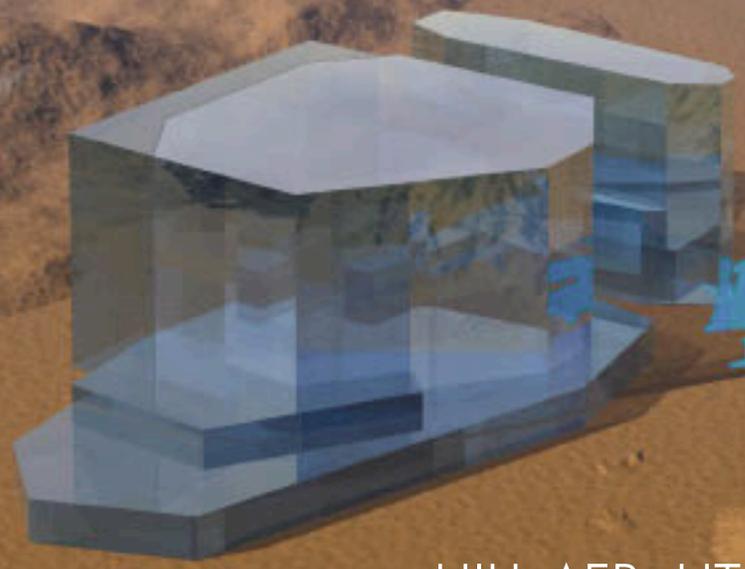


# UTAH TEST & TRAINING RANGE



HILL AFB, UTAH

## FOREWORD



Welcome to the Utah Test and Training Range (UTTR)! This brochure is designed to provide a brief overview of capabilities and facilities available to you. More detailed information may be found in related publications and documents available on the UTTR home page [www.hill.af.mil/uttr](http://www.hill.af.mil/uttr) or by calling (801) 777-9022. Our experts are eager to support your needs from initial planning through test, evaluation and data analysis. Our corporate knowledge in both the test and training arenas will ensure an optimum program at minimum cost.



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*F-16 Launching from Hill AFB*



## MISSION



The 388th Range Squadron operates and maintains the UTTR. We provide responsive open-air training and test services that support day-to-day training, large force training exercises, and large footprint weapons testing, thus guaranteeing superiority for America's war fighters and their weapons systems. The 388th Range Squadron provides key functions and capabilities required for range

support of Air Force operational test and training programs. This includes range infrastructure systems, equipment, software, targets, facilities, data processing and display, land and airspace control, environmental management, supply, security, and safety.

The UTTR provides the largest overland safety footprint available in the Department of Defense (DoD) for aircrew training and weapons testing. It supports training customers with capabilities

for air-to-ground, air-to-air, and ground force exercises. Operations include weapons and weapons platform testing as well as operational training missions. These range from two-ship basic fighter maneuvers and basic surface attacks to large joint composite force missions. Missions may include air-to-air, air-to-ground, both day and night, low and high altitude. Customers may also use the full range of supersonic airspace, tactical targets, electronic warfare facilities, and Air Combat Maneuvering Instrumentation (ACMI).

## LOCATION & GEOGRAPHY



The UTTR is located in north-western Utah and eastern Nevada. It is contained within the Great Salt Lake Desert, approximately 70 miles west of Salt Lake City. Mission Control facilities are located off-range at Hill Air Force Base (AFB). The UTTR is characterized by variable desert terrain that includes undulating sand dunes, mountains rising abruptly from the desert floor, and rolling hills building up to mountain ranges. The range is surrounded by mountains generally running north and south rising from 8,000 to 12,000 feet, separated by valleys with elevations of approximately 4,500 feet Mean Sea Level (MSL). UTTR has the largest overland special use airspace measured from the surface or near surface, within the continental United States (207 by 92

nautical miles). Of the total 12,574 square nautical miles comprising this area, 6,010 are restricted airspace and 6,564 are Military Operating Areas (MOAs). The UTTR also has the largest overland contiguous block of supersonic authorized restricted air space in the continental United States. Chaff and flares are authorized over much of this area. The airspace is situated over 2,624 square miles of DoD land, of which 1,490 square miles are Air Force owned. The remainder is owned and managed by the US Army at Dugway Proving Ground. Airspace boundaries do not necessarily coincide with the boundaries of the DoD land beneath this airspace. The UTTR is primarily surrounded by public domain land and is not likely to be encroached upon in the foreseeable future. Much of the UTTR airspace is over Bureau of Land Management (BLM) land,

and some Air Force equipment is located on BLM land. Ground operations on BLM land are coordinated and approved by BLM prior to the program commencement.

Restricted airspace is divided into "working sectors" to permit efficient scheduling and safe use of different parts of the range at the same time. These divisions were made in cooperation with the principal range users and were designed to meet their needs while permitting more extensive use of the range. Whenever possible, sector boundaries coincide with natural features readily distinguishable from the air.

Air refueling track locations and procedures for use are available in UTTR Supplements 1 and 2 (Test and Training) to AFI 13-212. Range users needing aerial refueling are required to make their own arrangements with refueling units.

**AERIAL MAP**

**UTAH  
TEST &  
TRAINING  
RANGE**

**58,000' MSL  
GANDY MOA**

**RESTRICTED 58,000' MSL**  
(Unlimited Vertical  
Airspace is Available)

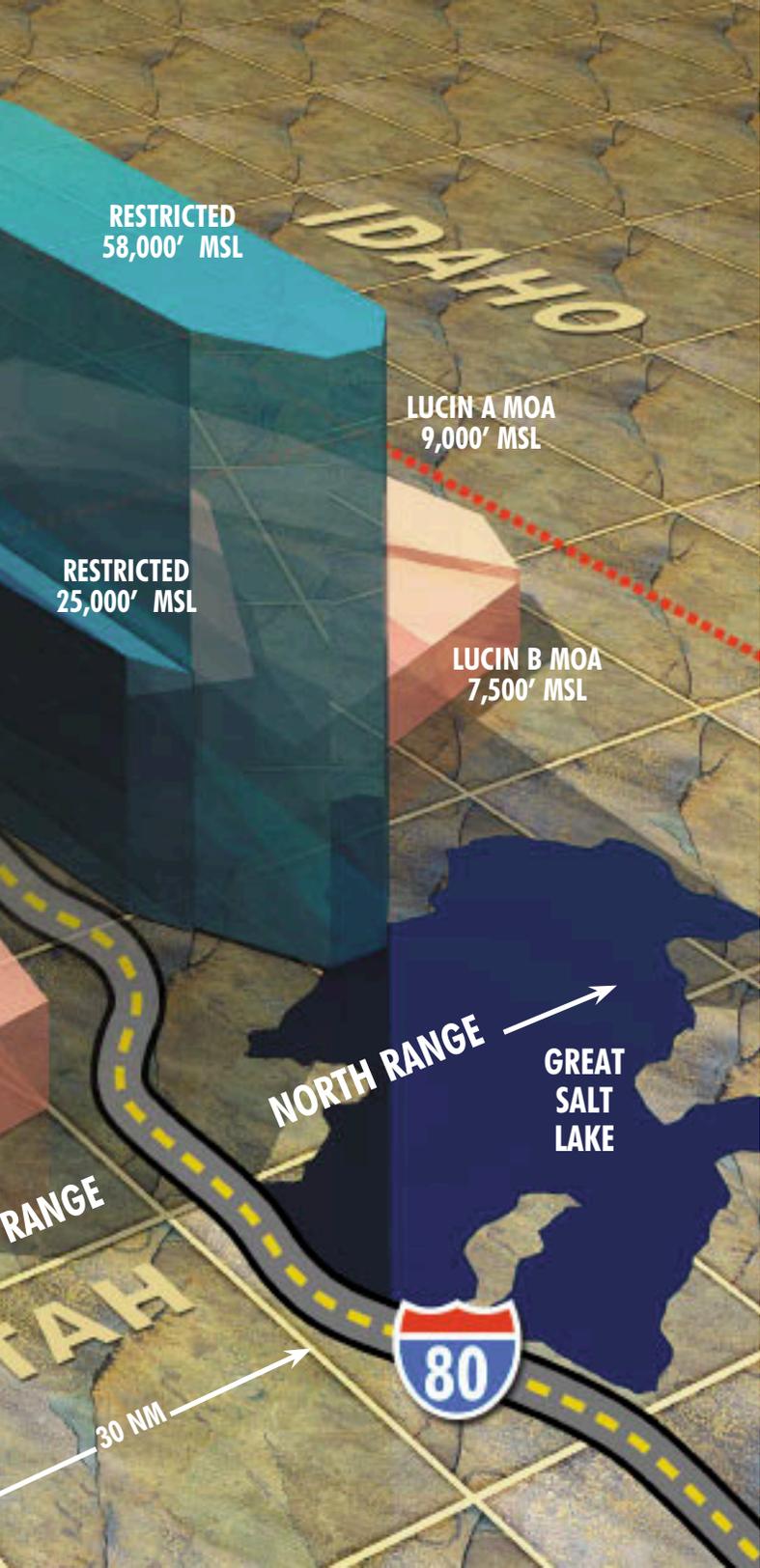
**SEVIER A MOA**  
**14,500' MSL**

**SEVIER B MOA**  
**FROM 100' AGL**  
**TO 9,500' MSL**

**NEVADA**



**SOUTH**



## AIRFIELDS

In addition to staging out of Hill AFB with its 13,200 feet runway and having access to a full array of support facilities, customers may stage out of Michael Army Air Field (MAAF) located at Dugway Proving Ground.

### MAAF

MAAF features a 13,500 foot runway available for use by manned and unmanned aircraft. The elevation of MAAF is 4,349 feet MSL. With prior approval, aircrews may stage from MAAF with live ordnance. A United States Air Force-owned hangar, 50 feet wide by 50 feet long by 26 feet high, located 200 feet from the runway and in proximity to a decontamination pad, is available. U.S. Army, Dugway can provide diesel fuel, MOGAS, and AVGAS. The Army provides ramp-side single-point refueling service. Range Operations also maintains aerospace ground equipment for use by transient aircrews.

## WENDOVER FIELD

Wendover Field is available only as an emergency airfield. Situated at an elevation of 4,240 feet MSL, Wendover Field is a commercial airport located on the Utah/Nevada border between the North and South Range areas.

### NORD LZ

In addition to these airfields, the UTTR also has a 5,000 foot gravel assault strip available for training (NORD LZ). NORD LZ is located adjacent to Target 22 on the North Range.

## CLIMATE

The climate at UTTR is generally arid with no extended periods of extreme temperature. High temperatures average 98 degrees Fahrenheit during July, the warmest month of the year. The lowest average temperatures occur during January, hovering near 30 degrees Fahrenheit. Visibility and weather are excellent; 96 percent of hourly observations show ceilings of 3,000 feet or higher, and visibility of 3 miles or greater. Storms tend to be short in duration, with visibility exceeding ten miles during more than 95 percent of the year. Flight testing may normally be carried out 350 days of each year.

*Mission Control Center*

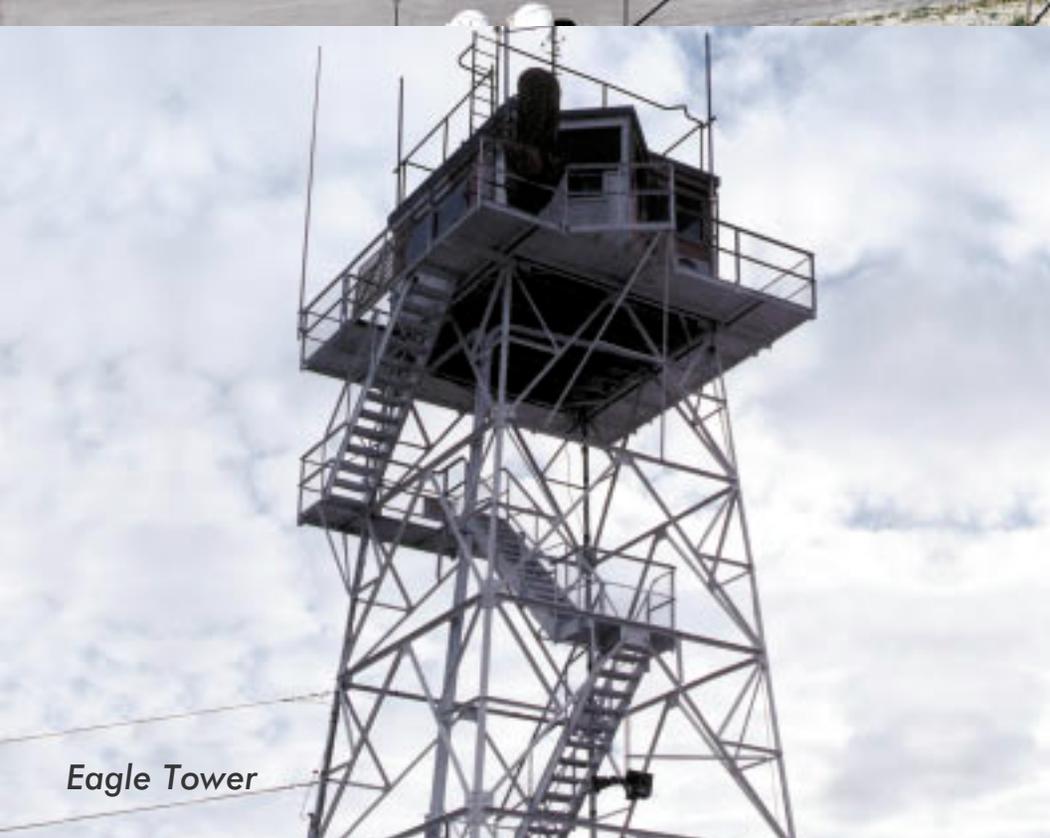


*Avery Compound*

*Grassy Mountain*



*Eagle Tower*



# INFRASTRUCTURE AND DEPLOYMENT



The UTTR offers electronic, photo-optic and radar tracking, telemetry acquisition, communication systems, and Range support capabilities for training and flight test operations. The following is a brief description of a few of the facilities available.

## **MISSION CONTROL CENTER**

The Mission Control Center (MCC) is located off-range at Hill AFB. It is the Command and Control Center for the Range. Telemetry, video and voice communication systems are connected to the MCC through a combination of microwave, fiber, and radio links from all major outlying support areas on the Range.

## **AVERY COMPOUND**

The Avery Compound (Building 1010, Dugway Proving Ground) is the main support facility for repair and maintenance activities on the South Range. Primary systems and equipment maintained here include HAMOTS, WISS, Microwave, Remote Cinetheodolites/Cinesextants, and Threats. WISS Operations are located on the second floor of Building 1010; remote cameras, monitors, and computer scoring are controlled in this facility. Two indoor maintenance bays are available for use in repair and maintenance of Cine and Threat equipment. Job Control, Logistics Support, PMEL, and Administrative Support for the South Range are also located at Avery.

## **WIG SUPPORT FACILITY**

The Wig Support Facility is the hub for most of the data and video signals entering and leaving the South Range. This facility supports the following target areas: TS1 (Cruise Missiles), TS2, TS3 (WSEP), TS4 (Sand Island and J-Target), TS5, and PGM. Systems supported through this facility are the TPQ-39 Radar, Granite Peak Telemetry, Threats, Cinetheodolites, Cinesextants, VMAS and

documentary video. Video, radar and Telemetry data are routed to the appropriate systems and transmitted to the MCC for display and processing based on mission requirements.

## **OASIS**

Oasis is a military complex located between the Grassy and Lakeside Mountains in the eastern portion of the North Range. It is the Operations and Headquarters facility for the Air Force Materiel Command (AFMC) 75th Range Support Squadron (75RANS). The complex has numerous facilities available, including billeting, dining, recreational, storage, and office space. Helicopters may land at a lighted concrete helicopter pad adjacent to the 75th Range Support Squadron building.

## **MOBILE TELEMETRY AUTOMATIC ACQUISITION SYSTEM (MOTAAS)**

MOTAAS provides the UTTR with the ability to extend line-of-sight telemetry coverage throughout the Range. The system is housed in a 40-foot trailer designed to accommodate two personnel for up to one week. MOTAAS is equipped to receive (via one meter auto-track antenna system) and record up to eight channels of telemetry data. In addition, the system can re-radiate two channels of telemetry data (dedicated portable microwave system) to any of the existing Range sites for transmission, processing, and display at the MCC.

## **GRANITE PEAK**

Granite Peak is a telemetry site on the South Range that features a high-gain auto track antenna designed to provide long range coverage. This system includes an 8-foot parabolic antenna mounted on a 50-foot tower. The system at Granite Peak can receive and record up to 8 separate or 4 combined data streams.

## **GRASSY MOUNTAIN**

Grassy Mountain is located on the North Range and includes a telemetry site with a high-gain autotrack antenna designed to provide long range coverage. This system includes a 16-foot parabolic antenna used for L and S band reception. It can receive and record up to 8 separate or 4 combined data streams.

## **WENDOVER PEAK**

Wendover Peak is a telemetry site on the Utah/ Nevada border that features a high-gain autotrack antenna designed to provide long range coverage for the western portion of the range. This system includes an 8-foot parabolic antenna used for L and S Band reception and is located on top of Wendover Peak. It can receive and record up to 8 separate or 4 combined data streams.

## **DIDDLES KNOLL**

Diddles Knoll is also located on the North Range. Diddles Knoll houses camera recording equipment used for mission photo support. The facility also serves as a communications hub for circuits to North Range Cine-Ts. Communications links may be routed to Hill AFB via Grassy Mountain, or through Clive to the Wig Support Facility on the South Range.

## **DEPLOYMENT**

Deployment procedures and responsibilities for units deploying to Hill AFB may be found in OO-ALC-HAFB Instruction 10-401. This publication is available on the Hill AFB web site, or can be obtained by calling the Deployment Control Center at DSN 777-6796. Air Traffic Control and Flight Operations procedures and responsibilities may be found in OO-ALC-HAFB Instruction 13-201, also located on the Hill AFB web site.

*Non-Residue Self-Protection Flares Being Dispensed*



# TRAINING



Training opportunities abound at the UTTR. The largest overland weapon footprint range in the continental US is complimented by availability of vertical airspace up to FL580. Seven different target complexes provide 365 air-to-ground targets. Two air refueling tracks, supersonic areas, and Smokey Surface-to-Air Missiles (SAMs) are also available. Chaff and flares (self-protection) may be used with pre-authorization .

The following is a brief description of just a few of our target complexes. Detailed descriptions may be found in the UTTR Supplement 2 (Training) to AFI 13-212, located on the UTTR web site. A schedule listing special Range time for bombers along with standard Air Combat Manuevering Instrumentation (ACMI) and Weapons Impact Scoring Set (WISS) operating hours is also available on this site ([www.hill.af.mil/uttr](http://www.hill.af.mil/uttr)).

## NORTH RANGE TARGETS

### CRANER'S TACTICAL TARGET COMPLEX

*Craner's Tactical Target Complex includes a landing strip with an aircraft, trucks, vans, factory, simulated AAA sites, and a SAM site. Conventional and simulated nuclear deliveries with inert heavy-case bombs and similar inert/training ordnance are authorized. Specific ordnance authorized for use are identified in UTTR Supplements 1 and 2 to AFI 13-212. Bomb deliveries are scored using the WISS.*

### EAGLE RANGE COMPLEX

*Eagle Range is a manned, scored class A/B/C air-to-ground range consisting of two bomb circles, four strafe targets, and two applied tactics targets. Conventional and simulated nuclear deliveries with inert heavy-case bombs and similar inert/training ordnance are authorized. UTTR Supplement 2 to AFI 13-212 identifies authorized ordnance. Bomb deliveries are scored using the Weapons Impact Scoring Set (WISS).*

### HELICOPTER AIR-TO-GROUND (HAG) TACTICAL COMPLEX

*The Helicopter Air-to-Ground (HAG) Tactical Complex is a High Explosive (HE) and inert training ordnance drop zone. A 'Coffin Area' is at the southern end of the HAG Range. This area has a graded perimeter, which gives it a coffin-shaped appearance easily distinguishable from the air. Weapons authorized for use at the Coffin Area are identified in UTTR Supplement 2 to AFI 13-212.*

### GROUND ASSAULT TARGET (GAT)

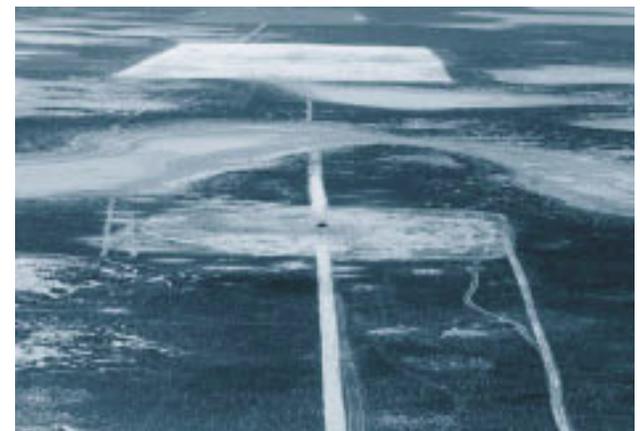
*The Ground Assault Target (GAT) borders the HAG on the north and is for ground troops to use in developing their assault capabilities. Weapons up to 50-caliber may be used in this area; larger weapons may be fired from this area onto the HAG. Authorized weapons are listed in UTTR Supplement 2 to AFI 13-212. The GAT is located five miles from an assault landing strip.*



*B-1 Max Load Weapons Drop*



*Craner's Complex*



*Eagle Range*

## TRAINING

### SOUTH RANGE TARGETS

#### BAKER'S STRONG POINT TACTICAL TARGET COMPLEX

Baker's Strong Point Tactical Target Complex simulates a fortified desert position. Targets consist of a 100-meter-long revetted area enclosed by a 5-meter earthen wall. Within the area are ten revetted artillery positions available for interdiction training. A simulated SAM site, Inter-Continental Ballistic Missile (ICBM) silo, tower, barracks, refinery, smelting plant, mining operations, fuel tanks, convoy, runway, and aircraft are located north of this target. WISS is used to score bomb deliveries. Conventional and simulated nuclear deliveries with inert heavy-case bombs and similar inert/training ordnance are authorized. Specific ordnance authorized for use are identified in UTTR Supplement 2 to AFI 13-212.

#### KITTYCAT LIVE TACTICAL TARGET COMPLEX

Kittycat Live Tactical Target Complex contains multiple armored targets, PGM targets, and munitions storage bunkers. Conventional deliveries of HE ordnance with impact fusing are authorized. UTTR Supplements 1 and 2 to AFI 13-212 identify authorized ordnance. Bomb deliveries are scored using WISS.

#### WILDCAT TACTICAL TARGET COMPLEX

Wildcat Tactical Target Complex has multiple targets located east, north, and northwest of Wildcat Mountain. The complex simulates an airfield with support facilities and area defenses. WISS provides scoring for bomb deliveries. Conventional and simulated nuclear deliveries with inert heavy-case bombs and similar inert/training ordnance are authorized. Specific ordnance authorized for use are identified in UTTR Supplement 2 to AFI 13-212. Individual targets include an assault strip, airfield complex, dispersal taxiway, fabricated MIG-21s, trains, marshaling yard, SA-3 site, SA-2 site, revetted 57mm Anti-Aircraft Artillery (AAA) site, vehicle convoy, headquarters area, materials storage area, tank battalion, assault strip, and an industrial complex.

#### OTHER TRAINING OPPORTUNITIES

Excellent joint training opportunities are available on the UTTR. Capabilities include a landing/drop zone for Airborne training and areas for small unit infantry maneuvers using training ammunition. Air Control Squadrons (ACSS) will find realistic training available at Diddles Knoll, a site regularly used by the 729th ACS.

The UTTR also has a Laser Boresight scoring capability controlled through the 299th Range Control Squadron. This capability is currently located at the Industrial Complex target area northeast of Wildcat.



Bridge at Wildcat



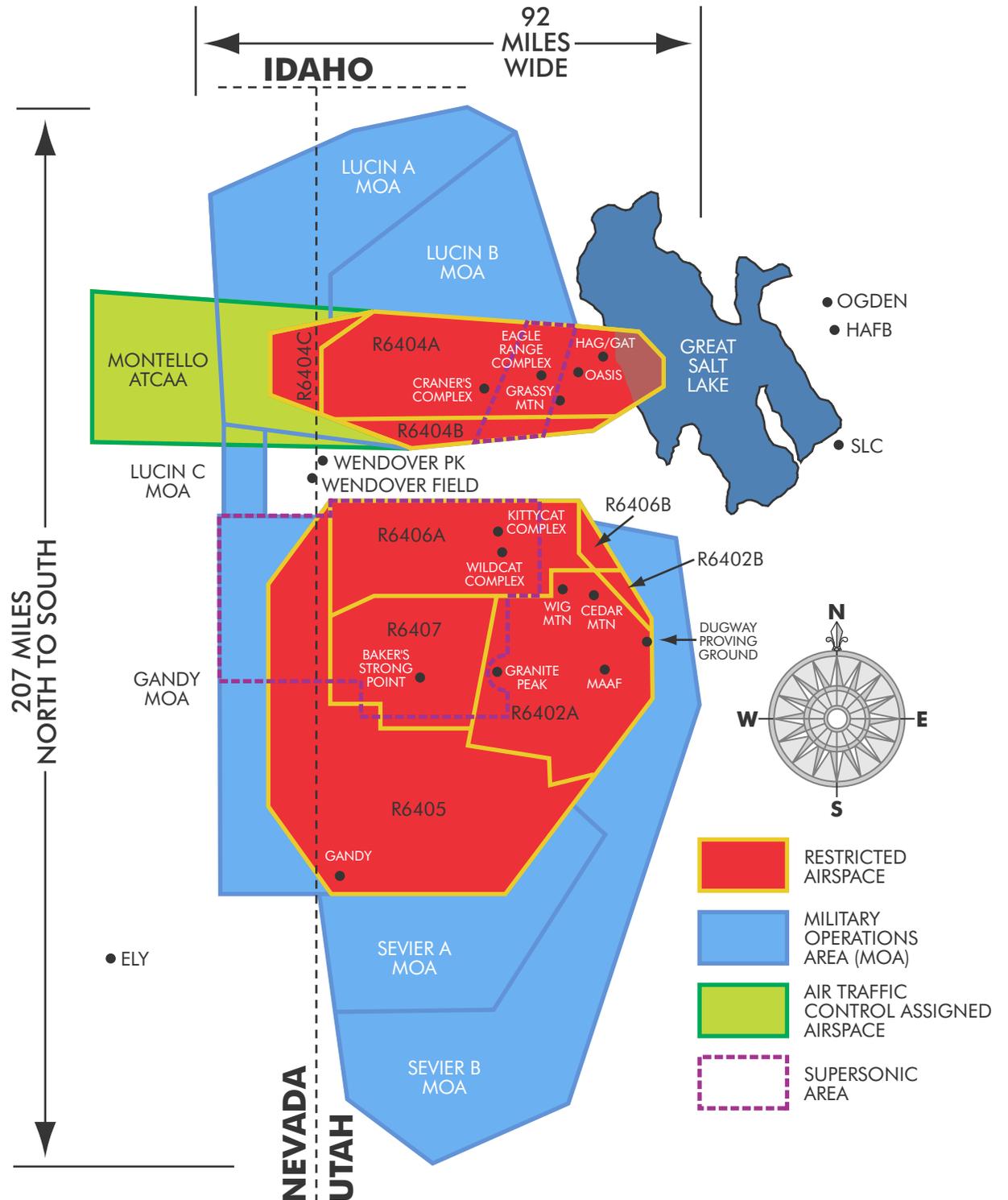
Wildcat SAM Site



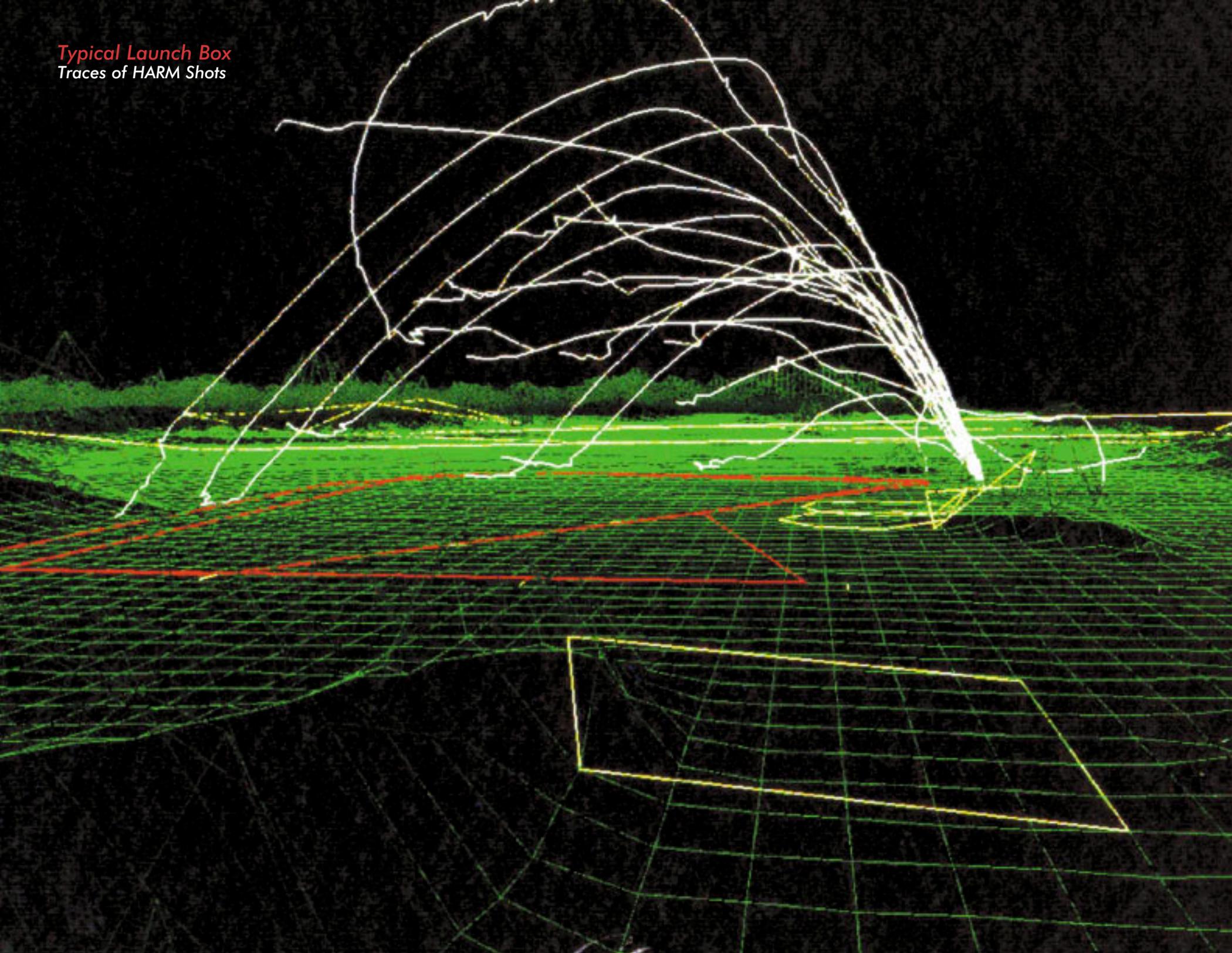
Laser Boresight

# UTTR MAP

## UTAH TEST & TRAINING RANGE



*Typical Launch Box*  
*Traces of HARM Shots*



# TEST



The UTTR was created in 1979 for testing of cruise missiles. The large amount of land and air-space required has made large footprint weapons testing a natural follow-on. The testing of smart munitions, long-range standoff weapons, remote controlled/unmanned air vehicles, boost-glide precision guided munitions, air-to-air missiles, and autonomous loitering anti-radiation missiles have all been accomplished at the UTTR. Targets are fabricated to meet your needs. Some of the existing target areas are described below. Detailed descriptions of test targets may be found in UTTR Supplement 1 (Test) to AFI 13-212.

## NORTH RANGE TARGETS

### LASER TARGETS

Laser Targets are designed to evaluate guidance systems of laser-guided conventional munitions and to enable training in the use of laser-guided weapons. These targets are available on both the North and South Range. The safe use of lasers and associated equipment is covered in detail within UTTR Test and Training Supplements 1 and 2 to AFI 13-212.

### MUNITIONS TEST TARGETS

Munitions Test Targets are used to test new munitions and conduct shelf-life surveillance testing. Each of the 10 maintained targets has been developed for a specific application for use with HE or inert munitions. These or other target

complexes can support a wide range of requirements, including Cluster Bomb Units (CBUs), runway penetration, and high volume propagation. The Munitions Test Targets are generally located in the eastern portion of the North Range.

### TARGET 24

Target 24 consists of four graded rectangular pads and one large pad used for munitions propagation testing.

### TARGET 22

Target 22 is a dual-purpose target. It is a 2,500 foot by 3,500 foot graded rectangle that can accept inert or training munitions and flares. The "Big Papa" Propagation Test Area features a graded, hardened surface built to accommodate a wide variety of conventional munitions propagation tests.



F-15 Dropping LGBs



F-16 Dropping LGBs



"Big Papa" Propagation Test Area

## TEST

### SOUTH RANGE TARGETS

#### TS1

TS1 is a target area used primarily as a cruise missile impact area. The target is generally used for cruise missiles equipped with Non-Tactical Instrumentation Kits.

#### TS2

TS2 is a 1,500 foot wide by 3,000 foot long hardened surface. This target is normally used for inert MK-82/84 class weapons. Guided weapons, inert CBU's and "Live" HE weapons may be employed against this target. UTTR Supplements 1 and 2 to AFI 13-212 identify all authorized ordnance.

#### TS3

TS3 target area (Targets 1 and 2) is used for collecting ballistic data on all conventional munitions in the Air Force inventory such as Laser Guided Bombs (LGBs) and Guided Bomb Units (GBUs). The target area consists of two target areas, each made from compacted earth pads measuring 150 feet by 250 feet. Each target has four Video Metric Analysis System (VMAS) cameras, one pan and tilt camera, and remote control data connections back to the Wig Support facility. A variety of remote control applications can be configured for the target including RF threat emitter control. The area is capable of supporting laser designation from Aircraft or the UTTR ground based laser on site.

#### TS4 (SAND ISLAND)

TS4 (Sand Island) is a sophisticated, multi-spectral target area. This is a live fire area that can accommodate RF, laser-guided, or infrared (IR) seeking weapons with a host of targets. Targets include remote control armored vehicles, air defense

radars, communications transmitters, and others as required by projects. Twenty target pads are available within a four-square mile area. Cameras are installed at target pads based on customer requirements. Features of this area also include remote Cine-T scoring, emitter remote control system, VMAS scoring, RF monitoring, and communications and control by fiber optic link. TS4 is designed to provide a live fire test environment that realistically simulates the offensive or defensive threats an aircraft could experience in the modern battlefield. This target may be used to subject attacking aircraft to a realistic threat environment. Threats are remotely controlled for safety. The primary focus is to test HARMs in a live fire environment. Weapon systems tested could include all those that seek out and destroy threat systems and those that could be attacked by ground threats. A variety of unmanned weapon systems such as cruise missiles, unmanned air vehicles, air-to-ground missiles, and smart munitions can be accommodated.

#### TS5

TS5 is a new target complex designed to accommodate large footprint weapons. Our intent is to provide targets that are fixed, high priority, and heavily defended, for defense suppression in an operational test environment. The TS5 complex is located west of the Wildcat PGM site and offers a 360 degree attack axis. It will accommodate weapons that have a maximum energy footprint in excess of 20 Nautical Miles, which will eliminate the need for an FTS on many weapons. Test infrastructure will include targets, VMAS camera stands, Cine-T pads, Fiber Optic and power cables. Other capabilities include trajectory and end game scoring data, both for day and night. In addition, a scoreable training target is planned for large footprint weapons.

#### "J" TARGET

"J" Target is used for collecting impact data on



TS2



TS3 Target 1



HARM

Joint Stand-Off Weapons (JSOW), Joint Direct Attack Munitions (JDAM), Wind Corrected Munitions Dispenser, Sensor Fuse Weapon, Joint Programmable Fuse, and AGM-88. The area is a compacted pad measuring 1 mile in length and 60 feet in width. Twelve VMAS cameras, two remote controlled pan and tilt cameras, and data connections to the center of the pad support the target area. Remote control and data connections are available back to the Wig Support Facility. A variety of remote control applications can be configured for the target including RF threat emitter control. In addition, heat plate augmented tank bodies can be fabricated and placed along the eastern edge of the roadway when requested by customers.

## **PRECISION GUIDED MUNITIONS (PGM)**

The Precision Guided Munitions (PGM) area is used to collect ballistic data on various air-to-ground missiles such as AGM-65, AGM-130, and AGM-142. The area is supported by 10 VMAS cameras, two remote pan and tilt cameras, and multiple remote data control points in the area. Eight of the VMAS sites are configured to score drops on the static tank array surrounding the target. The remaining two VMAS sites are configured for scoring drops on the wide area targets built from C-containers to represent buildings. The area is capable of supporting a remote controlled moving tank. All remote control and video support cameras are routed back to the Wig Support Facility. A variety of remote control applications can be configured for the target including RF threat emitter control.

## **CRUISE MISSILE TARGETS**

There are four cruise missile targets located at and near Wig Mountain. The High JTA target (located next to the Wig Support Facility) is used for cruise missiles carrying Joint Test Assembly (JTA) warheads. TS-1 (located at the edge of the mud flat north east of Wig Mountain) is used

primarily for cruise missiles carrying high fidelity JTA warheads. A hardened bunker just north of this target supports/protects on-site recording equipment.

## **CONVENTIONAL AIR LAUNCHED CRUISE MISSILE (CALCM)**

The CALCM Target area (located just south of TS-1) is used for cruise missiles carrying live conventional warheads. The CALCM target pad is designed so that a hardened target can be built to the customer's specifications. The CALCM target area is used to collect Time Space Positioning Information (TSPI) and blast pressure data from CALCMs. Four VMAS cameras, one pan and tilt camera, data/remote control circuits, and a full pressure transducer measurement system support the area. The pressure measurement system is capable of recording up to 56 individual measurement points configured as required for test objectives. All remote control and video support is routed back to the Wig Support Facility. The pressure wave data is recorded on site. A variety of remote control applications can be configured for the target including RF threat emitter control.

## **FLIGHT TERMINATION SYSTEM (FTS)**

The UTRR FTS provides the ability to remotely terminate or control test vehicles equipped with FTS receivers. Termination or control of test vehicles is accomplished using remote control boxes located in the MCC. Signals generated at the control boxes are transmitted from 1,000 watt UHF transmitters located on Cedar Mountain and Trout Creek. Each transmitter site has primary and backup transmitters with automatic switching capability and redundant communications circuits to the MCC.



"J" Target



"J" Target

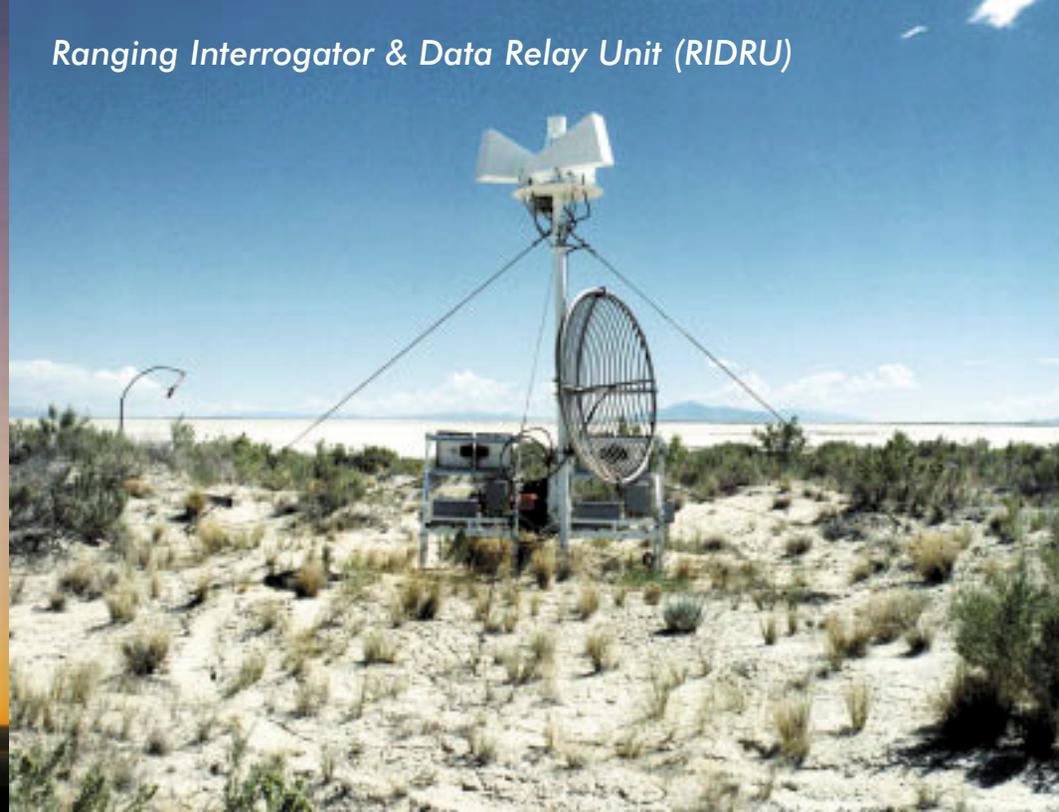


PGM

*Cinesextant*



*Ranging Interrogator & Data Relay Unit (RIDRU)*



*High Speed Camera Display*



*Multiple Threat Emitter System (MUTES)*



# INSTRUMENTATION

## TRACKING SYSTEMS

### **RADARS**

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Tracking radar systems provide TSPI to the UTTR MCC located at Hill AFB for use in real-time display systems, post-flight analysis, and for use as a pointing source for other Range assets. G-band digital instrumentation radars provide real-time Cartesian and polar data to the MCC. Systems can acquire and track both skin and G-band beacon targets. Data is sent real-time to the MCC and recorded on-site.

Air Traffic Control and Ground Control Intercept (GCI) support of UTTR air space is performed by the 299th Range Control Squadron (RCS) using local Federal Aviation Administration (FAA) Air Route Surveillance Radars at Francis Peak, Cedar City, and Battle Mountain, NV. Airport Surveillance Radars (ASRs) at Cedar Mountain, Trout Creek, and Bovine Mountain provide gap-filler coverage. These radars provide surveillance of the central UTTR and Dugway Proving Ground areas and of the southern, northern, and western approaches to the UTTR. Data from these radars is available for observation in the MCC at Hill AFB.

### **UTTR AIR COMBAT MANUEVERING INSTRUMENTATION (ACMI) SYSTEM**

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ACMI is an instrumentation tracking system for aircraft involved in controlled, simulated-weapons training exercises. The system tracks aircraft equipped with P4b variant transponders (pods). These pods are provided to visiting aircraft by the sponsoring organization (388th or 419th

Fighter Wings). The UTTR ACMI System provides real-time monitoring of aircraft position, flight dynamics, weapon status, and firing parameters. Significant performance data is relayed via a communications network, processed in real time at the MCC, and displayed in Building 3 (Hill AFB) for the Range Training Officer (RTO) and other observers. Tracking, computing, and display capabilities enable the RTO to follow real-time aircraft maneuvers. Displays are computer generated, 2 or 3 dimensional, and may be viewed on a computer monitor or projected on a large screen. Flight parameters and mission data are also displayed on a computer monitor. Ultra-high frequency (UHF) radio equipment enables the RTO to communicate essential flight information, mission results, and advisory data to flight leaders and aircrews and enables the 299 RCS to communicate air traffic control information to aircrews. All flight data and communications are recorded on tape for post-mission replay and debriefing. The replay and debriefing equipment is located in Building 3 at Hill AFB.

### **HIGH ACCURACY MULTIPLE OBJECT TRACKING SYSTEM (HAMOTS)**

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The High Accuracy Multiple Object Tracking System (HAMOTS) tracks, records, and displays the TSPI data of up to 20 high activity participants. TSPI data is displayed in real time at the MCC, located on Hill AFB. Typical accuracies for real-time filtered data are  $\pm 10$  meters horizontal and  $\pm 15$  to  $\pm 50$  meters vertical. Post-mission filtering of the raw HAMOTS data produces typical accuracies better than  $\pm 5$  meters laterally and  $\pm 15$  meters vertically. Accuracy depends upon location and altitude. There are approximately 60 Ranging Interrogator and Data Relay Units

(RIDRUs) located on both UTTR and BLM Land. Air vehicles being tracked must carry a vehicle transponder unit (VTU), or "Micro B". The 388th Range Squadron maintains a small inventory of these units for temporary use by Range customers

### **TEST EVALUATION COMMAND & CONTROL SYSTEM (TECCS)**

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Test Evaluation Command & Control System (TECCS) is a display system which uses available FAA and tracking radar data to monitor Range traffic during real-time missions. TECCS also provides pointing data to target acquisition equipment and is a source of target solutions that may be used in the event the primary TSPI processor fails.

### **ADVANCED RANGE DATA SYSTEM (ARDS)**

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Advanced Range Data System (ARDS) is a next generation TSPI system which uses the Global Positioning System (GPS). Each participant must be equipped with either a Range Application Joint Program Office (RAJPO) pod or plate. Satellite data is collected by the participant and processed along with ground-based reference receiver data that is then transmitted to the MCC. Both raw and processed data are linked to the MCC via the Data Link System, where it is processed further, displayed, and recorded for post-flight processing. Accuracy for this system is better than  $\pm 8$  feet horizontal and  $\pm 13$  feet vertical.

# INSTRUMENTATION



Relocating a Cine-T

## PHOTO OPTICS

Cinetheodolites (Cine-Ts) at the UTTR provide a film record of the flight path of an airborne object. This record indicates the azimuth and elevation angle of the object being tracked and indicates the exact time at which the picture was taken. Information is compiled from film taken by several Cine-Ts and is processed (post-mission) by computers to calculate the TSPI of the object tracked. The accuracy of the TSPI data provided by Cine-Ts is two feet or better depending on the geometry of the array of Cine-Ts and the closeness of the object being tracked. There are 21 Contraves Cine-Ts at the UTTR. Eight of the Cine-Ts are also remotely configured using the Remote Instrumentation Control System (RICS) van to support test vehicles with large footprints that cannot be tracked safely with human operators. Four remote controlled Cine-Ts use Forward-Looking Infrared Radar (FLIR) cameras to acquire and track heat emitting targets. Cinesextants at the UTTR track airborne objects and provide motion picture and video coverage. Cinesextants can also provide filmed records of specific events such as parachute deployments and ground impacts. Unlike

Cinetheodolite films, films taken by Cinesextants are not used to determine the position/location of the object being tracked. There are six Cinesextants and one kineto at the UTTR. These mobile units can be located almost anywhere on the Range where commercial or generator power is available. They do not require a surveyed pad and need only one person for set-up, alignment, and operation. Products produced by Cinesextants include documentation film, high-speed time-control sequence data, and/or real-time video data. Documentation films are available at variable frame rates (5 to 500 frames per second) from one or more geographic locations. These films are edited in a normal sequence of events to show an overall picture story of the test. High-speed camera tracking provides a time-controlled sequence on film which can be viewed in a stop-action mode to review high-speed actions at a low-speed playback rate. UTTR resources include high-speed 16 millimeter (mm), 35mm, and 70mm equipment. Real-time video data can be obtained by a video camera mounted on a Cinesextant. The video image can be recorded on-site and/or sent to the MCC via microwave for real-time display

## SCORING

### THE WEAPONS IMPACT SCORING SET (WISS)

WISS provides scoring information for ordnance dropped on numerous complexes throughout the Range, including targets located at the Wildcat and Kittycat Tactical Target Complexes on the South Range of the UTTR.

WISS is designed to provide support in training pilots and aircrews in the delivery of air-to-ground

ordnance. WISS is an electro-optical instrumented system designed to accurately measure the impact location of air delivered ordnance with respect to the target center. WISS typically consists of two camera groups which cover the scoring area. Video is sent from the camera groups to a master console located at the Avery Complex on Dugway Proving Ground. Video data received at the master console may be scored electronically or manually.

All WISS target complexes can be scored at night if the ordnance used has a spotting charge. A change of target is possible for all scoreable UTTR targets at night.

### VIDEO METRIC ANALYSIS SYSTEM (VMAS)

VMAS is a computer-controlled video measurement system which is used for terminal area scoring. It uses calibrated, Inter-Range Instrumentation Group (IRIG) B synchronized, fixed field of view video cameras to provide three dimension point in space, attitude, and two dimension data. Various static arena sizes can be supported depending upon the size of the object of interest and the required data accuracy. Typically, a 300 foot horizontal and 265 foot vertical area can be covered and provide a positional accuracy of  $\pm$  one foot with an object the size of an MK-82 bomb. A variety of data products can be provided using the basic X, Y, Z position data from VMAS. Hard copy listings and plots of various calculated parameters such as velocity, acceleration, slant range, horizontal distance, vertical distance, heading, dive angle, and X, Y, Z component standard deviation can be provided.

# INSTRUMENTATION

## TELEMETRY

Telemetry systems at the UTTR include three fixed telemetry acquisition stations, one mobile acquisition station, and three mobile single channel acquisition stations. In addition, the UTTR has a ground station located near the flightline for flightline telemetry verification (pre-mission). The fixed telemetry acquisition stations are located at Granite Peak, Grassy Mountain West, and Wendover Peak. All of the acquisition stations can auto-track on both L- and S-bands and omni on P-band and can insert data into the UTTR Hybrid Communications System for transmission back to the MCC.

## TIME SPACE POSITION INFORMATION (TSPI)

Time Space Position Information (TSPI) is available to provide real time display and post flight position and derived parameters from any of UTTR's TSPI sensors. These include the two instrumentation radars, AN/TPQ-39 and AN/MPS-36, HAMOTS, cinetheodolites and GPS.

## THREATS

### MUTES

The AN/MST-T1A Multiple Threat Emitter System (MUTES) is a computer-controlled, multi-emitter system designed to transmit simulated threat signals. MUTES tracks aircraft using Identification Friend or Foe (IFF) or beacon, and has a limited TV tracking ability. Using keyboard entry, the operator selects programmed threat scenarios or

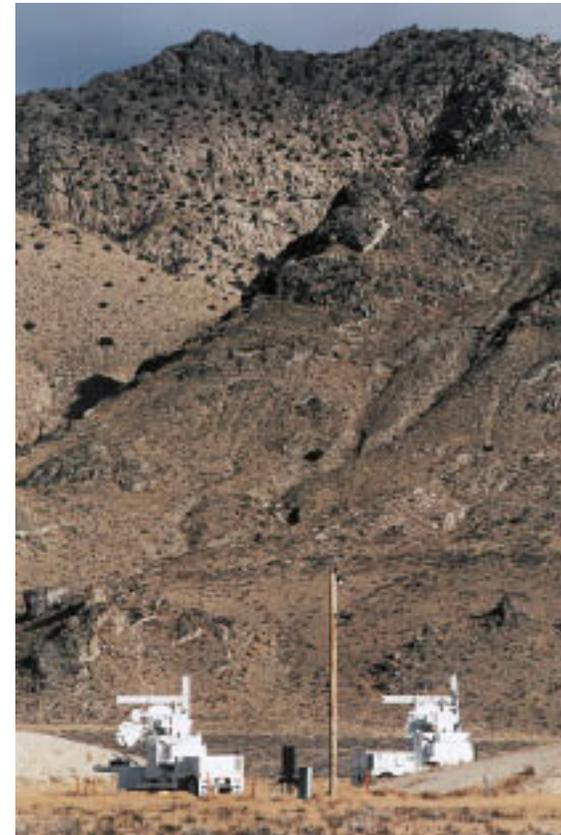
*manually selects individual signals. The computer can store up to 120 different threat signals and can radiate up to five signals at one time. The MUTES does not receive or react to aircraft jamming; scenarios are advanced based on programmed time intervals or aircraft range from the site. Mini-MUTES is a smaller, more mobile version of the MST-T1A MUTES. Each master control group at a radar bomb scoring (RBS) site can control up to 10 remotely positioned pedestals. There are four Mini-MUTES configurations which combine transmitters identical to those used in the larger MUTES, but each pedestal is designed to radiate only a particular threat family of signals or acquisition signals. Acquisition and tracking is accomplished by a built-in IFF system, and the Mini-MUTES has a receiver to collect electronic countermeasure (ECM) data for scoring.*

### TRAINS

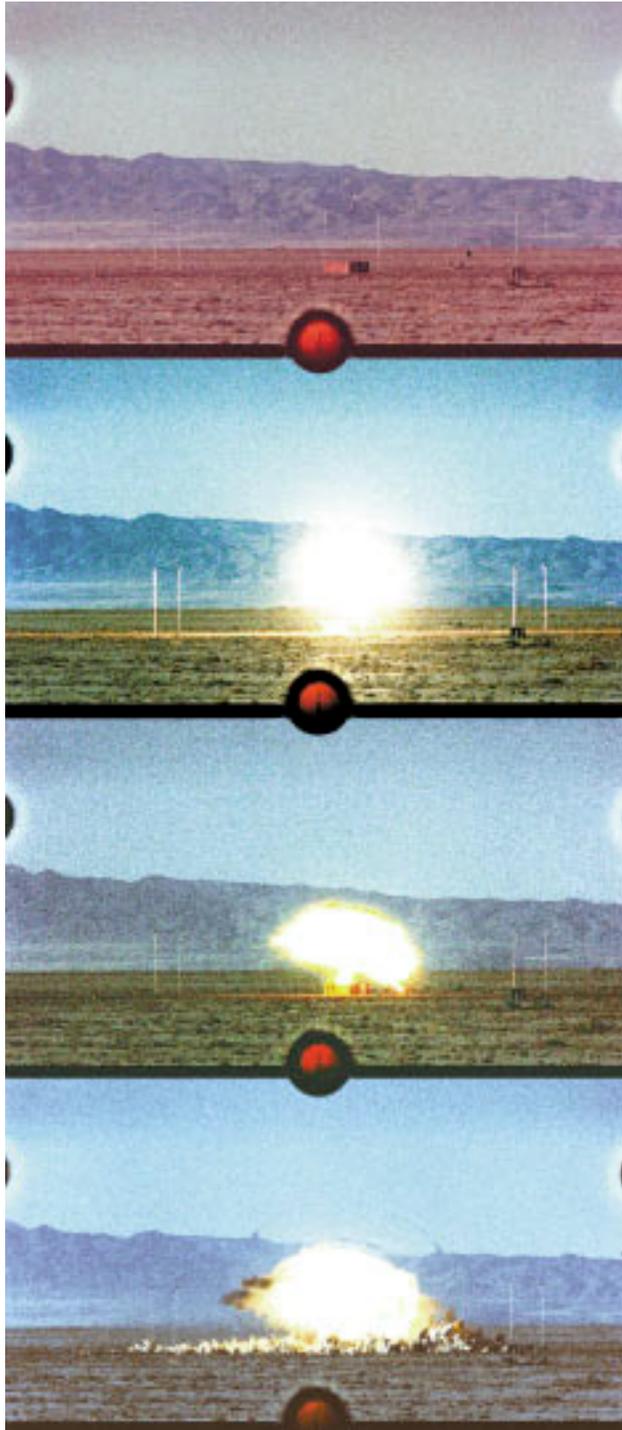
The AN/MSR-T4 Threat Reaction Analysis and Indicator System (TRAINS) is a mobile system consisting of a single van capable of receiving electromagnetic transmission from 0.03 Hertz (Hz) to 18.0 Gigahertz (GHz). The system is deployed with the MST-T1A (MUTES) and receives electromagnetic emissions from airborne and ground electronic warfare (EW) equipment through a single omni-directional and four directional antennas. The antennas are slaved to external tracking systems (MUTES or SEEK SCORE) and collect the measurement and analysis data necessary to evaluate airborne and ground EW equipment emissions. Results of the analysis are collected and provided in a chronological listing of run events called end-of-run summaries (EORS).

## REMOTE SMOKEY SAMs

Remote Smokey SAMs are installed at Baker's Strong Point, Wildcat, and Craner's target sites. Each site is capable of launching up to 48 Smokey SAMs. All Smokey SAMs can be launched from a single point, currently Clover Control on Hill Air Force Base. Remote control capability allows Clover Control to perform correlated launches based on aircraft location and mission. A mobile Smokey SAM launcher is available for use based on mission requirements.



Deployed Mini-MUTES



Gen Hawley JDAM Drop, 3 Dec 98

## FUTURE IMPROVEMENTS

### **NIGHT VMAS**

Night VMAS is available at a number of established test target complexes in the South Range today. Additional targets may be added in the future.

### **LASER SPOT SCORING**

Laser Spot Scoring with Laser Code ID is available to test customers and will be available for training in the future. This capability provides an x-y score of the Laser spot position, as well as Laser code.

### **UTAH AIR DEFENSE SYSTEM (UADS) AND THE UTAH THREAT DEBRIEFING SYSTEM (UTDS)**

The UTTR is currently developing a UTTR Air Defense System (UADS) specifically designed to utilize the UTTR threat systems and infrastructure. The UADS will be a fully integrated threat control system which will allow aircraft to actively engage ground threats during realistic training missions. The system will include multiple remote controlled threat systems, video systems, and the Utah Threat Debriefing System (UTDS). The UTDS will provide a full mission playback within one half hour of the mission completion. The UTDS will support dial-in capability to allow off base support crews to download and view mission data.

### **TPT-4 AND TPT-5 EMITTERS**

TPT-4 and TPT-5 emitters were recently acquired and are being integrated into the UADS. These additional threats will enhance existing coverage available on the UTTR.

### **MUTES EXPANSION**

Multiple Threat Emitter System (MUTES) coverage of the UTTR is being expanded with the addition of four new Mini-MUTES sites. Two Mini-MUTES are being installed at Sand Island on the South Range. The North Range will also have two new Mini-MUTES installed.



For more detailed information concerning Test or Training capabilities and instructions, please refer to the UTR Supplements 1 and 2 to AFI 13-212. Both of these Supplements are located on the 388th Range Squadron Home Page ([388fw.hill.af.mil/uttr/index.htm](http://388fw.hill.af.mil/uttr/index.htm)). You may also request information by calling (801) 777-7852, or DSN 777-7852.



The text and photos in this publication were provided by the 388th RANS. Graphic design and layout were developed by the Photo/Graphic Imaging Center at Hill Air Force Base, Utah.