on air-launched tactical and air-defense missiles, guided weapons and electro-optical weapon system delivery.



An example of a JANUS simulation on a computer system.



Electro-optical countermeasure systems are performed by the U.S. Army flarecopter.

The Command's 46th Test Group, a tenant unit based at Holloman Air Force Base, N.M., provides diverse, flexible aerospace testing. The 746th Test Squadron, also known as the Central Inertial Guidance Test Facility (CIGTF) is a DoD Center of Expertise with responsibility for test, evaluation and analysis of components and systems applicable to missile guidance, aircraft navigation and spaced-based pointing and tracking. CIGTF is the responsible test organization for GPS-user equipment for the GPS Joint Program Office. Capabilities include inertial lab and mobile van testing, field and lab GPS jamming and spoofing testing, and inertial guidance flights and rocket sled testing.

The 846th Test Squadron, also known as the High Speed Test Track, became operational in the early 1950s because of the extensive space needed to simulate captive-flight testing of various weapons and space systems. This national resource is the longest and most precisely aligned and instrumented facility of its kind in the world. The track provides a high speed, high acceleration and deceleration rail platform from which to perform aircrew escape testing, munitions testing, aerodynamic testing, electronic counter measures testing plus more. Captive flight-testing is a valuable tool in research, development and evaluation of system components.

The National RCS Test Facility (NRTF) of the 46th Test Group, formally known as RATSCAT, is the premier outdoor static radar cross-section (RCS) measurement facility within the DoD. The NRTF has two facilities: NRTF main site is on the alkali flats near mid-range and the RCS Advanced Measurement System is in the foothills of the San Andres Mountains near the western range boundary. NRTF can measure the RCS of very low observable weapon platforms, including flyable aircraft, and perform highly accurate bistatic RCS measurements of aircraft and munitions. Test articles, weighing up to 100,000 pounds, can be measured at various aspect angles at frequencies from 100 MHz to 94 GHz.

The 586th Flight Test Squadron plans, coordinates and conducts flight tests of advanced weapons and avionics systems, primarily in the airspace over WSMR. The squadron also flies two

highly modified AT-38Bs in support of Army, Navy and Air Force testing. These aircraft are equipped with GPS and can carry electronic countermeasures pods, chaff, flares and a variety of other stores.

Personnel from another Air Force unit, the 49th Fighter Wing at Holloman Air Force Base, are assigned to the missile range. This group controls all air traffic in the skies over WSMR 24 hours per day, 365 days per year. They keep White Sands' commanding general informed on all matters pertaining to the range's airspace. The office manages the airspace above the range to support customers, controls aircraft in support of tests and maintains air safety surveillance of the restricted airspace.

The Deputy for Air Force Office, in Building 124, is the focal point for all Air Force activities on the range. The office also sponsors any Air Force programs using the range. For more information visit www.holloman.af.mil or call 505-678-1251 or write to: Deputy for Air Force, ATTN: TGOR, WSMR, NM 88002.

The Desert Navy

The Navy has been part of the test community at White Sands since June 14, 1946, when Naval activity was established to participate in research and testing of captured German V-2 rockets.



Air Force personnel monitor White Sands' restricted airspace.

Today, the mission of the Naval Air Warfare Center Weapons Division-White Sands includes land-based test of Naval weapon systems (missiles and gun munitions) and launch operations for sub orbital space systems and research rockets.

Navy facilities include the U.S.S. Desert Ship. The Desert Ship serves as a primary live fire test bed for today's surface-to-air weapons including Standard Missile and Evolved Seasparrow Missile (ESSM). The Desert Ship is continually being upgraded to meet live fire testing requirements. The Desert Ship has tested all versions of Standard Missile (SM) including Tartar, Terrier and Aegis variants of SM-1 and SM-2, Seasparrow, Sealance, and Vertical Launched AntiSubmarine Rocket (VL ASROC).



Shown is an aerial view of the High Speed Test Track.

Testing is performed at sites other than the Desert Ship. The Navy's Launch Complex 34 (LC34) is the land-based test site for the Rolling Airframe Missile (RAM). LC34 is a semi-hardened facility, which can be used in self-defense and close-in engagements. Lot acceptance tests for both U.S. and NATO rounds have been conducted at this site.

The Navy's research rocket program supports a variety of government and commercial firms in



Equipment is prepared to undergo testing at the NRTF facility.

the launch and recovery of suborbital payloads. Payloads include Theater Missile Defense countermeasures experiments, advanced technology demonstrations, and targets to support testing of theater missile defense systems. The low cost ballistic target alternative supports requirements where low to medium fidelity is acceptable.

Navy's customers at White Sands receive industrial support from modern shops featuring numerically controlled mill and lathe facilities and extensive field construction capabilities. Industrial shops provide quick response prototyping and manufacture of specialized fixtures and other devices to support customer needs. Navy launch facilities, sites and support equipment are also maintained and enhanced by Facility Engineering. Engineering has an electrical/electronic crane, heavy-duty equipment, and mobile heating and air conditioning capabilities. As a part of customer service, specialists assist in preparation of environmental documentation and in the handling of hazardous waste.

The Navy at White Sands has a proud tradition of low-cost, high-quality support of its customers. In an era of defense consolidation and downsizing, the Navy finds the means to continue to provide and to improve the quality, cost and responsiveness of its products and services. For more information visit www.nawcwpns.navy.mil or call 505-678-2101. Write to: Officer in Charge, Naval Air Warfare Center, White Sands Missile Range, N.M. 88002-5510.

White Sands Test Facility (NASA)

In 1962, the National Aeronautics and Space Administration's (NASA's) Johnson Space Center selected WSMR as the location for testing engines of the Apollo Command Service Module and

Lunar Module. A 94-square-mile area on the west side of the range was assigned to NASA for the development of a propulsion systems test facility.

Since 1964, the NASA White Sands Test Facility has conducted propulsion system testing

in simulated space conditions in support of the nation's major manned space programs, including the Apollo Lunar landing, the Skylab and Space Shuttle Programs. Propulsion systems development and qualification testing for the Apollo Service Module and Lunar Module ascent and descent stages were conducted here from 1964 to 1970. Skylab and space shuttle propulsion systems development and qualification testing were conducted from 1970 to 1983. NASA also conducted qualification tests of the Apollo Launch Escape System at White Sands' Launch Complex 36.

Recent propulsion tests include continued support of the space shuttle, development of space station attitude control and orbit reboost propulsion systems, refurbishment of shuttle orbiter components and static firing tests associated with the Delta Clipper-Experimental reusable rocket program. Work is also conducted on propulsion systems for the International Space Station, new or modified rocket engines for improved shuttle performance and reliability, and propulsion systems for deploying civilian and military payloads, including deep space probes.

The White Sands Test Facility operates White Sands Space Harbor, where approach and landing training is conducted for shuttle pilots. The harbor



A Navy Standard 2 IVA is fired from the Vertical Launcher at the U.S.S. Desert Ship.

PHOTO BY TED GASKINS



also serves as an alternate orbiter landing facility. The Space Shuttle Columbia landed at the space harbor at the end of Mission STS-3 in 1982 because heavy rains at the usual landing site at Edwards Air Force Base, Calif., left part of the dry lakebed under water.

Laboratories at the test facility are engaged in extensive testing efforts to evaluate the compatibility of materials being considered for use in aerospace applications. Flammability, offgassing, thermal stability, outgassing, toxicity, hypervelocity particle impact, detonation phenomena, susceptibility to ignition and other such evaluations are performed regularly. The laboratories also perform spacecraft component qualification testing, precision cleaning, failure analysis and a variety of other activities for NASA, other government agencies and private industry.

The Tracking and Data Relay Satellite System (TDRSS) ground station adjacent to the test facility became operational in 1983 following the insertion of the first shuttle-launched TDRSS satellite into geosynchronous orbit. The system now includes seven satellites and two ground stations to provide tracking and data relay services for

spacecraft, including the shuttle, in low Earth orbit. For more information visit www.wstf.nasa.gov. or call 505-524-5773. Write to: NASA, P.O. Box 20, Las Cruces, N.M. 88004.

Ground-Based Electro-Optical Deep Space Surveillance

Responsibility for keeping track of everything in orbit belongs to the U.S. Space Command, Space Control Center, located within Cheyenne Mountain Air Force Station in Colorado Springs, Colo. Ground-based Electro-Optical Deep Space Surveillance sites, assigned to the 21st Space Wing, Air Force Space Command, play a vital role in tracking "deep space" objects. Some 2,500 objects, including geostationary communications satellites, are located in deep space 3,000 miles and beyond.

There are currently three operational GEODSS sites reporting directly to the 18th Space Surveillance Squadron, Edwards Air Force Base, Calif., which in turn report to the 21st Space Wing. They are: Detachment 1 at Stallion Range Center

near WSMR's northern boundary; Detachment 2 at Diego Garcia, British Indian Ocean Territories; and Detachment 3 at Maui, Hawaii.

To perform its mission, GEODSS brings together three optical telescopes, low light level television and four computers. The system only operates at night when the telescopes can detect objects 10,000 times dimmer than the human eye can detect. The main telescopes have 40-inch apertures and a two-degree field of view. The auxiliary has a 15-inch aperture and six degrees field of view.

The GEODSS system, which can track objects as small as a basketball more than 20,000 miles out in space, is a vital part of the Air Force Space Command mission as "Guardian of the High Frontier."

The GEODSS concept was researched and developed by the Massachusetts Institute of Technology Lincoln Laboratories at the Experimental Test Site near Detachment 1 at Stallion. The site is still in use by MIT research and development. For more information visit www.spacecom.af.mil or call 505-835-4546, or 505-679-4134. Write to: DET 1, 18 SPSS/DC, P.O. BOX W, Socorro, N.M. 87801.



A Terrier Black Brant research rocket blasts off from Launch Complex 36.

Office of the Test Director

The Office of the Test Director (OTD), Precision Guided Weapons Countermeasures (PGWCM) Test and Evaluation (T&E) Directorate's mission is to direct, coordinate, support and conduct countermeasures/counter-countermeasures (CM/CCM) T&E activities applicable to precision guided weapon systems and related components.

OTD is a small, unique, joint service agency made up of Army, Air Force, Navy/Marine, and Foreign Systems offices staffed by civilian scientists and technical personnel, as well as field grade officer technical representatives.

While home-based at White Sands Missile Range, OTD deploys test teams capable of operating under a variety of environmental and operational conditions, conducting CM/CCM test operations on a world-wide basis. Directorate personnel develop, maintain and use an inventory of unique CM equipment and techniques not under development or available anywhere within other DoD components programs. OTD also conducts, coordinates, participates in, or is cognizant of, foreign equipment exploitation within defined program objectives. Supporting all activities, testing, and equipment development, OTD performs, conducts and/or participates in PGW systems CM/CCM susceptibility and/or vulnerability analyses.

OTD provides service-independent countermeasures (CM) analysis, testing and evaluation throughout a weapon system's life cycle. Its activities complement or supplement the various Service program efforts. Its independent cooperative CM test approach is highly effective and increases cost effectiveness and eliminates redundant testing.



Shown is a modified Gulfstream jet used to simulate the Space Shuttle as it makes approach landings at Northrup Strip.

OTD then makes recommendations for improvements to system developers, decision makers, as well as to OSD, contributing to the production of CM-hardened U.S. weapons systems and improving capabilities for these systems to function effectively in increasingly hostile environments.

For more information visit www.acq.ods.mil/te/organization/otd/htm or call 505-678-7221. Write to: Director, PGWCM, White Sands Missile Range, N.M. 88002-5519.

commanders with an organized forum for the discussion and resolution of range problems. Established in 1951, the RCC also sets common technical standards for RCC ranges and serves as a consultant to military and civilian organizations.

Funded by the RCC ranges, the Secretariat employs a full-time staff including an executive secretary, management support assistant, technical editor/writer and word processing personnel. Services provided by the Secretariat include

editing, publishing and distributing all RCC documents and group minutes; maintaining the RCC Web Homepage, historical archives, membership directory, and processing membership applications; and assisting in the preparation of briefings for presentation at RCC biannual meetings.

For further information visit tecneto.jcte.jcs.mil or call 505-678-1107. Write to: Secretariat, CSTE-DTC-WS-RCC, White Sands Missile Range, N.M. 88002.

Range Commanders' Council Secretariat

The Range Commanders' Council Secretariat, located at White Sands Missile Range since the mid 1960 provides administrative services to the Range Commanders' Council (RCC). The RCC is an unofficial, unchartered organization providing



View of GEODSS Detachment 1 at Stallion Range Center.



Community Services & Facilities

Army Community Services

The Army Community Service Center provides social service programs to enhance wellness within the family and the community to include:

Relocation Assistance Program – pre and post move orientations, temporary loan of household items, services for waiting families as well as foreign born—spouses, welcome packets and Standard Installation Topic Exchange Service (SITES).

Outreach Program – the Army's primary program for linking family support programs with soldiers and their families. Outreach services include welcome visits, volunteer meetings, educational and special interest programs, social activities and support groups. Outreach conducts a community needs assessment survey and implements a Community Outreach Service Plan.

Cubby Hole – a non-profit program designed to assist individuals and families of service members, E-5 and below, with household, clothing and baby items. The used items are generated from the community through donations and are free for the taking.

Family Advocacy Program – committed to enhancing healthy family relationships and preventing family violence through classes, programs, activities and supportive services.

Exceptional Family Member Program – offers assistance and services to include a summer camp for families with special needs. The program ensures medical and special education needs are considered in the assignment process.

Employment Assistance Program – helps family members with their job search. Services include job referrals, employment counseling, resume writing and interview technique workshops, and a teen job bank.

Army Emergency Relief – provides financial assistance in the form of loans or grants to soldiers, active and retired, and their families who have financial emergencies.

Consumers Affairs and Financial Assistance Program – offers financial counseling, assistance with debt liquidation and training in basic money management skills.

FOODCARE and KIDCARE Programs are available to community members.

The Army Community Service Center, Building 250, is open 7:30 a.m.-4:30 p.m., Monday-Friday. For more information, call 505-678-6767.

The Substance Abuse Prevention Program is dedicated to prevention and rehabilitation.

Awareness education and community outreach for military and civilian personnel and their family members are integral parts of the program. Offices are in McAfee Health Clinic, Room 903. Call 505-678-1957 for information.

The *Employee Assistance Program* helps civilian employees with personal problems, including stress management and problem solving that can interfere with work performance. Offices in McAfee Clinic, Room 903 and can be reached by dialing 505-678-1957.

Army Education Center

The White Sands Education Center is a “one-stop-shop” for professional development needs, offering the full range of academic services and programs to the local military community as well as to reservists and guardsmen.

Education Center services include academic, career and financial aid counseling; Tuition Assistance (TA) for service members; a testing center supporting both military and civilian testing needs; two computer labs; and an Army Learning Center. The center offers individual and group tutorial services, computer courses, computer based training, internet access, distance learning/independent study programs for college credit and CD-ROM, audio/videotape and textbook references for test preparation and personal development. The tutor can be reached at 505-678-4716, and is available Monday - Thursday, 11:45 a.m.-9:45 p.m.

Academic programs range from basic skills remediation to graduate level study. On-post universities include New Mexico State University's (NMSU) Dona Ana Branch Community College and Troy State University (TSU). The Education Center organizes and arranges instructional programs in basic skill remediation, English-as-a-second language plus high school completion and General Education Development (GED). The Education Center is co-located with the Post Library in Building 464. Office hours are Monday-Thursday, 7:15 a.m.-4:45 p.m. and Friday, 7:15 a.m.-3:45 p.m. For more information call



PHOTO BY SANDRA FLORES

Six-year-old Charlie Mellnick sits atop Stormy at the Special Equestrian Riding Therapy program.

505-678-4646. University representatives can be reached at: NMSU (505) 678-6198 and TSU (505) 678-6052. Detailed information on our services and programs is available at our website: www.wsmr.army.mil/education.

Arts and Crafts Center

A well-equipped Arts and Crafts Center is in Building 426 on Dyer Street. The facility has woodworking, ceramics, stained glass, silversmithing and lapidary areas as well as T-shirt and picture framing shops. Classes are periodically offered in these crafts as well as macramé, gourd painting, pottery and wood burning. The facility includes a sales area, which carries supplies. A trained staff is on duty to help with projects and teach new techniques. Hours are: Saturday and Sunday, 9:30 a.m.-5 p.m.; Monday and Tuesday, 1:30-9 p.m.; Wednesday, 11 a.m.-7 p.m. and closed Thursday and Friday. For more information call 505-678-5321.

Auto Skills Development Center

The Auto Skills Center, at the corner of Aberdeen and Dyer Streets, has tools and equipment for minor service to major repair. The facility is set up for self-help auto maintenance, but has a qualified mechanic to perform maintenance and service repairs. The facility has four lifts and four open bays. Available technical equipment includes a brake drum lathe, front end alignment



Customer service is a priority at the Commissary.

rack, engine analyzer, tire changing and wheel balancing machines, alternator and starter test equipment plus a variety of hand tools and manuals for most American and foreign cars. There are fees for the use of the facility and equipment and service fees charged for mechanic services performed. On-post towing of passenger cars is available for a nominal fee. There is a small resale store in the center and parts can be special ordered. A 24-hour coin-operated car wash is next to the center.

Hours are Monday-Wednesday, 4:30-7 p.m., Saturday and Sunday, 9 a.m.-4:30 p.m. For more information call 505-678-5800/6365.

Bowling Center

The Bowling Center, Building 234, is next to Bell Gym. It has 10 lanes, shoe rentals, a pro shop and lounge. The snack bar has an excellent reputation for its short order menu. Lane hours are Monday-Friday, 6 a.m.-10 p.m.; compressed Fridays, 10 a.m.-10 p.m.; Saturdays 10 a.m.-10 p.m.; Sunday and holidays—closed. Snack Bar hours are 6:30 a.m.-10 p.m., Monday-Friday; compressed Fridays, 10 a.m.-10 p.m.; Saturdays, 10 a.m.-10 p.m., Sundays and holidays, closed. The lounge is closed Saturdays, Sundays and holidays. Lounge hours on compressed Fridays are 11 a.m.-6 p.m. For more information call 505-678-3465.

Chapel Services

Religious services are conducted at the Main Post Chapel in Building 265 and at Sierra Chapel, Building 145. Worship services include: Protestant-Sunday, 10:15 a.m.; National Baptist Gospel Hour-Sunday, 11:45 a.m. at Main Post Chapel; Catholic-Saturday, 6 p.m. and Sunday, 9:30 a.m. at Sierra Chapel. Many other religious activities are offered for all age groups. Marriage, pre-marriage and religious counseling is available. Call 505-678-2615 for additional information.

Child and Youth Services Programs

Child and Youth Services offer a variety of quality programs to range personnel and their families. An annual registration is required for all programs. The Child Development Center and the School Age Services program are nationally accredited. The Alan Nord Youth Services Center is a National Boy and Girls Club affiliate. Programs are:

Child Development Services—Full day childcare, hourly and part time care options for ages six week-10 years. Located in the Child Development Center, Building 272, 5:30 a.m.-6 p.m., Monday-Friday, excluding compressed Fridays. For more information call 505-678-2059.

Family Child Care—Childcare available on compressed Fridays, weekends, evenings and extended hours. Located at 105 Twin Cities, open 7 a.m.-4:30 p.m. Call 678-6942.

School Age Services—Before and after school care for ages 6-10. Providing educational and recreational opportunities for youth during parental duty hours. Quality weekly, winter, spring and summer camps during school vacations for ages 6-15. Located at the Youth Services Center, Building 1316, 6 a.m.-6 p.m. For more information call 505-678-8625.

Youth Services—Organized individual and team sports programs for youth, 4-18. Homework and computer labs are open six days a week, 3-7 p.m. The Teen Council meets every Friday evening and is active many community projects. Great middle school and teen trips are planned with the teens' input. Dances and swimming parties are conducted. There are a variety of clubs. Located in the Youth Services Center, Building 1316. Hours are 3-8 p.m., Monday-Thursday, 3-10 p.m., Friday. Youth 10 and older, 3-6 p.m., Monday-Friday, 1-10 p.m., Saturdays.

Supplemental Programs Services—Parent education classes are offered monthly. On site childcare is available for meeting and special events. "Smart Moves" exercise classes are offered weekly for parents and children. Parent/child activity sessions are offered monthly. For a complete list of all current parent opportunities call 505-678-7704.

Commissary

The Commissary features modern equipment in a shopping environment typical of the larger supermarkets. Customers get "Best Value Items" that are the lowest prices found in the Defense Commissaries Program. The commissary carries some 7,300 items in its grocery, produce, meat and deli departments. The commissary, Building 262, is across from the Post Exchange. Store hours: Sunday, 11 a.m.-5 p.m.; Monday, closed; Tuesday, 7 a.m.-8 p.m.; Wednesday, 7 a.m.-6 p.m.; Thursday, 7 a.m.-8 p.m.; Friday, 7 a.m.-6 p.m.; Saturday 9 a.m.-5 p.m. For more information call 505-678-2313/2358.

Community Center

The Community Center, Building 460, offers activities such as music, dance and language classes, flea/crafts markets, ethnic programs, small interest groups and music/theater programs. The center operates a video/DVD rental with more than 700 titles and other video accessories. It also has a UPS shipping service. The center contains game, music, card and TV rooms, in addition to a large ballroom. Groups can arrange for use of the large room for social or business meetings. Musical instruments and board games are available for check out. Purchase discounted tickets (local and regional), make hotel, condo or cabin reservations, and book



PHOTO BY SANDRA FLORES

White Sands students learn first hand about farm animals and livestock during Agriculture Day.



Partial view of the outdoor Missile Park at the Museum Complex next to the front gate.

tours at the Information, Ticketing and Registration (ITR) office. The ITR office has information for the surrounding areas and can assist with vacation planning. The center is open seven days a week. For more information, call 505-678-4134.

Dental Care

The dental clinic is staffed to provide care for active duty personnel. The clinic provides an intensive preventive dentistry program to include fluoridation of the range water supply. Hours are 7 a.m.-4 p.m., Monday-Friday, with sick call and exams 7 a.m.-8:30 a.m., Monday-Friday. For more information call 505-678-1142.

Department of Motor Vehicles Office

A New Mexico State Department of Motor Vehicles Office is in the Museum building. Services offered include driver's licenses and ID cards, titles and registrations. Hours are Monday-Thursday, 7 a.m.-3:30 p.m. and Friday, 7 a.m.-2:30 p.m. For more information call 505-678-8824.

Document Automation and Production Service

The Document Automation and Production Service is responsible for document automation and printing within the Department of Defense, encompassing electronic conversion, retrieval, output and distribution of digital and hardcopy information. The print shop is located in Building 153. For further information, call 505-678-1107 or visit our web site at www.ftbliss.swbedaps.mil.

Equal Employment Opportunity Office

Located in Building 124, the Equal Opportunity Office serves as advisor to the commanding general

and White Sands community on equal opportunity matters. Its philosophy is based on fairness, justice and equity. The range equal opportunity program is committed to ensuring a climate free of discrimination and sexual harassment. It is designed to provide an avenue of redress to military personnel, civilians and family members. For more information call 505-678-1291.

Frontier Club

The Frontier Club is the center for special events at White Sands Missile Range. The club is open for: Breakfast, Monday-Friday, excluding compressed Fridays, 6:30 a.m.-8 a.m., serving custom made omelets and burritos, "Grab and Go" breakfasts, Starbucks coffee and daily specials. Lunch, Monday-Friday, excluding com-

pressed Fridays, 11 a.m.-1 p.m., serving daily specialties and featuring a double soup and salad bar, custom made deli sandwiches and grilled special and hot sandwiches, desserts, freshly baked cookies and Starbucks coffee. Red and green chile dishes are featured during the winter. Brunch is served on compressed Fridays and weekends, 10:30 a.m.-1 p.m., featuring special entrees, made-to-order omelets plus regular breakfast fare. "Grand Champagne Buffets" are served on Easter Sunday and Mothers Day. Dinner is served nightly, 5:30-7:30 p.m. Seasonal specialties are served on non-compressed Fridays. Dinner is often served on the patio where one can "graze and gaze" with an unimpeded view of the Organ Mountains.

The East Lounge is open dinner hours, Monday-Sunday, 5:30-7:30 p.m., and on non-compressed Fridays, 4 p.m.-1 a.m. The Frontier Club is in Building 1330 on Martin Luther King Jr. Blvd. For more information call 505-678-2055/2057

Other Frontier Club Facilities

The Italian Café - Located at the Community Center, Building 460, the cafe serves pizza, pasta, and hot and cold sandwiches. Hours are Monday, Wednesday and Thursday, 11 a.m.-7:30 p.m.; Tuesday and Friday, 11 a.m.-8 p.m.; Saturday, 4:30-8 p.m.; closed Sundays. Delivery is available on post on Fridays and Saturdays for a nominal charge. Call 505-678-0544 for the weekly special or to place orders.

Stallion Lunchbox - Located at Stallion Range Center at the far north end of the missile range, the Lunchbox serves breakfast, 7-9 a.m. and



Norman Mabie demonstrates the skilled art of fly tying at the Arts and Crafts Center.

PHOTO BY SANDRA FLORES



lunch, 10:30 a.m.-1p.m. Monday-Friday, except compressed week Fridays. Call 505-679-4444 for daily specials.

La Cantina-Located at Launch Complex 38, off Nike Avenue, Mexican and American food is served. Breakfast hours are 7-10 a.m. and lunch is served 10:30 a.m.-1 p.m. Call 505-678-9406 for special menu requirements.

Golf Club

One of the most popular spots on post is the White Sands Golf Club. This 9-hole course is at the foot of the Organ Mountains, just south of the post housing area. Facilities include a driving range, and putting and chipping greens. Nationally advertised brands of clubs, bags and accessories are on sale in the pro shop. Motor carts and hand-pulled carts are available for rent. A yearly family membership entitles the entire family to enjoy golf without a limit on the number of rounds played. The course is open six days a week and normally closed on Monday, except for holidays. The telephone number is 505-678-1759.

Health Care

McAfee U.S. Army Health Clinic, an outpatient medical treatment facility is in Building 530 on Rock Island Road, just south of the gas station. Among the services offered are: general outpatient care including obstetrics and pediatric clinics, pharmacy, lab, x-ray, immunization clinic, social work/community mental health services, optometry, medical records administration, patient education (including preventative health care, obstetrics orientation, diabetes, asthma, hypertension and HIV awareness), environmental health, industrial hygiene and occupational health. Emergency services are provided by the treatment room staff, comprised a 24-hour ambulance service, a physician and registered nurse. Department of the Army civilians and other non-military residents on White Sands are eligible for medical care as paying patients. For more information call 505-678-1138 or visit www.wsmr.army.mil/mcafee on the web.



The Organ Mountains serve as a backdrop for the Volunteer Park Pavilion/ACOE Lodge.



Jack Baker assists Albert Voegeli in assembling a corner wall clock made of oak in the woodworking area of the Arts and Craft Shop.

Inspector General

The Inspector General provides the range commander a continuing assessment of his operational and administrative effectiveness. He also operates the Inspector General Action Request system to render assistance and identify injustices and conditions detrimental to efficiency, economy or the Army's or White Sands' reputation. All military and civilian personnel can voice concerns verbal or in writing to the Inspector General in Building 124. Requests for assistance are accepted daily during regular duty hours. For more information call 505-678-3902.

Legal Services

The legal assistance and claims sections of the Office of the Staff Judge Advocate provide legal services to the community. Fully qualified practicing legal assistance attorneys provide confidential advice and other assistance. Services are available to active duty and retired personnel of all services, and their family members. Service is also available to civilian employees who have been named as respondents for reports-of-survey.

Professional legal assistance services include legal advice and related services concerning the laws of marriage, divorce, adoption, immigration, change in name, civil damage actions, wills and estates to mention a few. The claims department is responsible for most claims filed against the Army within the State of New Mexico. They routinely process household goods, hold baggage, and tort claims. Representatives within the department will help properly present and file claims.

The Office of the Staff Judge Advocate is in Building 124 on Crozier Avenue. Appointments for legal assistance problems are required. Powers of attorney, claims and notary public service is provided on a "walk-in" basis. Bring all documents relating to legal problems. There is no charge for any of the services. For more information, call 505-678-1263. More information is available at www.wsmr.army.mil/sja.

Museum and Gift Shop

The mission of the White Sands Missile Range Museum is to collect, curate and exhibit the historical artifacts and other material culture items necessary to interpret the prehistoric, historic and modern occupation and use of the lands occupied by, or in some cases adjacent to, the current 3,200 square mile installation. Visitors may learn about the Army's 19th century Indian War campaigns in the Tularosa Basin, the Trinity Site test, and the rocket, missile and other weapons development projects carried on at White Sands after World War II and during the ensuing Cold War period.

The museum, located just inside the Las Cruces Gate, is open year-round. Hours are Monday-Friday, 8 a.m.-4 p.m.; Saturday and Sundays, 10 a.m-3 p.m. and closed holidays.

Outside the museum is Missile Park, displaying a variety of missiles and rockets tested at White Sands, ranging from the WAC Corporal and Loon to the Pershing II and Patriot. The park is open dawn to dark seven days a week. For more



information concerning events call the White Sands Missile Range Museum at 505-678-8824 or see www.wsmr-history.org.

The gift shop carries items with the White Sands logo as well as southwestern gifts and jewelry. For information call 505-678-8824.

Post Exchange

For one-stop shopping convenience, the Post Exchange includes the Main Store, Shoppette, Class Six, Family Hair Care Center, Optical Shop and Flower Shop, all in Building 260, on Hof Street. Services include deferred payment plan, layaway, special orders, check cashing, gift-wrapping, customer convenience orders and others. The *Main Store* stocks a wide variety of items for the home as well as automotive merchandise. The *Shoppette* stocks a full line of convenience foods like dairy products, canned foods, snacks and beverages with a Class Six stock of beer, wine and distilled spirits.

The *Gas Station* is in Building 270, across the street from the Main Exchange. The *Mountain View Cafe*, in Building 120 on Aberdeen Avenue, serves hot breakfasts and lunches. The cafe is open 7 a.m.-1 p.m. Monday-Friday and is closed on weekends, holidays and compressed Fridays. The *Post Theater*, in Building 254, offers the latest in movie entertainment. Other services available are laundry/dry cleaners and bakery. For further information concerning any of these facilities call the Exchange at 505-678-3270.

Post Library/Technical Library

More than 38,000 volumes of fact and fiction are available in open stacks at the Post Library. There are children's books, periodicals, reference materials and a wide range of fiction, including best sellers. Other materials include records and cassette tapes. The library offers microfiche readers/printer and a photocopier. A typewriter is available for adult patron use.

The technical library staff is ready to research reference questions or to assist patrons with reference searches for school or personal use. In addition, the library has an extensive southwest collection and offers Dial-a-Story for children. A child may dial 505-678-BOOK to hear a story anytime of the day or night. The libraries are in the Education Center, Building 464. Telephone numbers are 505-678-5820/1556.

Post Office

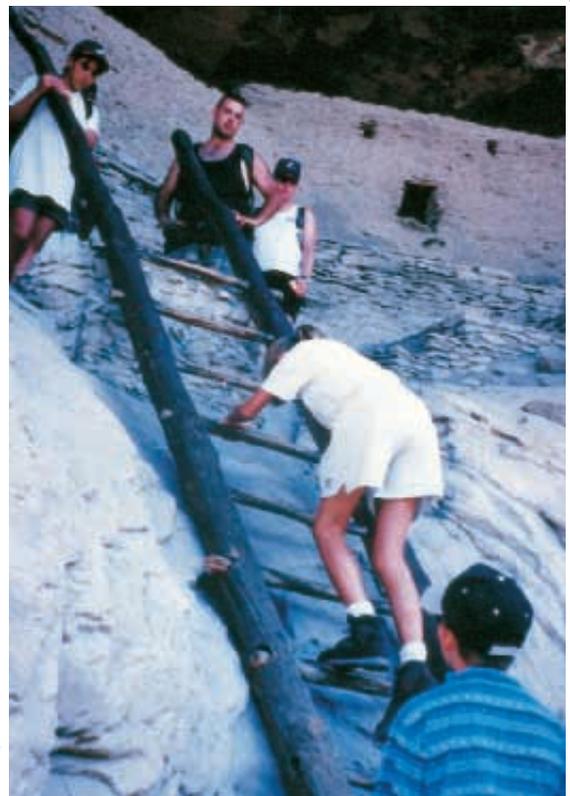
Located in Building 153 on Joliet Street, the post office is open 10 a.m.-1 p.m. and 2-4:30 p.m., Monday-Friday. The lobby is open 24 hours a day. Box rental is available. Mail is delivered to quarters once a day, Monday-Saturday, excluding federal holidays. For more information call 505-678-3241.

Private Organizations

More than 20 private organizations are active on range. There are groups and clubs for all ages and interests, ranging from Boy Scouts to the White Sands Missile Range Historical Foundation. For more information, including points of contact, call 505-678-3398.

Public Affairs

Located in Building 1782, the Public Affairs Office works to provide timely and accurate information about the missile range, its services and activities to the workforce, community and general public. Organizations and individuals may submit items to the weekly post newspaper, the *Missile Ranger*. Appearing on Fridays, the *Missile Ranger* has a circulation of about 6,000 and is distributed to all work sites and residents on post. Public Affairs is responsible for local Channel 3 programming to include the *White Sands Week* news show plus an electronic message board. The Public Affairs website, www.wsmr.army.mil/paopage/pao, contains general information about the missile range at its history. For more information call 505-678-1134.



WSMR youth explore Indian ruins during a Youth Services sponsored field trip.

Las Cruces Public School System. The first semester begins in August and ends before Christmas. The second semester starts in January and run through May. The school is within walking distance from the housing area.

White Sands high school students are bused to Ocate High School in Las Cruces, about a 25-minute ride. For more information call the

Public Schools

White Sands Elementary/Middle School, kindergarten through eighth grade, is part of the



Special White Sands events include the annual Bataan Memorial Death March.



PHOTO BY SANDRA FLORES

Post youth enjoy one of a number of sports programs offered.



White Sands School at 505-678-3241 or visit the Las Cruces Public School System website at lcps.k12.nm.us/LCPS.

Recreation Equipment Issue

The Recreation Equipment Issue facility offers a wide range of outdoor recreation items for a nominal fee. Available equipment includes tents, lanterns, stoves, sleeping bags, bikes, skis, shotguns, camping trailers, boats and outboard motors. Campers, boats and outboard motors must be reserved in advance. The facility operates a resale outlet for fishing and hunting items, and sells New Mexico fishing and hunting licenses.

Recreation Equipment Issue is also responsible for the Volunteer Park Travel Camp Sites. Although reservations are not required, they are highly recommended. Weapons and ammunition of all types can be ordered through the facility. The Skeet and Trap Ranges are under the facility and may be used on a reservation basis.

Equipment is issued from Building 445, 11 a.m.-5 p.m. on Monday; 9 a.m.-5 p.m. on Tuesday, Thursday and Friday; 1 to 5 p.m. on Wednesday; and 9 a.m.-1 p.m. on Saturday. If a holiday falls on Monday, the facility is closed that day. The telephone number is 505-678-1713.

Shipping

United Parcel Service and Federal Express pick up and deliver at White Sands Monday through Friday. For information call toll-free, UPS, 1-800-222-8333 or Fed Ex, 1-800-238-5355. Call the Transportation Freight Terminal, 505-678-3916, on matters concerning military freight and transportation.

Sports

Bell Gymnasium, Building 236, offers adult and youth sports, recreation and physical activities. The gym is open seven days a week. It features a weight room, three racquetball courts and an aerobic area. Outdoor facilities include six tennis courts and five ball fields plus an indoor swimming pool, adjacent to the Community Center. A diverse array of recreational and instructional opportunities is offered through drop-in recreation, intramural activities, special interest classes and special events. For details call 505-678-3374. Or, see the website at www.zianet.com/vinyard/wsmr.

Thrift Shop

Community volunteers operate the Thrift Shop in Building 250. The shop has clothing, household items and furniture at reasonable prices. Hours are 10 a.m.-3 p.m. each Thursday. Consignments are accepted, 10 a.m.-2 p.m. For more information call 505-678-3681.



Derek Porter gets a tiger-size hug from "Scoops" during White Sands Night at the El Paso Diablos baseball game.

Travel Services

The Carlson Wagonlit Travel office, the post travel agency is in Building 124, Room 144. It provides the most cost effective and expeditious means of transportation, domestic and international for official travelers. Office hours are 7:45 a.m.-4:15 p.m., Monday-Friday. For more information call 505-678-4778.

Veterans' Assistance

The Veterans' Assistance Office is located in Building 124, Room 118. Its hours of operation are Monday, Wednesday and Friday, 9 a.m.-3 p.m. The office provides assistance and information to

all veterans who are encouraged to visit the office and obtain information on benefits of which they may not be aware. For more information call 505-678-0213/0219.

Veterinarian Services

The Veterinarian Clinic services include morning sick call, vaccinations and scheduled surgeries. Appointments may be made by calling the clinic during duty hours. For after hour emergencies call McAfee Health Clinic at 505-678-2222 and they will page veterinary personnel. Clinic hours are Monday-Friday, 7:30 a.m.-noon and 1-4 p.m. For more information call 505-678-2683.



History



First flag-raising ceremony at WSPG on Oct. 19, 1945, in front of Post Headquarters.



Technician with WAC Corporal rocket at the bottom of launch tower; Launch Complex 33 first fired in the fall of 1945.



Dr. (Capt.) Levin, seated, and two medics are photographed at WSPG clinic in 1945.

In the early fall of 1944, as a result of America's accelerated missile program, it became evident that a land range somewhere in the U.S. would be required so missiles could be test fired and recovered after flight for further study. These studies would provide data to aid in the development of future missiles for military application.

A group of specially-selected officers and civilians representing the War Department and the Corps of Engineers visited all sites designated as "possible." One area, in the Tularosa Basin of southern New Mexico, fit the bill. It would eventually become White Sands Proving Ground.

In a Real Estate Directive dated Feb. 8, 1945, the seeds for WSPG were sown. This document declared the area to be of military necessity. The majority of selected land which would make up White Sands was already under the control of the War Department. It was comprised of Fort Bliss Antiaircraft Firing Range, Dona Ana Target Range, Castner Target Range and Alamogordo Army Air Field's Alamogordo Bombing Range.

In addition to acreage controlled by the Army, other public domain and private lands would be added in the following years to comprise the new proving ground.

Work at the desert site began in June 1945 as buildings and roads were constructed from plans prepared two months earlier. Since the prevailing attitude was that White Sands would only be a short-term project, temporary buildings, such as old Civilian Conservation Corps structures and a hanger were moved from Sandia Base in Albuquerque, N.M.

An Army Forces circular dated July 13, 1945, officially announced the July 9 establishment of WSPG. Lt. Col. Harold R. Turner was its first commander. White Sands' address plus railhead for equipment and supplies was listed as Las Cruces, N.M.

In the early years Fort Bliss was responsible for most of the administrative and supply services at WSPG. The impact area north of the main post (the Alamogordo Bombing Range) was still under the jurisdiction of the Army Air Corps.

The Army's first launch area, now referred to as Launch Complex 33, was established six-and-a-half miles east of the headquarters area. To provide protection for personnel and equipment at the launch site, the Army built a reinforced concrete blockhouse. Construction of the Army blockhouse began on July 10. It was followed by the addition of concrete launching pads, a wooden observation tower and a 75-foot service gantry with 2,000 feet of track.

In mid-August 1945, 300 railroad freight cars of V-2 components captured in the European Theater of Operations arrived in New Mexico. The Santa Fe Railroad spotted ten cars per day in Las Cruces, N.M. for unloading and transport by military personnel to WSPG on the east side of the Organ Mountains.

To get an idea of the magnitude of the logistics problems, every railroad siding from El Paso, Texas, to Belen, N.M., a distance of 210 miles, was full of railroad cars. The Army hired every flatbed truck in Dona Ana County to move the material. The task was completed in 20 days.

Meanwhile, the new proving ground celebrated its first milestone with the launching of a modified Tiny Tim booster rocket on Sept. 26, followed by a dummy WAC Corporal rocket the next day.

The remaining months of 1945 saw an influx of troops arriving for duty at White Sands. Testing continued as contracts were let for more permanent structures at both the firing facilities and in the main post area.

In 1946 White Sands began its famous modified V-2 launches. These continued through 1952. Meanwhile, the Navy signed on at White Sands with the construction of a Naval cantonment area just west of the Army headquarters. In addition, launching facilities for the Navy were constructed two miles east of the Army's launch complex.

Stationed at Fort Bliss were members of the "Paperclip Crew," Germans who had worked on the V-2 development team. The crew was headed by the



famous Dr. Wernher Von Braun. They traveled daily to the proving ground to work with American scientists and engineers in assembling and launching the modified liquid-fueled V-2s. The vehicles were 46 feet long and 5.5 feet in diameter, and could develop 56,000 pounds of thrust.

These V-2s, launched from White Sands with their scientific payloads, set a variety of firsts for America's space program. Milestones included achieving the first high-altitude and velocity records for a single-stage rocket. A V-2 was the first large rocket to be controlled in flight. During the U.S. program, 67 V-2s were fired at White Sands.

U.S. Highway 70 runs north of the Army's launching area. To accommodate the new science of rocket and missile testing at WSPG, permission was needed from the state of New Mexico to block the highway to safeguard the well-being of travelers. Application was made to the New Mexico State Highway Department. WSPG received a letter, dated Nov. 15, 1948, declaring Highway 70 a military highway subject to periodic closing to the public.

White Sands borders began to take shape on Aug. 19, 1952, when the Department of Defense moved control of the area known as the Alamogordo Bombing Range from the Air Force to WSPG. The change was part of a plan for an integrated range. A year later, on Oct. 6, 1953, the Department of the Army defined the boundary line between White Sands and Fort Bliss. With the inclusion of the Alamogordo Bombing Range territory, WSPG inherited one of the world's most historic pieces of property — Trinity Site.

During World War II, the Manhattan Project required a piece of isolated land to test an atomic device in its quest for the development of an atomic bomb. A piece of desert in the northern part of the bombing range was selected. Trinity Site is 90 miles north of the main post near U.S. Highway 380 and the small town of San Antonio, N.M.

In the predawn hours of July 16, 1945, the first atomic device was detonated at Trinity Site.

By the close of 1955, the proving ground contained a miniature city, offering modern conveniences to those who resided on post. Apart from the barracks buildings, there were 430 housing units and 93 trailer spaces with gas, water, sewer and electrical facilities. A branch U.S. Post Office and a branch bank were in operation. A post newspaper was published weekly. Telephone and telegraph facilities, as well as a service station, were available. To fill the educational and religious needs, an elementary school, a post chapel and a Sunday school were built.

Because there weren't enough on-post quarters for both military and civilian personnel, government buses furnished daily transportation for those who lived in the surrounding communities.

A Department of Army General Order dated April 29, 1958, effective May 1, officially redesignated WSPG as White Sands Missile Range.

The 1950s also saw development of other missiles and rockets built on the V-2 experience. These included the Sergeant, Redstone and Nike series.

The Nike series began with the Nike Ajax anti-aircraft defense missile and continued with the development of the Nike Hercules and Zeus missiles.

In 1963 the missile range established off-range launch sites and flight corridors ranging as much as 400 miles from White Sands. These test sites were located at Green River and Blanding, Utah, as well as Fort Wingate and Datil, N.M. Athena reentry vehicles and Pershing ballistic missiles were launched from these off-range sites frequently during the 60s and early 70s.

Another famous missile system which had its humble beginnings at the missile range in the early 1970s was the Patriot air-defense missile. The Patriot gained notoriety during Operation Desert Storm.

On March 30, 1982, White Sands made history when the Space Shuttle Columbia landed at the range's Northrup Strip. The landing marked the end



WSPG Commander's staff group poses in front of Headquarters Building in 1946.



A V-2 lifts off from LC-33 in 1946. The gantry and Army blockhouse are to the left.

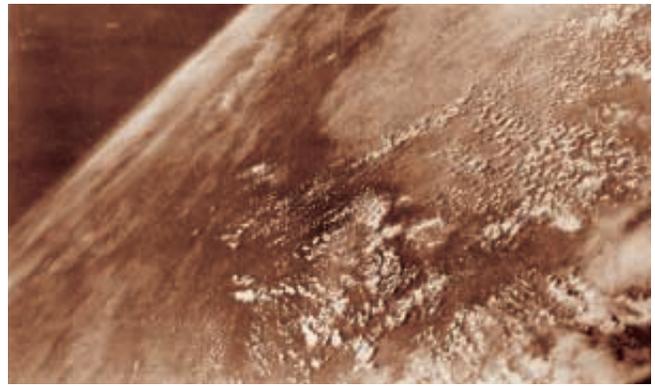
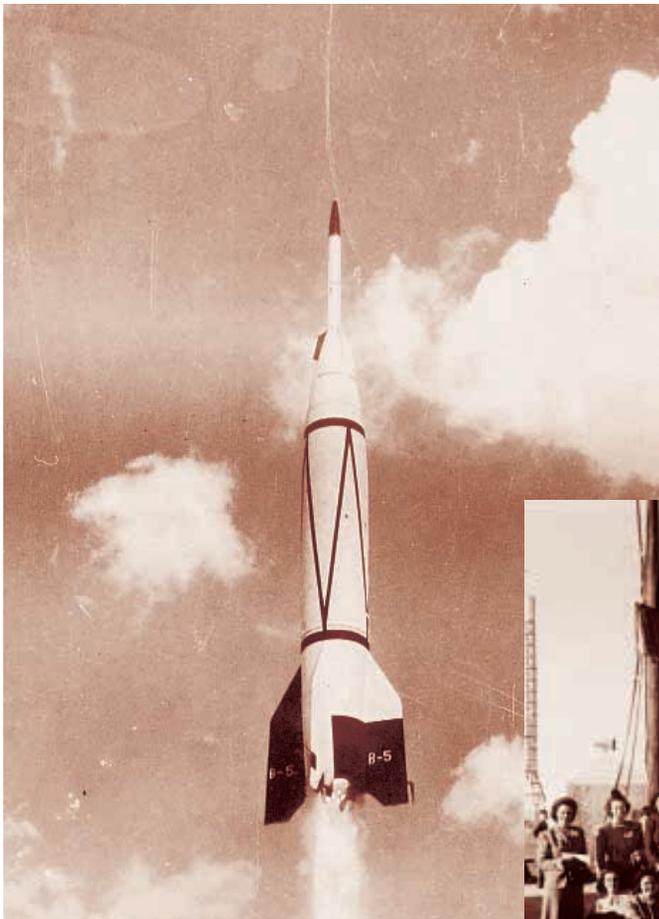
of the third test flight in the shuttle series and proved the craft could land in different spots under a variety of conditions. An Act of Congress changed the name of the landing site to White Sands Space Harbor.

White Sands Missile Range entered the field of laser technology in 1983 with a ribbon-cutting ceremony at the High Energy Laser Systems Test Facility. A milestone was achieved six years later, on Feb. 23, 1989, when the Navy's Mid-Infrared Advanced Chemical Laser destroyed a missile flying at supersonic speeds.

In October 1985 the Launch Complex 33 gantry and blockhouse were designated a National Historic Landmark by the National Park Service. A Hermes A-I missile, on permanent loan from the Smithsonian Institute, was placed in the gantry and dedicated in August 1984.

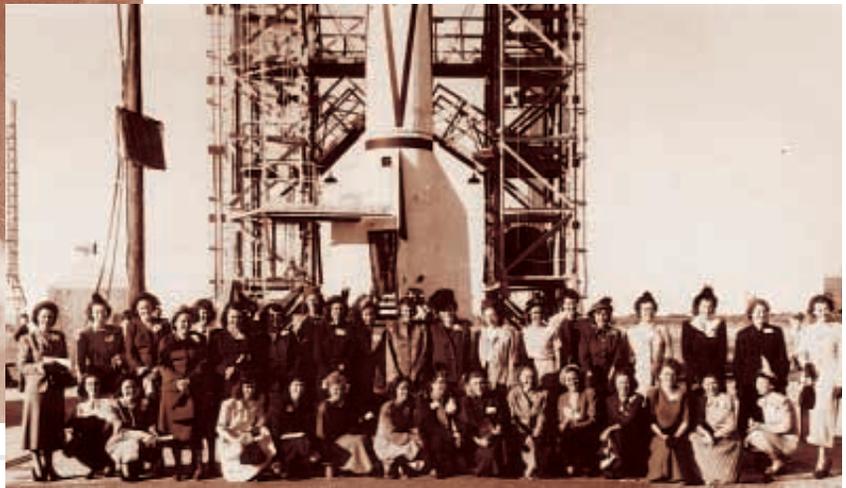
In August and September 1993 the missile range went back to the future with the successful series of launches of the Delta Clipper Experimental Vehicle. Launch and hover tests conducted at White Sands Space Harbor paved the way for a new type of reusable rocket.

Much has happened in and around the Tularosa Basin in the past 50 years. Numerous rocket and missile systems have done their premiere testing here since 1945. WSMR will continue to be a very important part of the basin into the next century as it works to uphold its motto of Birthplace of America's Missile and Space Activity.



One of a series of photographs taken from a camera on board a modified V-2 on March 7, 1947, showing Earth's curvature from an altitude of 101 miles.

Above: Bumper flight no. B-5 flies from WSPG on Feb. 24, 1949. The Bumper was composed of a V-2 and a WAC Corporal missile. It was the world's first large two-stage rocket to achieve a record altitude of 250 miles.



WSPG Officers' Wives Club take a tour of the V-2 launching site and pose for a group shot in 1950.

Right: A Hermes A-1 surface-to-surface missile awaits launching at LC-33. The Hermes was first fired in May 1950.



The Bright Eyes telescope mount prepares to track a rocket launch in the late 1940s at WSPG.



A Corporal missile stands ready to launch in the desert. It was America's first designed, engineered and fabricated surface-to-surface missile.

Visit us on the Internet — www.wsmr.army.mil

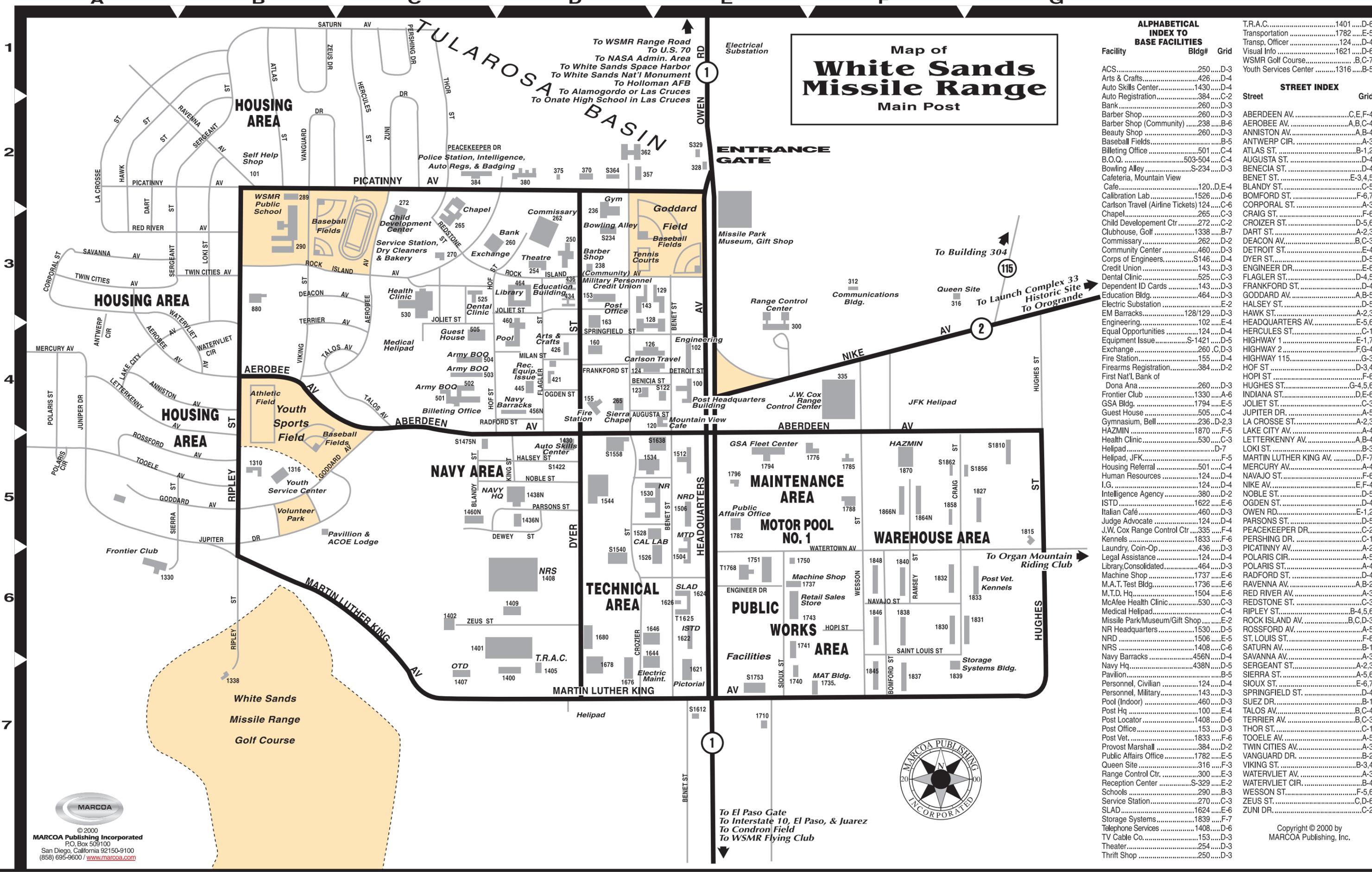


QUICK REFERENCE LIST

Accountable Property Officer, Bldg. 1838678-5957	Counseling678-4646	Military Personnel Office, Bldg. 143678-7645	Staff Duty Officer, Bldg. 100678-1234
Adjutant General, Bldg. 143678-5289	Learning Center678-4716	After duty hours678-1234	Staff Judge Advocate, Bldg. 124678-1263
After duty hours Bldg. 1646678-2130	MOS Library678-3360	Museum Gift Shop678-8824	After duty hours678-1234
Airline Ticket Office678-6226/678-4778	Receptionist678-4646	Notary Public, Bldg. 124678-1265	Swimming Pool, Community Club678-4134
Appointment Desk (Clinic) Dental Clinic, Bldg. 525678-1141/678-1142	Testing678-4211	Occupational Health Service678-3134	Taxi Service, Bldg. 1782678-2340
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Map of White Sands Missile Range Main Post

To WSMR Range Road To U.S. 70
 To NASA Admin. Area
 To White Sands Space Harbor
 To White Sands Nat'l Monument
 To Holloman AFB
 To Alamogordo or Las Cruces
 To Ocate High School in Las Cruces



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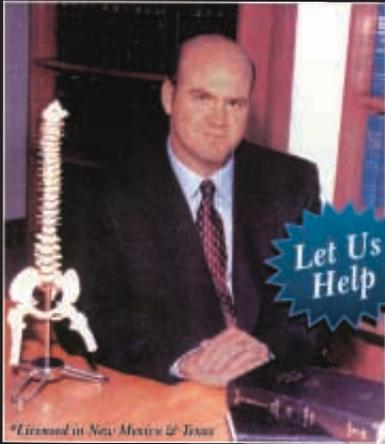
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ZUNI DR.		C-2

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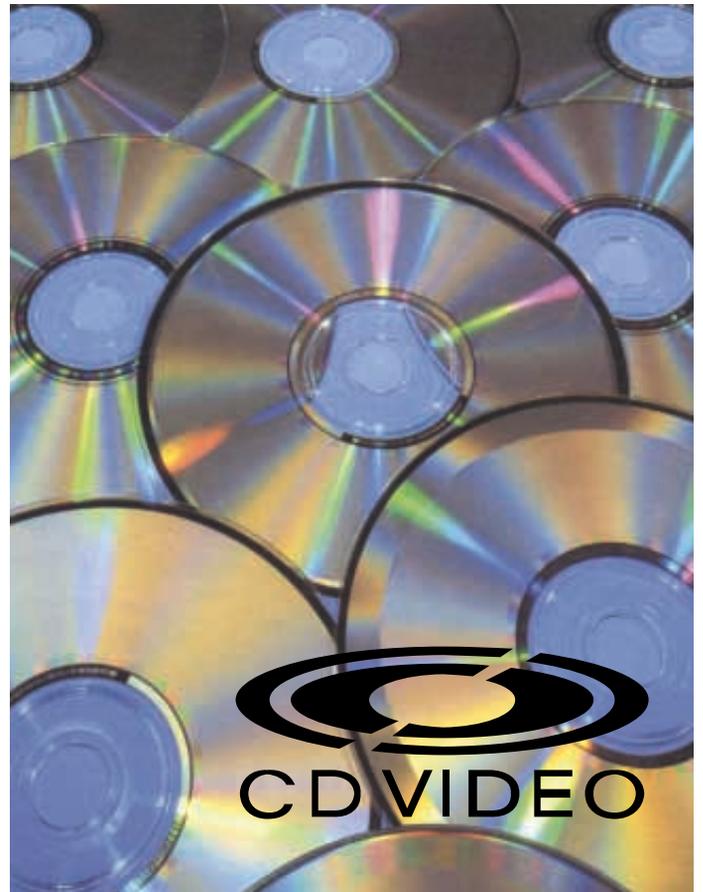
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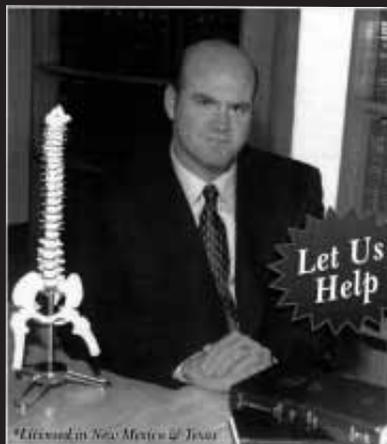


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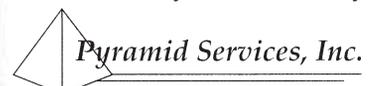
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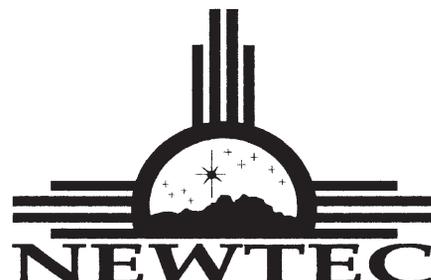
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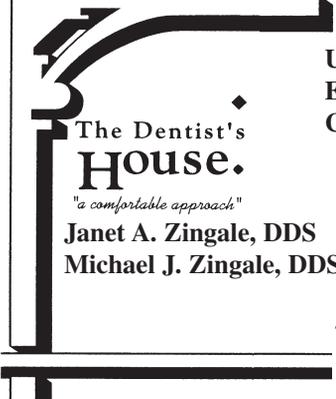
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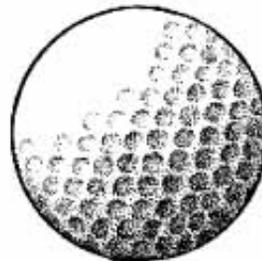
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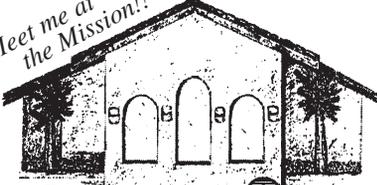
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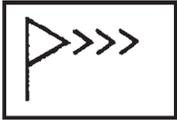
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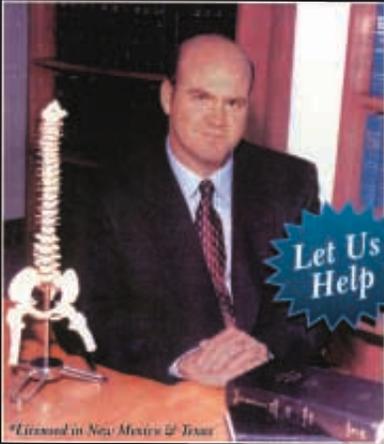
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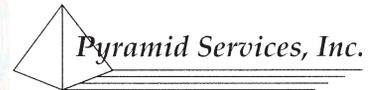
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