



U.S. ARMY REDSTONE TEST CENTER

Redstone Arsenal
Huntsville, Alabama

rtc.army.mil



U.S. ARMY

U.S. Army Redstone Test Center



Aviation Flight Test Instrumentation

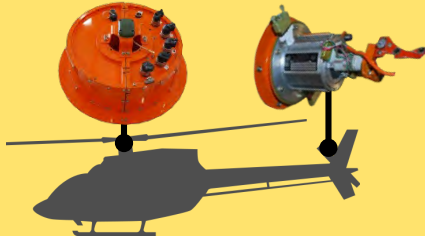
RTC provides support in the design, development, installation, integration and operation of aviation flight test instrumentation. Our electrical and mechanical engineers design, fabricate, install, integrate and calibrate a variety of pulse code modulation based instrumentation systems. RTC engineers also install and/or integrate a number of non-standard test articles and developmental aircraft subsystems into all existing Army rotary and fixed wing aircraft platforms. RTC data capabilities include the collection of flight test data, time-space-position information, differential global positioning systems, and high definition video. RTC can also provide aircraft instrumentation cockpit displays, telemetry decommutation and display, open air environment data collection and ground station digital communication testing. An RTC key capability is the state-of-the-art flight test control center which provides real-time display of telemetered flight test data and flight test data storage. RTC can also collect and process real-time and post-mission airframe and systems flight test data in locations across the CONUS with our mobile assets. Once non-standard systems are installed, RTC creates airworthiness substantiation documentation used to support airworthiness approval for RTC flight releases and AED airworthiness releases.

CORE COMPETENCIES

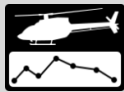
- Airborne data acquisition
- Real time flight test data monitoring for data quality and safety of flight
- Software development for unique data processing and analysis
- Wireless Rotating Instrumentation Package for rotating parameter measurement
- Structural design and analysis for test item and instrumentation installation
- Experienced workforce that can support all instrumentation and data reduction activities for all developmental flight testing activities

CAPABILITY HIGHLIGHT

RTC utilizes a wireless rotating instrumentation package (WRIP) to collect data on rotating components located on or above the main rotor system. The WRIP design allows collection of structural data on the aircraft rotating components without the use of slip rings, transmission modifications, or standpipes. The WRIP design reduces data transmission latency and supports aggressive test schedules.



Flight Test Data Collected (2018)



600+ Data Flight

610+ Telemetry Hours

Parameters Collected per Test



7500 Total

4200 Measured

3300 Bussed

TM Ground Stations



5 Total

2 Fixed

4 Mobile

Instrumentation



8000+ Items

\$33M+ Value

U.S. Army Redstone Test Center



Aviation Flight Test

For years, the team at the Redstone Test Center Army Aviation Flight Test Directorate (AFTD) has provided an expert workforce and technologically advanced test equipment to conduct the rigorous testing necessary for U.S. Army acquisition and airworthiness decision makers to equip our soldiers with mission-effective and safe aviation equipment. AFTD is comprised of diverse and multi-disciplined pilots, engineers, and technical personnel who work with a fleet of aircraft to provide government and commercial customers complete developmental flight test and test support services.

The AFTD team is comprised of nearly 400 military, Department of Army civilian, and contract personnel with diverse, multi-service backgrounds, and includes 50 U.S. Naval Test Pilot School graduates and 40 flight test engineers. More than 260 contract engineering and technical personnel from QinetiQ, Sikorsky, and Wyle support our operations.

While much of RTC aviation flight test operations are conducted at Redstone Arsenal, AFTD has on many occasions executed test activities at remote locations throughout the United States to include Yuma Proving Grounds, Arizona, Eglin Air Force Base, Florida, and Marquette, Michigan, when specific capabilities or climatic conditions are required.

CORE COMPETENCIES

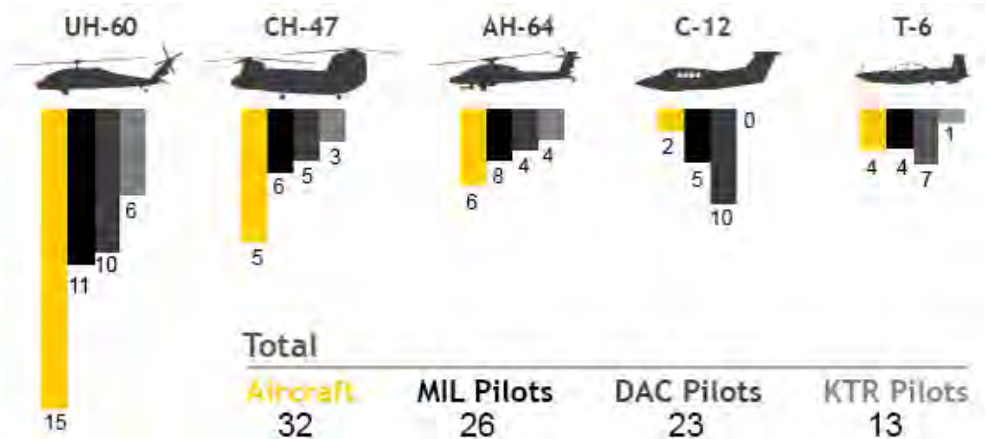
- Aircraft Survivability Testing
- Unmanned Aircraft System & Manned-Unmanned Teaming
- Targeting/Pilotage Sensors
- Navigation/Communications/Avionics
- Aircraft Platform Interoperability
- Software Regression
- Aircraft Performance
- Handling Qualities
- Aircraft Icing Testing - Natural & Artificial

CAPABILITY HIGHLIGHT

The JCH-47D helicopter icing spray system (HISS) aircraft is an airborne spray tanker that uses water from the 1,800-gal capacity tank to create an artificial icing cloud used in qualification testing.



Aircraft/Pilots



U.S. Army Redstone Test Center



Aviation Systems Test and Integration Lab

The Aviation Systems Test and Integration Laboratory (AvSTIL) offers an innovative approach to aviation system and subsystem testing by fully immersing aviation platforms in a controllable, repeatable and synthetic testing environment, allowing engineers the ability to fine tune scenarios, produce more precise test and evaluation results, reducing overall program risk to project managers prior to flight test. The AvSTIL serves as the only U.S. Army installed systems test facility for tactical hardware installed on aircraft, which eliminates some of the uncertainties commonly attributed to bench-level component testing.

The AvSTIL is capable of hosting all current aircraft survivability equipment on Army aircraft. The AvSTIL is also capable of simulating aircraft 1553 bus traffic (to include EGI) and pitot-static and radar altimeter data for the AH-64D/E, UH-60M and CH-47F. The AvSTIL houses a test control center equipped with all necessary instrumentation to plan, execute, and report on advanced flight tests up to a SECRET classification level.

CORE COMPETENCIES

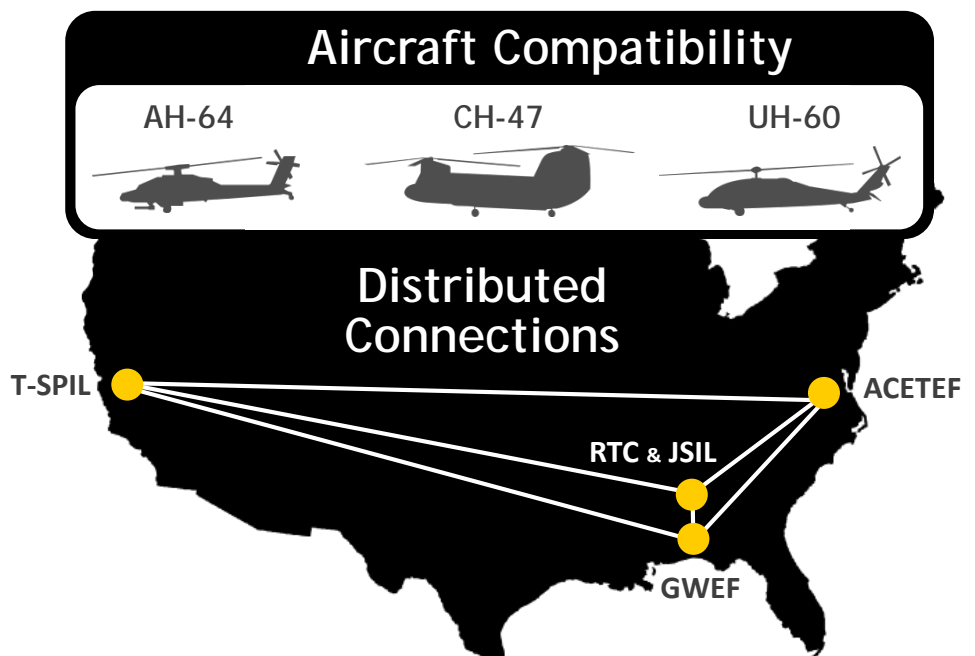
- Integrated Aircraft Survivability Equipment Testing
- Unmanned Aircraft System & Manned-Unmanned Teaming
- Navigation Testing
- Software Regression
- Aircraft Platform Interoperability
- Pre-Flight Confidence Testing
- Integration Check-Out

CAPABILITY HIGHLIGHT

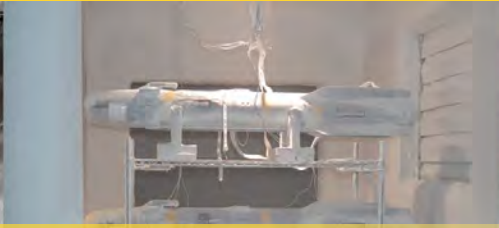
Multispectral test capability for integrated testing of installed ASE (CMWS/ICMD, APR-39 RSDS, AVR-2B LDS), with growth capability for CIRCM

Enhanced projection capability for providing simulated missiles to CMWS during aircraft virtual flight

Provides AH-64E simulated manned unmanned teaming protocols for simulated UAS payload control during levels of interoperability two, three and four in an LVC-DE



U.S. Army Redstone Test Center



Climatic Testing

RTC has comprehensive Climatic test expertise and capabilities supporting missile, sensor and aviation component, subsystem and system-level testing. Specially designed facilities allow for Climatic testing of “explosive and hazardous” test items. Modular and flexible test capabilities allow for custom test tailoring to replicate fielded environments. Climatic testing supports the full life-cycle through engineering development, qualification, field failure investigation, and stockpile reliability. Portable temperature conditioning capabilities are available to support range testing. RTC maintains expertise in performing combined environment profile development, developing life cycle environmental profiles, and climatic test tailoring.

CORE COMPETENCIES

TEST STANDARDS

- MIL-STD-810
- DO-160
- ASTM G85
- NATO AECTP
- DEF STAN 00-35
- TOPs/ITOPs

EXPERTISE

- Explosive/Hazardous Item Testing
- Combined Environment Testing
- Field Failure Investigation Support
- Test Tailoring/Custom Procedures
- Life Cycle Environmental Profile Development
- Field Instrumentation

CLIMATIC TEST CAPABILITIES

	Temperature/Humidity Temperature Shock	-100°F to 185°F / 5 to 95%RH Two Chamber Method Temperature Shock
	Temperature/Altitude/ Humidity	-65°F to 200°F / 20-90%RH / 100k ft.
	Solar	Full Spectrum Actinic and Heating Effects, Diurnal Cycling
	Icing/Freezing Rain Snow	Glaze and Rime Ice. Anti-icing Testing. Snow Generation.
	Corrosive Environments	Large Item Salt Fog Testing, Salt Fog with SO2 Testing Per ASTM G85.
	Rain	Blowing and Steady Rain from 1-27 inches/hr. Dripping Rain. Test Item Temp. Conditioning
	Blowing Sand	1.1 to 2.2 g/m ³ / Ambient Temperature
	Blowing Dust	2 to 12 g/m ³ , 9 m/s, 70 to 160°F
	Immersion	Test Item and Water Temperature Conditioning
	Contamination by Fluids	Test Item and Fluid Temperature Conditioning
	Wind	High Speed Steady and Gust Capability.



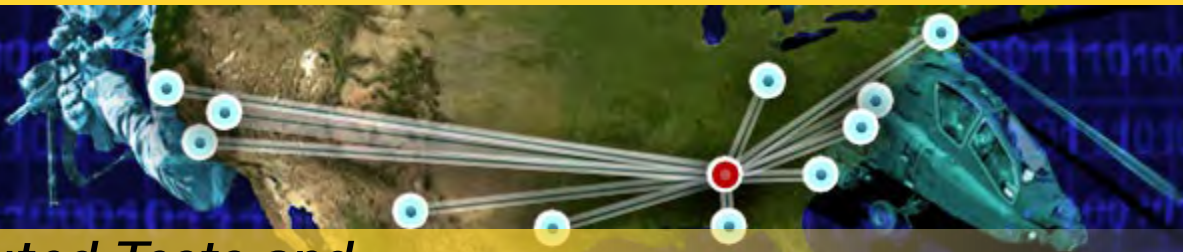
FACILITY HIGHLIGHT

Multi-Environment Chamber Test Facility (Bldg. 7280)

Two Drive-In Chambers supporting Extreme Temperature, Humidity, Solar Icing/Freezing Rain, Snow, Dripping Rain and Steady State Rain with the following specifications:

- Size: 25 ft. x 25ft. x 25ft.
- Temperature Range: -100°F to 185°F
- Relative Humidity: 20%-95%
- Temperature Rate of Change: 3.6°F/min
- Floor Load Capacity: 12,000 lb/ft²

U.S. Army Redstone Test Center



Distributed Tests and Modeling & Simulation

RTC's distributed testing and modeling & simulation capability is centered around the Distributed Test Control Center (DTCC). The DTCC is RTC's central point for connecting distributed systems. For test events both internal to RTC and with outside organizations, the DTCC serves as the RTC command and control, communication, data acquisition, and visualization center.

The DTCC operates globally at various classification levels on multiple distributed test networks. This state-of-the-art facility serves as the hub connecting all RTC ranges and labs through reliable, robust and high-capacity connectivity. It is the central access point to and from RTC assets and other organizations around the world. DTCC engineers and computer scientists provide subject matter expertise for networks and simulation architecture as well as for RTC's High Performance Computer asset, which resides in the DTCC and provides computational power for the center.

CORE COMPETENCIES

- Distributed Test Networks
 - DREN, SDREN, JIOR, JOIN, CFBLNet, Cross Domain Solutions
- Modeling & Simulation Suite
 - OneSAF, ExCIS, MATREX, UAS Sim, EO/IR Sensor Sims
- Man-in-Loop Interfaces
 - Reconfigurable RWA simulator
 - Small Arms Threat Sims
- JSTEN
 - Link-16, Blue Force Tracker
 - Standard Common Data Link
 - Mode 5, WNW, SRW
- High Performance Computing
 - Unclassified / Secret
 - Coalition Computing Resources
- Data Acquisition
 - NSITE
 - JMETC tools
 - MAK tools

CAPABILITY HIGHLIGHT

The JSTEN combines parallel computing resources with a scalable, high fidelity network emulation and a computer-generated forces model to represent, in a virtual space, tactical networks, force movements, interactions, and communication loads to live systems under test. This network emulation allows interfacing real hardware with virtual components to produce operationally realistic numbers of network nodes.

TACTICAL



M&S



TECHNICAL CONTROL



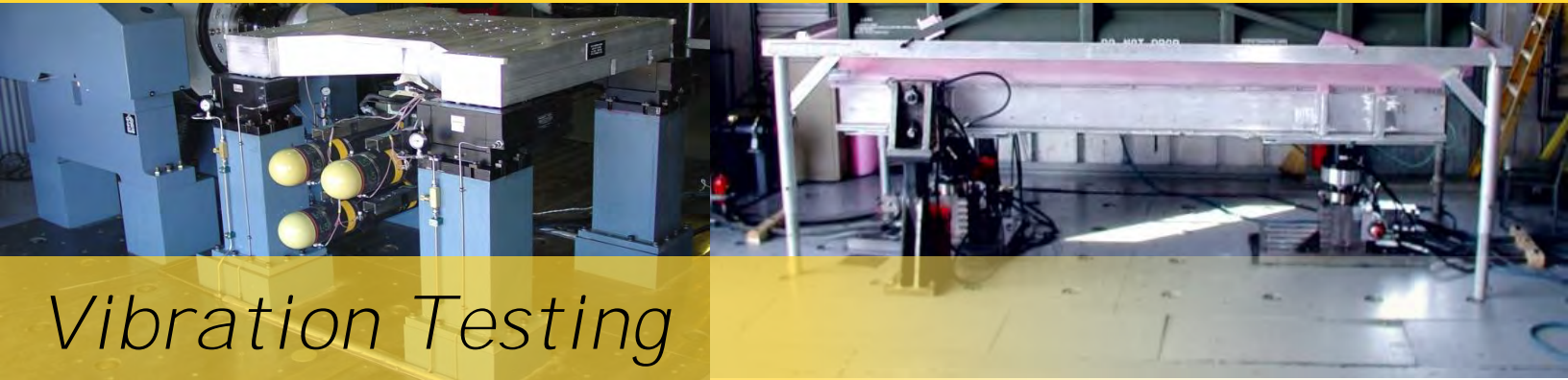
DATA COLLECTION

PROTOCOL GATEWAY

TEST SUPPORT NETWORK

STANDARDS • SECURITY • CROSS DOMAIN SOLUTION
VV&A • INFORMATION • CONFIGURATION MANAGEMENT

U.S. Army Redstone Test Center



Vibration Testing

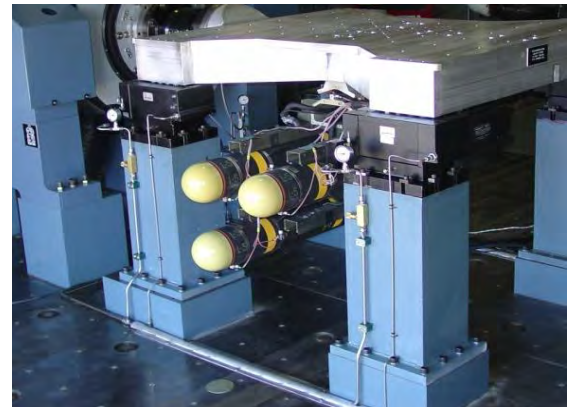
Introduction

The U.S. Army Redstone Test Center (RTC) Dynamic Test Division has an extensive capability in the area of vibration testing allowing responsive, flexible, and convenient completion of test programs. A large number of both electrodynamic and electro-hydraulic shaker systems are available allowing replication of the full-range of vibration environments a test article may experience during its life cycle. This may include common carrier vibration, wheeled and tracked vehicle transportation, aircraft (fixed and rotary wing) flight, shipboard transport, missile flight, etc.

Numerous vibration control systems can be configured to control all types of complex vibration spectra including sinusoidal (swept, dwells, resonant search), broadband random, sine-on-random, narrowband random-on-random, and non-stationary motion replication. Shakers are reconfigurable for multi-shaker/multi-axes excitation and vibration testing can be conducted at temperature extremes (-85°F to +300°F). Remote operations allow for testing of hazardous material, including live missile systems.

Electrodynamic Shakers

Electrodynamic shaker systems are available in force ratings ranging from 1,000-lbf to 55,000-lbf and displacements up to 3-in Pk-Pk. These shakers can be configured into multi-shaker setups increasing the force capability significantly. Various size slip tables accommodate a wide range of test article sizes. Typically electrodynamic shakers have a frequency capability up to 2,000 Hz with some versions going as high as 3,500 Hz.



Servo-Hydraulic Shakers

Servo-hydraulic shaker systems are more flexible allowing multi-shaker/multi-axes excitation with high displacement and high force; however, they typically are limited to up to 500 Hz. Shakers ranging in size from 11,000-lbf to 80,000-lbf and displacements up to 6-in Pk-Pk are available. In addition, Multiple 6-DOF systems are available allowing for independent control of 3 linear and 3 rotational degrees of freedom simultaneously.



U.S. Army Redstone Test Center

Vibration Test Capabilities Equipment Summary

Electrodynamic Shakers (2,000 Hz bandwidth)

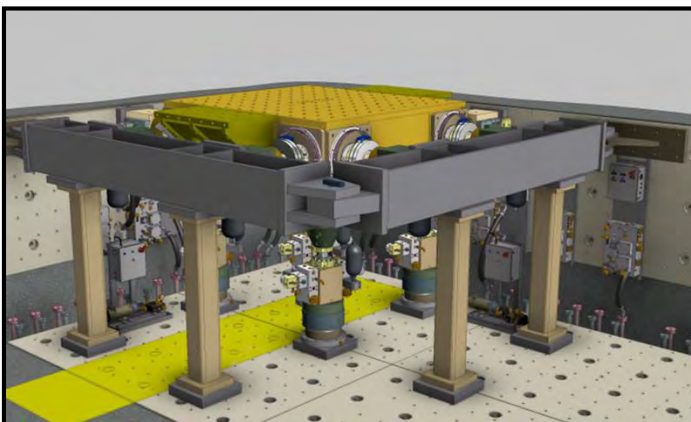
Make	Model	Force (lbf) ¹	Displacement (in Pk-Pk)	Slip Table Size	Qty
Unholtz-Dickie	T5500	55,000	3.0	60-in x 60-in	2
Unholtz-Dickie	T4000	40,000	2.0	60-in x 60-in	4
Unholtz-Dickie	T4000	40,000	3.0	60-in x 60-in	2
Unholtz-Dickie	T2000	25,000	2.0	36-in x 36-in	1
Unholtz-Dickie	T2000	25,000	3.0	48-in x 48-in	3
Ling	C395	18,000	1.0	36-in x 36-in	2

Notes:

1. Sine rating. Performance may vary for random excitation and as a function of field setting.

Electro-Hydraulic Shakers (500 Hz bandwidth)

Make	Model	Force (lbf)	Displacement (in Pk-Pk)	Slip Table Size	Qty
Team Corp.	Cube-6DOF	14,000	2.0	30-in x 30-in	2
Team Corp	W8000-5	80,000	5.0	Multiple	1
Team Corp	W5000-.5	50,000	0.5	Multiple	2
Team Corp	W5000-6	50,000	6.0	12-ft x 4-ft	2
Team Corp	62/15.0	30,000	2.375	Custom	2
Team Corp	62/10.0	20,000	2.375	12-ft x 4-ft (vertical)	2
Team Corp	62/5.5	11,000	2.375	Custom	1
Team Corp	LC6DOF	120,000 – X 120,000 – Y 225,000 – Z	3.0	8 ft x 8 ft (4 ft x 12 ft with extensions)	1



U.S. Army Redstone Test Center



Shock Testing

Introduction

The U.S. Army Redstone Test Center (RTC) Dynamic Test Division has a wide array of shock equipment and facilities capable of replicating the full-range of shock and transient-type environments a test article may experience during its life cycle. This may include ground vehicle transport, rough handling (drops & pendulum impact), launch shock, pyro-separation events, etc. Capabilities include free-fall and accelerated-fall shock machines, Pyro-Shock testing, Drop & Pendulum Impact, Loose Cargo (Bounce) Machines, as well as vibration exciters capable of replicating complex waveforms such as Shock Response Spectra (SRS). Testing may be conducted at temperature extremes (-85°F to +300°F) and remote operations allow for testing of hazardous material including live missile systems. Extensive instrumentation is available for acquiring shock data during each event including high speed camera coverage.

Shock Machines

Free-fall and accelerated-fall shock machines, horizontal and vertical, are available with table sizes ranging from 12x12-in to 48x48-in allowing for replication of a full-range of shock levels and durations including half-sine, haversine, trapezoidal, square-wave, and terminal peak sawtooth-shaped pulses.

Pyro-Shock

Pyro-Shock testing is available allowing for high g-level, high-frequency input to a test article induced by the detonation of ordnance devices.

Drop & Pendulum Impact

Drop test facilities are available with steel, concrete, and dirt drop surfaces with a capability of dropping large payloads as high as 40-ft IAW MIL-STD-810 & 2105. Pendulum impact may be conducted against reinforced concrete walls IAW FED-STD-101C.

Loose Cargo (Bounce)

Loose Cargo (Bounce) machines are available which provide repetitive shock to a test article replicating unrestrained transport in a ground vehicle.

U.S. Army Redstone Test Center

Shock Test Capabilities Equipment Summary

Shock Machines

Make	Model	Max Weight (lbs)	Max Velocity (in/sec)	Max Acceleration (g's)	Max Height (ft)	Table Size
Lansmont	HSX122	4,000	500	1,500	12	48-in x 48-in
IMPAC	2424	600	250	1,000 (est.)	10	24-in x 24-in
MTS	1212	200	1,920	20,000	17	12-in x 12-in
RTC Horizontal	H1	3,000	600	1,000 (est.)	10	48-in x 48-in

Electrodynamic Shakers – Shock Capability

Make	Model	Shock Force (lbf)*	Displacement (in Pk-Pk)	Slip Table Size	Velocity (in/sec)
Unholtz-Dickie	T5500	82,500	3.0	60-in x 60-in	140
Unholtz-Dickie	T4000	60,000	2.0	60-in x 60-in	140
Unholtz-Dickie	T2000	37500	3.0	48-in x 48-in	140

Notes:
1. Performance will vary as a function of field setting.

Loose Cargo (Bounce)

Make	Model	Motion	Max Weight (lbs)	Speed Range (rpm)	Displacement (in Pk-Pk)	Table Size
L.A.B	6000	Vertical Linear, Non-synchronous, Circular Synchronous, 30° out of Phase & Synchronous	6,000	150-300 (est)	1.0	60-in x 60-in
L.A.B	2000	Same As Above	2,000	150-300	1.0	48-in x 48-in

U.S. Army Redstone Test Center



Acceleration Test

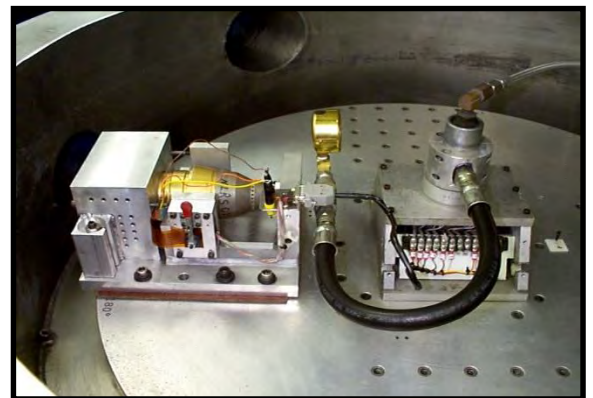
Introduction

Acceleration testing is conducted to ensure a test article can structurally withstand the steady state inertial loads induced by acceleration and maneuvers on missile or aviation platforms during the service environment. The Dynamic Test Division of the U.S. Army Redstone Test Center (RTC) uses centrifuges to provide sustained acceleration to a test article. Specifically, two unique centrifuges are available capable of testing a variety of test articles: 36-inch diameter and 24-foot diameter.

Testing may be conducted at temperature extremes (-85°F to +300°F) and remote operations allow for testing of hazardous material including live missile systems. Small vibration exciters may be mounted to the centrifuge to allow for combined vibration-acceleration testing. Extensive instrumentation is available for acquiring data during each event including high speed camera coverage.

Schaevitz Centrifuge

The 36-in Diameter Schaevitz Centrifuge is capable of handling a payload of 100-lb with a max g-level of 1000-g at 1700 rpm. A slip-ring package allows for 46 5-amp and 10 10-amp channels of instrumentation. 100 psi air is also available through the slip ring.



High Capacity Centrifuge

The 24-ft Diameter High Capacity Centrifuge (HCC) is capable of handling a payload of 500-lb with a max acceleration of 100-g. A slip-ring package allows for 32 channels of instrumentation. A power unit consists of a 200-hp electric motor with precision control of $\pm 1G$.



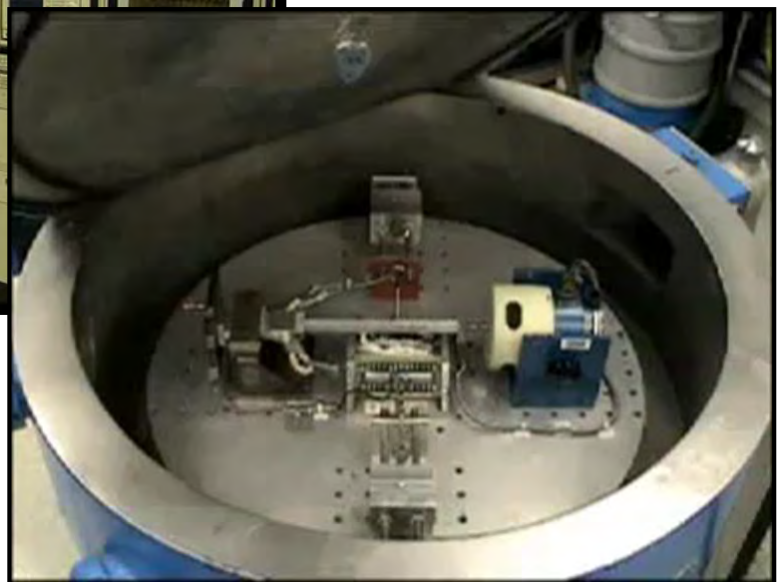
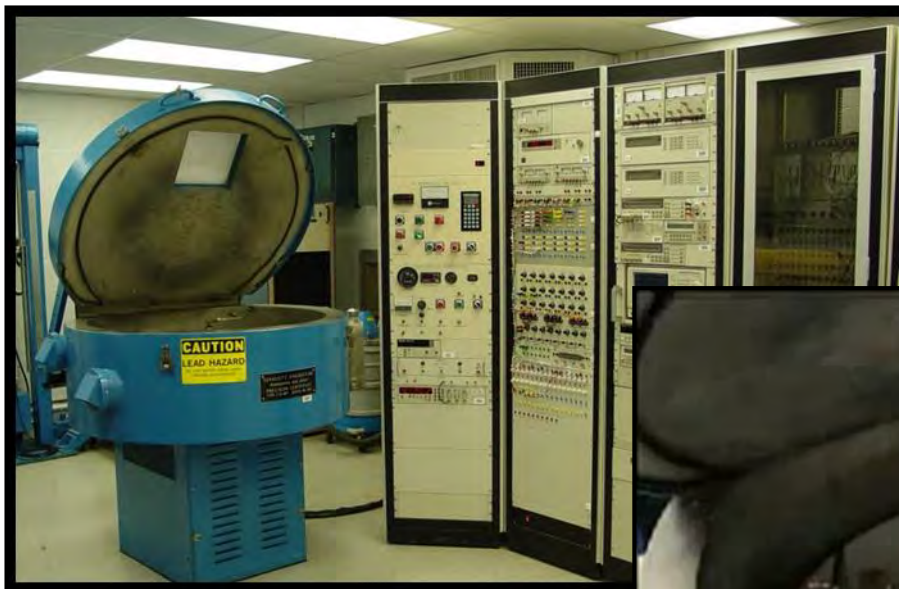
U.S. Army Redstone Test Center

Acceleration Test Capabilities *Equipment Summary*

Make	Model	Max Payload Weight (lbs)	Max Velocity (rpm)	Max Acceleration (g's) (at center of table)		Arm Radius	Table Size (mounting surface)
				with no payload	with max payload		
Schaevitz	C-3-APF	100	1,700	1,000	500	18-in	10-in x 10-in (max height of 9-in)
HCC ¹	HCC-1	500	162	100	100	12-ft	24-in x 24-in

Notes:

1. High Capacity Centrifuge (HCC) was custom designed and built in-house. It is powered by a 200-hp electric motor.



U.S. Army Redstone Test Center



Field Test

Introduction

The Dynamic Test Division has several surfaces with various obstacles and terrain to which ground vehicle payloads may be subjected. The primary purpose of field testing at RTC is to characterize the dynamic environment of ground vehicle payloads such as electronics, weapon systems, and sensors.

Field testing is primarily conducted at the RTC Controlled Input Road Course (Test Area 7) and the Natural Terrain Road Course (NTRC), although additional surfaces are available at other locations on Redstone Arsenal. RTC has four specific missions in the area of field dynamics testing: (1) field-induced data acquisition, (2) laboratory vibration schedule development, (3) research and development support, and (4) Large Assembly Transport testing in accordance with MIL-STD-810.

Field testing frequently requires the use of instrumentation and data acquisition equipment for collecting data to measure dynamic environments. On-board signal conditioning equipment and transducers allow for collection of a large number of data channels for subsequent data analysis and development of laboratory vibration profiles.



RTC Controlled
Input Road Course
(Test Area 7)



Natural Terrain Road Course
(NTRC)

U.S. Army Redstone Test Center

Field Test Capabilities

Surface Descriptions and Lengths

Surface	Location	Type	Length
2-in Washboard	TA-7	Concrete, Serpentine, 2-in bumps, 2-ft apart	470-ft
Radial Washboard	TA-7	Concrete, Serpentine, 2 to 4-in bumps, 1 to 5-ft apart, Random	275-ft
6-in Washboard	TA-7	Concrete, Straight, 6-in bumps, 6-ft apart	400-ft
Belgian Block	TA-7	Granite Cobblestone	500-ft
Embedded Rock	TA-7	Granite Rock Embedded in Concrete	200-ft
Pothole Course	TA-7	Four (4) 12-in deep concrete, Can Vary Depth	75-ft
Variable Height Bump	TA-7	Steel, Varying Heights, 4-in to 12-in	100-ft
3-in Spaced Bumps	TA-7	Steel, 3-in bumps	120-ft
Paved Road	TA-7	Bituminous Concrete, 10-ft wide	2.2 mile loop
Improved Gravel	TA-7	Compacted Gravel, Straightway, 12-ft wide	5,000-ft
Cross Country	NTRC	Moderate Severity, Native Loam	1 mile loop



U.S. Army Redstone Test Center



Rail Impact

Introduction

The Department of Defense (DoD) requires Rail Impact Testing to determine the effect of normal railroad car impacts that occur during rail shipment, to verify the structural integrity of the materiel, and to evaluate the adequacy of the tie down system.

This testing is performed in accordance with MIL-STD-810 and is required by the Military Surface Deployment and Distribution Command (SDDC) to satisfy transportability certification requirements. The Dynamic Test Division of the U.S. Army Redstone Test Center has the unique capability to conduct rail impact testing on wide variety of hardware including vehicles, trailers, shelters, as well as hazardous materiel such as live missile/rocket systems. Testing can be conducted at temperature extremes (-65°F to +160°F).

Rail Impact Testing frequently requires the use of instrumentation and data acquisition equipment for collecting data to characterize the dynamic input to the test article during the shock events. On-board signal conditioning equipment and transducers allow for collection of a large number of data channels for subsequent data analysis.



U.S. Army Redstone Test Center



Vibro-Acoustic Test

Introduction

Vibro-acoustic testing is conducted to ensure a test article can structurally withstand the combined acoustic and vibratory loads on missile or aviation platforms during the service environment. The Dynamic Test Division of the U.S. Army Redstone Test Center (RTC) uses a combination of air modulators and speaker arrays to generate the acoustic environment. Testing may be conducted at temperature extremes (-85°F to +300°F) and remote operations allow for testing of hazardous material including live missile systems. The facility can be configured to perform pure acoustic, 6-DOF vibration, or combinations thereof. Extensive instrumentation is available for acquiring data during each event including high speed camera coverage.

Acoustics Chamber

The RTC reverberant acoustic chamber is a non-parallel wall design. The average dimensions are approximately 29'Lx25'Wx17'H yielding approximately 12,500 square feet of interior chamber volume. Maximum sound pressure levels approach 162 dB when employing servo-hydraulic modulators and 145 dB when employing speaker arrays.

6-DOF Excitation System

The integrated 6-DOF excitation system is a Team Cube Model 3 servo hydraulic system. This system is capable of addressing specimen mass of up to 1,000 pounds. The actuators are 2 in DA displacement, 14 klbF/linear DOF and the system is capable of ± 6 degrees of angular motion.

Test Services

The test services of the Redstone Test Center are available to both Government customers as well as private industry. RTC customers include all branches of the armed forces, other U.S. Gov't agencies (e.g., NASA), foreign countries, and private industry.

U.S. Army Redstone Test Center, Dynamic Test Division
7856 Patton Road, Redstone Arsenal, AL 35898 (256) 313-8045

U.S. Army Redstone Test Center

Automated Test Set Design & Development

RTC's workforce specializes in rapidly developing test instrumentation, set-ups and processes to support our customer's unique requirements. Customized automated test sets are required to provide testing of assets while in various extreme environments.

RTC's expertise in testing components such as missile seekers, guidance systems, and control systems as well as all up rounds can be traced back to the early days of Army tactical missiles. Customized missile and aviation test sets developed internally at RTC are used throughout a system's life-cycle and all over the world. RTC has a proven track record of providing affordable, in-depth data recording and visualization that provides our customers a real-time, independent look at system performance.

By providing expertise in testing, test equipment and in the systems tested, RTC maximizes our customers' return on funding.














CORE COMPETENCIES

- Test set design, fabrication, and support
- Custom cable fabrication
- Data collection and analysis in support of numerous missile and aviation systems

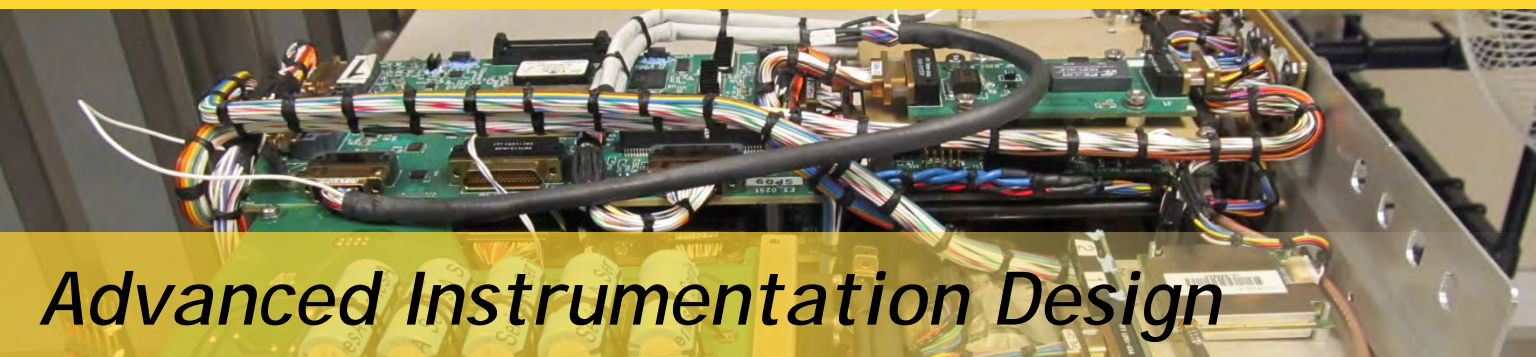
CAPABILITY HIGHLIGHT

RTC developed the Modernized HELLFIRE Universal Test Set to test all variants of all-up-round HELLFIRE missiles. MHUTS are used regularly at the HELLFIRE Production Facility; the Anniston Army Depot; on RTC Surveillance Test Vans; and at Climatic and Dynamic test facilities at RTC. MHUTS includes the ability to stimulate SAL and MMW seekers and is currently being adapted to support the upcoming dual-mode missile.

Test Sets

	 Production Plant	 Environmental Test Facility	 Test Lab	 Flight Range
HELLFIRE 	4	5	6	-
Javelin 	-	3	3	1
Stinger 	-	-	1	-
	 Surveillance	 Depot	 Marines	
HELLFIRE 	4	4	-	
Javelin 	2	-	2	
Stinger 	1	-	-	

U.S. Army Redstone Test Center



Advanced Instrumentation Design

RTC's customers continue to develop systems that are faster and generate larger amounts of data than ever before. As technology advances, so does the need for better ways to collect and analyze that data. Enter RTC's Advanced Instrumentation capability. When high speed, technically complex instrumentation is needed that isn't commercially available, RTC builds its own.

Advanced custom instrumentation from RTC has several advantages. First, as a government entity, RTC is able to provide in-government expertise regarding how each system works and performs. This provides an independent source for test data collection and analysis to RTC's customers. Additionally, RTC is able to rapidly and cost-effectively develop data emulators and collectors for use in a wide-variety of test applications. RTC Advanced Instrumentation specializes in what others say can't be done.

RTC has a proven track record of providing affordable, in-depth data recording, analysis, and visualization that provides our customers a real-time, independent look at system performance.

CORE COMPETENCIES

- Embedded and application software coding in LabVIEW, C, C++, C#
- Programmable Logic development in VHDL and Verilog
- Printed Circuit Board design, fabrication, and testing
- Custom cable fabrication
- Data collection and analysis in support of numerous missile and aviation systems
- Subject matter expertise in high speed digital and analog circuit design, as well as RF reception and transmission

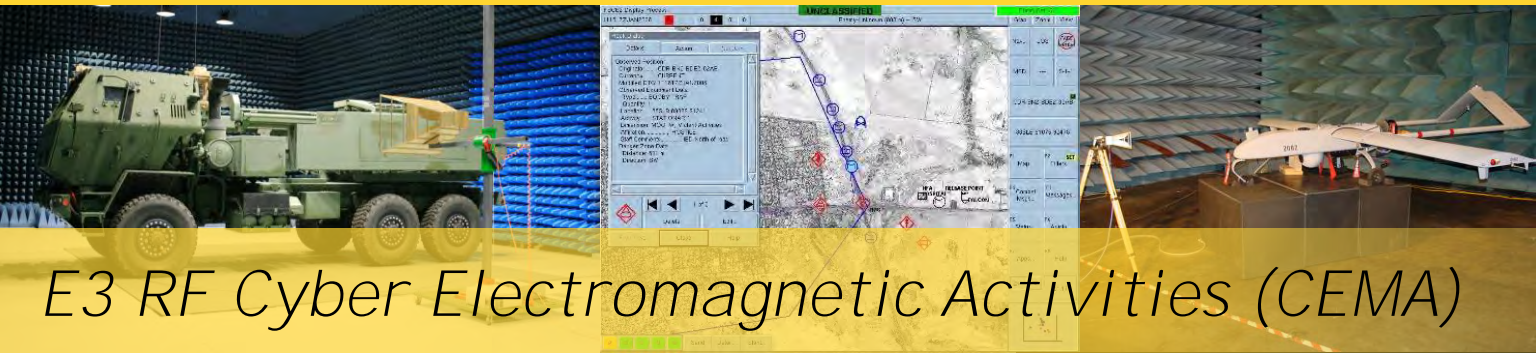
CAPABILITY HIGHLIGHT

RTC developed the Common Missile Warning System (CMWS) Instrumentation Data Recorder, or CIDR. This capability is used to provide PM-ASE a host of collection and analysis tools for data collected during aircraft survivability testing. CIDR has supported a variety of test events over several years. RTC's subject matter expertise in interfacing with CMWS has provided unsurpassed value to PM-ASE.

Custom Products

	Purpose	Customer	Years Active
CPIC	Missile Interface	JAMS	14
CIDR	Data Recorder	PM-ASE	7
RTE	Sensor Emulator	PM-ASE	5
ACE	Missile Interface	CCWS	3
MADR	Data Recorder	PM-ASE	2
AMDT	RF Analysis and Decoding	PM-Apache	5

U.S. Army Redstone Test Center



E3 RF Cyber Electromagnetic Activities (CEMA)

RTC's CEMA capability will serve a wide variety of test customers and commodity areas, specializing in missiles and aviation component, subsystem, and system-level testing. The facility will be a world-class RF Cyber Effects test chamber by providing an exact and immersive Electronic RF environment.

The important role of GPS Operational Environment: RTC's goal is to provide an operationally realistic environment for the testing of Cyber effects, specifically through the creation of a synthetic GPS setting. This capability will establish a standard between benchtop testing and live-fire missions by providing a RF controlled environment for the realistic testing of systems such as GPS Jamming, GPS Anti-Jam, Controlled Reception Pattern Antennas (CRPAs), Assured Position Navigation and Timing, malicious code/functionality, threat response, etc.

The important role of CEMA: This capability will establish a standard between benchtop testing and live-fire missions by providing a RF controlled environment for the realistic testing of GPS Jamming, GPS Anti-Jam, Controlled Reception Pattern Antennas (CRPAs), Assured Position Navigation and Timing, malicious code/functionality, threat response, etc.

CORE COMPETENCIES

GPS Environment Capability

Current:

- GPS Constellation Emulator with virtual timing/location
- Live Sky Re-Radiator for real GPS environment from within the chamber
- TSMO Validated Communication and GPS threat inventory
- Can test component level, ground vehicles, missile systems, UAVs, small helicopters inside chamber

Future:

- Realistic Operation Environment with Artificial GPS - Simulated Satellite Track to simulate the in-view orbit of satellites
- Artificial GPS, Live Sky GPS and SATCOM broadcast for RF Immersed chamber
- Simulate any location in the world
- Environmental Noise Emulator (TV, Communication (Comm), Radio)
- GPS/Comm Denial & TSMO Threat Inventory

FACILITY HIGHLIGHTS

Chamber Dimensions:

- 100dB Large Anechoic Chamber
- 66' (l)x36' (w)x20' (h) volume
- 18' turntable
- 12' (w)x15' (h) door

Data Connections:

- JMN, SDREN, SIPR connections
- Open Top-Secret storage
- Constructive Data Streaming

Operational Environment:

- Distributed GPS, Phased Array, Multi-Satellite, Angle of Arrival Emulator

Realistic Operational Environments



U.S. Army Redstone Test Center

Hardware-in-the-Loop Testing

RTC has a suite of Hardware-in-the-loop capabilities including three operational facilities that provide performance assessment and production acceptance testing of millimeter wave, IR and SAL missile seekers and all-up rounds.

These facilities are supported by subject-matter expertise in combining T&E with M&S to support simulation-based acquisition. The HWILs include: the Longbow Simulation Test and Acceptance Facility used to provide non-destructive test of all-up-round Longbow missiles for production and stockpile reliability; the Electro-Optical System Flight Evaluation Lab (EOSFEL), used to test seekers, control sections, command launch units and other components (adaptable to test semi-active laser seekers); and the Advanced Multispectral Simulation, Test and Acceptance Resource which provides a performance test bay for tri-mode seekers that utilize any combination of mid-wave IR, SAL and KA band millimeter wave-seeker technologies. HWIL capabilities also include ad-hoc and component test capabilities, such as FLIR HWIL and dynamic fin loading.

CORE COMPETENCIES

EOSFEL

- Component and system-level testing
- Can include climatic effects
- Repeatable testing across entire system performance envelope
- Cost-effective characterization of tactical hardware and software at all stages of the acquisition cycle





STAF

- Can immerse the Longbow missile in a virtual world
- Real-time millimeter wave (MMW) scene generation and projection system
- 3-axis flight table to simulate roll, pitch, and yaw of the round
- A specialized test interface is used to inject capabilities that are not simulated such as accelerations and fin responses

CAPABILITY HIGHLIGHT

EOSFEL quickly developed an entire closed-loop simulation for the TOW AN/TAS night sight allowing a private industry customer a validation tool prior to LFT&E.



 Year Opened	1997	1997
 Current Missiles per Year	22	500
 Total Missiles Tested	230	2800
 Simulated Flight Tests	46,000+	11,200+

U.S. Army Redstone Test Center



Joint Test Management Office

The Joint Test Management Office (JTMO) is a venture between ECTD and MSTD to promote common program management processes across the directorates. The JTMO directs Test Coordinators, Test Directors, and Program Integrators who manage cost, schedule, and performance for programs led by either ECTD or MSTD. The JTMO also includes the respective Document Quality Teams who review and edit all Test Plans and Reports prior to release. The “joint” nature of the office enables the management of programs involving multiple divisions across both directorates. *The JTMO promotes smooth execution of test programs, ensures RTC’s customers receive a quality product, maintains RTC’s high standards in meeting ATEC metrics, and provides essential and timely information to leadership on program and financial status across the two directorates.*

Test Directors (Government) and Program Integrators (Contract)

- Maintain communication among those involved in the test program
- Ensure accurate and detailed test planning
- Coordinate schedules, resources, and test assets across multiple divisions
- Track status to plan of programs provided
- Alert the test team to changes in program status and assist in corrective actions

Test Coordinators (Contract)

- Maintain and manage projects within the ATEC and RTC test management tool sets
 - ATEC Decision Support System (ADSS)
 - Program Management Module (PMM)
 - RTC Cost Estimating Tool (CET)
 - PRO3
- Draft the RTC Project Proposals and DD1144 forms
- Coordinate and monitor funding requests, acceptance, allocations, and expenditures
- Assist in corrective actions
- A specialized Ammunition Coordinator assists Test Engineers and Test Coordinators with disposition and disposal planning for Class 5 Ammunition brought in for test events, and, in a support role, provides Aging Asset information to the RTC S4.
- The ECTD JTMO employs specialized Division Test Coordinators residing within each division who manage programs assigned but also track the financial health of the division through monitoring overhead expenditures and execution versus expenses on customer funded programs.

U.S. Army Redstone Test Center



Material Analysis Testing



CORE TEST COMPETENCIES

- Optical extensometers
- Meso-scale tensile testing
- 750J Charpy Impact Tester
- 1800J Drop Tower Tester
- Thermogravimetric analysis with infrared
- Differential Scanning Calorimetry
- Dynamic Mechanical Analysis
- 56 kip fatigue testing system good for -130 degrees C to 1500 degrees C
- Scanning Electron Microscopy
- Chemical Composition Analysis
- Tensile/Torsional Testing
- Residual Stress Analysis
- Grease and Oil Analysis
- Hardness Testing
- Sample Preparation
- Optical Microscopy
- Metallography
- Coating Removal

The RTC Material Analysis Laboratory analyzes materials of U.S. Army aviation and missile system components in order to ensure the samples have the correct material properties for a given application. This capability supports a variety of test efforts and investigations related to material failures or deficiencies.

The RTC Material Analysis Laboratory utilizes equipment such as high-magnification Scanning Electron Microscopes, destructive and nondestructive Spectrometers for chemical composition analysis, tensile and torsional test systems, x-ray analysis for residual stress measurements, micro-hardness and macro-hardness testers, coating removal system and optical microscopes for fracture and grain analysis. The RTC Material Analysis Laboratory supports test programs such as Aviation Product Quality Deficiency Reporting, Aviation Component Structural Testing, Condition Based Maintenance, Production Lot Testing, Repair Parts and Engineering Investigations.



CAPABILITY HIGHLIGHT

Scanning Electron
Microscope



High-Magnification Imagery and
Chemical-Composition Analysis



Test Programs & Number of Tests Performed*

Product Quality
Deficiency Reporting
PQDR
114

Aviation Component
Structural Testing
ACST
8

Repair Parts

Defense Logistics
Agency
DLA
8

AMCOM Logistics
Center
ALC
6

Production Lot
Testing
PLT
29

Engineering
Investigations
EI
4

* Number of tests performed over 4 quarters

U.S. Army Redstone Test Center



Missile Modification

RTC's Missile Modification capabilities include the primary services of disassembly and modification as well as several other services, all of which are contained below and to the right.

- Modifications are performed: 1) on currently fielded items (missiles), for experimental/developmental testing for possible future upgrades, 2) on currently fielded items being reconfigured for subsequent theater use, and 3) on Foreign Items for testing at various locations.
- Disassembly is performed: 1) for Stockpile Reliability Programs (SRP) down to the sub-component level and 2) on Foreign Items for testing at other facilities.
- Develop and/or aid in the development of assembly/disassembly procedures for new configurations of older items (ordnance).
- Inert Certifications are performed on ordnance whose explosives have been removed.

CORE COMPETENCIES

Munitions and Ordnance Testing

- Ordnance Modification
- Disassembly/Assembly of Ordnance
- Prototype Missile Assembly
- Missile Telemetry Kit Installation
- Missile Modifications
- Component Removal and Replacement
- Explosive Prototype Development
- Foreign Item Testing

FACILITY HIGHLIGHTS

Bldg. 7290 on Climatic Test Campus:

- Four (4) Missile Mod Bays
- Co-located with High & Low Energy X-ray & Hazardous Metrology

Bldg. 7625 on TA-10:

- Four (4) Missile Mod Bays plus seven (7) other support Bays
- Co-located with Low Energy X-ray, Hazardous Metrology, & near MHUTS operation
- A large paint booth
- "Secret Open Storage" (IDS)

Photos of Representative Services & Test Items



Stinger Disassembly to Component Level for SRP



TOW 2B Warhead being Modified to Inert Warhead



GMLRS Rockets awaiting Disassembly for Testing



HELLFIRE Basic Warhead Modification

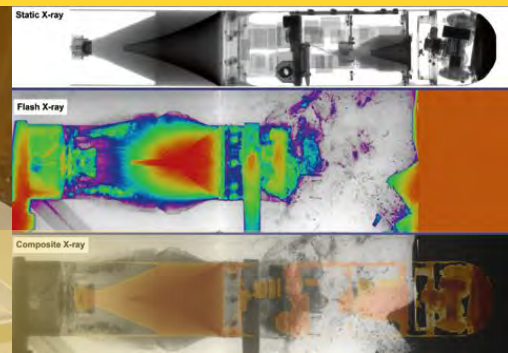


Longbow Painting & Stenciling after Modification



JAGM Final Paint with Roll Pattern

U.S. Army Redstone Test Center



Non-Destructive Test (NDT)

RTC's Non-Destructive Test (NDT) capability serves a wide variety of test customers and commodity areas, specializing in missiles and aviation component, subsystem, and system-level testing. Facilities include those designed both for explosive and non-explosive test items.

The important role of X-ray Inspections: RTC's customers require that X-ray inspections be performed "prior to a test" to establish the initial condition of the article and to verify that the item is safe to test. They also require "post testing" to determine the effect of the test and whether it is safe to continue on in a series of tests on that same item. Periodic inspections are also conducted to determine the effects of aging and therefore fitness to return to service or storage.

The important role of Metrology Services: These services provide the "mass property and dimensional measurements" required to predict and evaluate flight hardware performance.

CORE COMPETENCIES

Non-Destructive Test (NDT) Capabilities

X-ray Labs:

- High Energy: Have 2 systems that range from 2 to 9 MeV. Can support both film & CR.
- Low Energy: Have 8 systems that range from 160 kV to 600 kV. Support film, CR, & DR.
- 3-D Computed Tomography (CT & DR)
- Portable X-ray Systems: 3 systems (300kV)

Metrology Lab:

- Full Metrology (Weight, CG, & Moments)
- CMM (2m X 4m X 1.5m)
- Dynamic Spin Balance

Surface & Visual Inspections:

- Liquid Dye Penetrant
- Magnetic Particle Examination
- Borescope Inspection

Flash X-ray:

- Flash X-Ray and Detonation Velocity
- Warhead Jet Characterization

FACILITY HIGHLIGHTS

Support X-ray Inspections:

- 7290: 1 HE & 2 LE X-ray Bays
- 7292: 2 LE X-ray Bays
- 7345 at TA10: W. Bay for HE or LE & E. Bay for LE

Support Hazardous

Metrology:

- 7290: 2 Bays
- 7625 at TA-10: 1 Dedicated Bay plus 6 other support Bays
- 7345 at TA-10: E. Bay

Support Surface & Visual Inspections:

- 7290, 7292, 7625, &/or 7345

Photos of Representative Services & Test Items



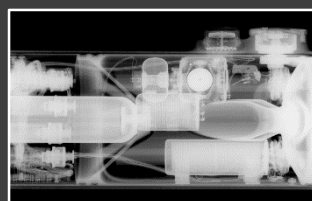
5-9 MeV Linear Accelerator X-ray System (Film or CR)



3-D Computed Tomography (CT) & DR X-ray System



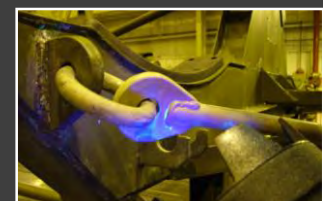
CT Image of TOW 2A Warhead



TOW Missile Gyro Section Digital X-ray Image



Coordinate Measuring Machine (CMM)



Dye Penetrant Inspection

U.S. Army Redstone Test Center



Surveillance Testing

RTC conducts surveillance testing on Army and Foreign Military Sales throughout the world on major weapons systems to identify deterioration of components and to gather data to predict remaining shelf life and reliability.

Evaluation includes long-term storage effects for HELLFIRE, Longbow, Javelin, and Stinger missiles. World-wide surveillance testing is accomplished by subject matter experts with state-of-the-art mobile test vehicles. Engineers working with these systems provide evaluations; non-destructive functional testing; and electrical, mechanical, optical, and physical inspections. Surveillance testing increases readiness and war-fighting capability, and local commanders benefit by receiving current status on weapons and storage conditions.

CORE COMPETENCIES

- Missile Surveillance Testing
- State-of-the-Art Vehicles for World Wide Test Capability
- Safely test live tactical hardware
- Evaluation of long-term storage effects
- Non-Destructive Functional Testing
- Electrical/Mechanical/Optical /Physical Inspection

CAPABILITY HIGHLIGHT

- System safety, reliability, and shelf life of fielded missile hardware is determined from parametric test data results.
- Testing identifies and purges unserviceable hardware from inventory.



Missile Surveillance Test Vans



4

HELLFIRE



2

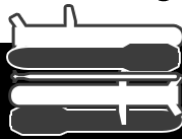
Javelin



1

Stinger

Typical Annual Activity



2,581

Missiles Tested



17,150

Miles Driven



12,050

Miles Flown

U.S. Army Redstone Test Center

Insensitive Munitions Testing

Insensitive Munitions Testing at RTC is conducted (IAW MIL-STD-2105) at Test Area 4.

Our engineers and technicians obtain data for hazards classification and safety assessments of rocket motors and explosive components.

Insensitive munition testing includes multiple caliber bullet impact testing, fragment impact, live munitions drop testing, slow and fast cook-off tests, warhead arena tests, sympathetic detonation, shaped charge jet and spall impact, and vulnerability and survivability tests.

Five test pads are remotely located in the test area supported by an equipped blockhouse with high-speed digital control and data acquisition systems. Test pads are configured to ensure maximum safety for tests.

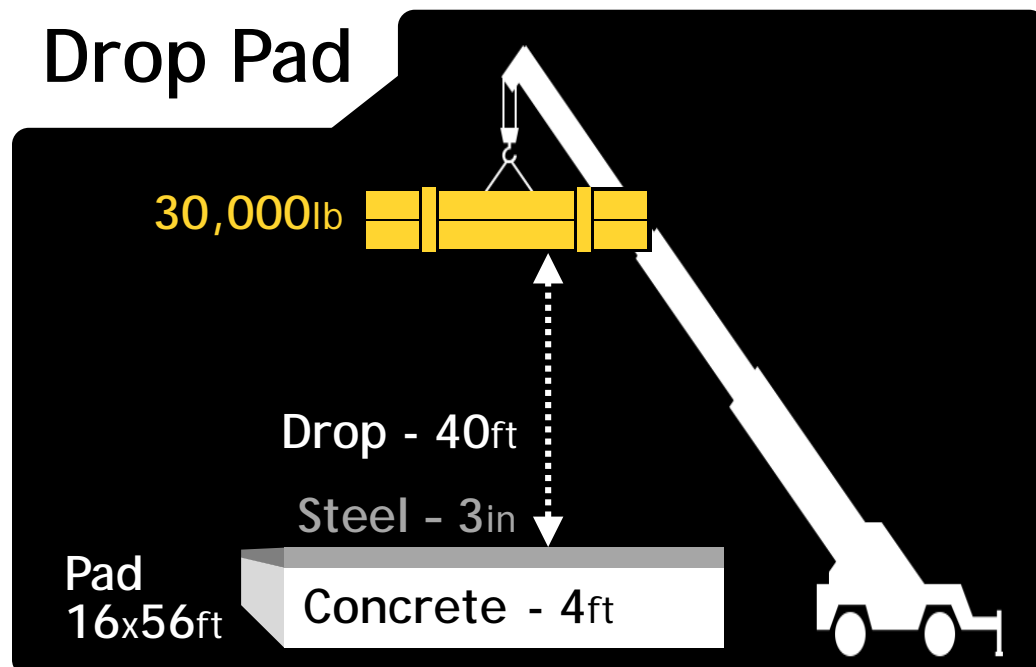
CORE COMPETENCIES

- Slow Cook Off Testing
- Fast Cook Off Testing
- Bullet Impact Testing
- Fragment Impact Testing
- Shaped Charge Impact Testing
- Sympathetic Detonation (confined and unconfined)
- 40ft Drop Tests
- Arena Testing
- All other Hazard Classification and Inensitive Munitions (IM) testing

CAPABILITY HIGHLIGHT

Fast Cook Off - TA4 has the largest permanent fast cook off pan in the Department of Defense. The pan is 50ft x 70ft and encompassed by a concrete retaining wall that allows us to surround the pan by water to keep it cool during testing which allows it to be reused. Currently we have conducted tests with up to 30,000 gallons of JP8.

Drop Pad



Drawing not to scale

U.S. Army Redstone Test Center



Laboratory Sensor Testing

RTC provides laboratory sensor test and evaluation capabilities with subject-matter expertise on assemblies, subassemblies, and components of Electro-Optic/Infrared systems, such as Forward-looking Infrared, Direct-view Optics; hyperspectral sensors; laser designators, pointers, and rangefinders; acoustic sensors, and radar components for the U.S. Army and other customers within and external to the DoD.

Sensor test capabilities include instrumented data acquisition, laser scoring, image analysis, and radar/antenna measurement systems. Other Lab capabilities exist for acoustic, seismic, thermal night vision sight test, and missile-seeker systems. Specific sensor lab testing includes EO/IR sensor characterization (Minimum Resolvable Delta Temperature, Noise Equivalent Delta Temperature, Modulation Transfer Function, field of view, resolution, noise, boresight, target location error, and other parameters); laser beam parameter characterization (pulse energy, pulse width, PRF code, pulse-to-pulse time stability, missing pulses, beam divergence, boresight error); testing of FLIR, DVO & Day TV, laser, biometric, and hyperspectral sensor systems and subsystems at temperature extremes; calculations of probabilities of detection, recognition, & identification from lab or field data; interoperability testing; precision focusing, distortion mapping, non-uniformity measurement and correction; seeker/radiometer calibration; and target paint reflectivity measurements all in conjunction with extensive modeling and simulation tools.

CORE COMPETENCIES









- Leader in sensor lab testing methodologies
- Target acquisition sensor measurements (boresight, MRTD, NEDT, MTF)
- Expertise with FLIR, DVO & Day TV and LRF systems
- Laser beam characterizations
- Seeker/radiometer calibration, image processing, target paint reflectivity measurements
- Non-Uniformity Correction of IR sensors, Large Format Resistive Arrays scene projectors arrays & projector systems

CAPABILITY HIGHLIGHT

LASER Test Capabilities

- Power/Pulse Energy
- Wavelength
- Pulse Duration and Response Rate
- Laser Beam Profiles
- Near Field or Far Field Beam Divergence
- Probability of hit (P_H) - Use lab and field data Laser Designator Weapon System Simulation (LDWSS) model to determine P_H

Test Labs

 Electro Optical/ Infrared (x2)	 LASER Lab	 Visible Sensor	 Hyperspectral Sensor
 Mobile IR Scene Projector	 RADAR Near Field Ranges (x2)	 Acoustic Chamber & Speakers	 Non-Uniformity Correction

U.S. Army Redstone Test Center



Material Analysis Testing

The RTC Material Analysis Laboratory analyzes materials of U.S. Army aviation and missile system components in order to ensure the samples have the correct material properties for a given application. This capability supports a variety of test efforts and investigations related to material failures or deficiencies.

The RTC Material Analysis Laboratory utilizes equipment such as high-magnification Scanning Electron Microscopes, destructive and nondestructive Spectrometers for chemical composition analysis, tensile and torsional test systems, x-ray analysis for residual stress measurements, micro-hardness and macro-hardness testers, coating removal system and optical microscopes for fracture and grain analysis. The RTC Material Analysis Laboratory supports test programs such as Aviation Product Quality Deficiency Reporting, Aviation Component Structural Testing, Condition Based Maintenance, Production Lot Testing, Repair Parts and Engineering Investigations.

CORE TEST COMPETENCIES

- Scanning Electron Microscopy
- Chemical Composition Analysis
- Tensile/Torsional Testing
- Residual Stress Analysis
- Grease and Oil Analysis
- Hardness Testing
- Sample Preparation
- Optical Microscopy
- Metallography
- Coating Removal

CAPABILITY HIGHLIGHT

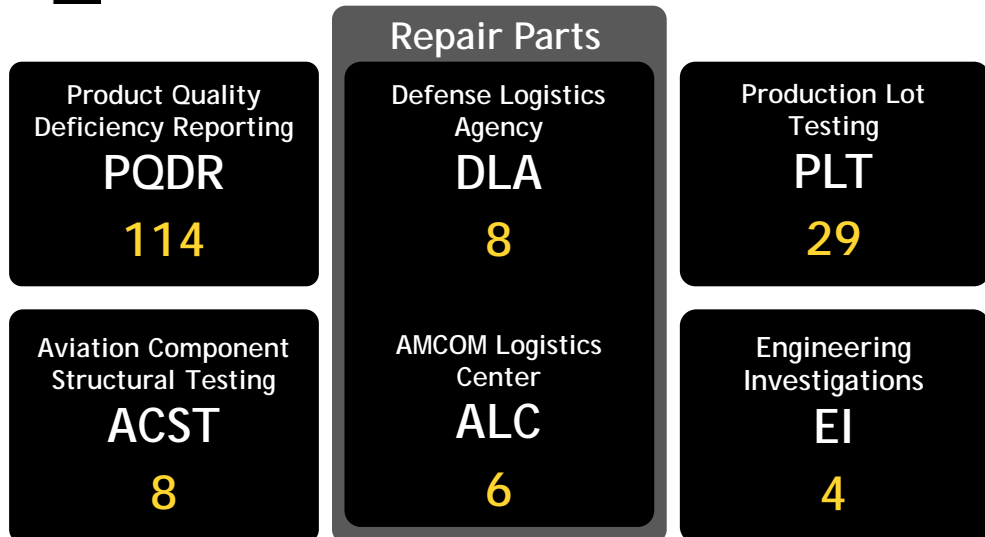
Scanning Electron
Microscope



High-Magnification Imagery and
Chemical-Composition Analysis



Test Programs & Number of Tests Performed*



* Number of tests performed over 4 quarters

U.S. Army Redstone Test Center

Missile Telemetry

RTC engineers and technicians design, build, test and support custom telemetry systems for a multitude of research and development and fielded Department of Defense weapon systems. Specialized requirements are compiled in order to design and deliver a custom solution to meet every customer's unique needs.

After the system design phase, RTC manufactures and tests the systems using a rigorous assembly and test process to ensure functionality and quality.

RTC's mission isn't complete, however. Once built and tested, RTC installs the telemetry package into the host system and supports data collection during functional and flight tests using state-of-the-art fixed and mobile-ground station facilities locally or at remote destinations.

RTC engineers serve as subject matter experts for the Army and DOD in weapon-system telemetry and flight-termination hardware and applications and serve as technical liaisons between customer, testing activity, and data evaluators.

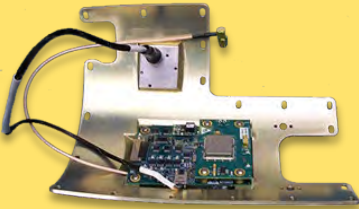
Missile Telemetry capabilities include dedicated design, test, and production labs, automated test capabilities, data simulation, high dynamic GPS integration, flight termination, and a complete processed data package formatted for compatibility with customer evaluation toolset.

CORE COMPETENCIES

- Telemetry System Design & Development
 - Custom Designs
 - Electronics and Mechanical Host Interfacing
 - Custom Firmware and Software
 - Telemetry Frame
 - Technical Data Package
- Telemetry System Production
- Telemetry System Support
 - State of the Art Fixed and Mobile Telemetry Ground Stations

CAPABILITY HIGHLIGHTS

Custom Telemetry Design



Mobile Telemetry Ground Station



Last 5 Years



800+

Telemetry Flights



20+

Flight Termination Systems



700+

Missile Flights



50,000

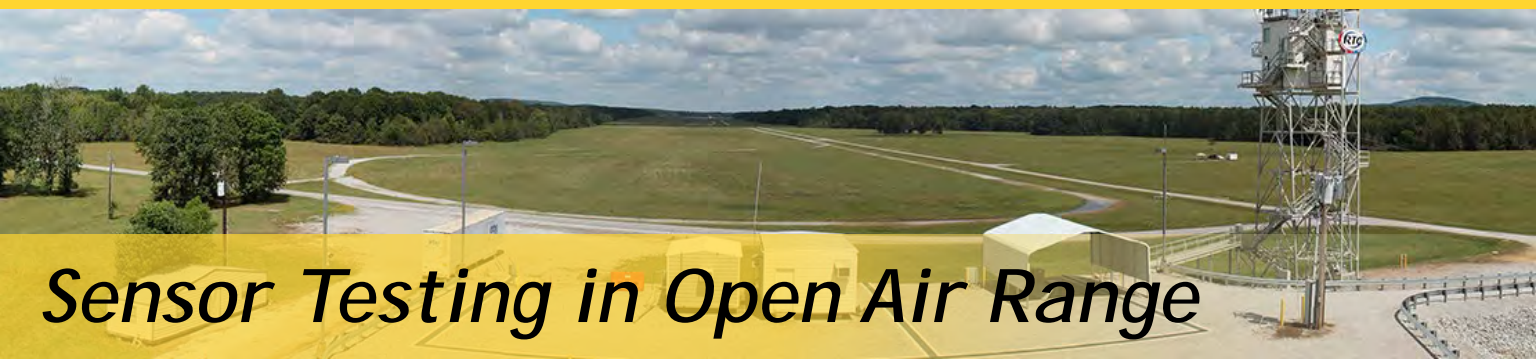
Lines of VHDL Code



20Mb/s

Data Rate

U.S. Army Redstone Test Center



Sensor Testing in Open Air Range

RTC provides testing for sensors on Redstone Arsenal open air ranges and with safari test capabilities worldwide. Primary test mission areas include ground and airborne testing of seeker and sensor systems in an open air field environment.

RTC performs Sensor and Seeker field tests in the following areas:

- Captive-Carry Testing using the Stabilized Electro-Optical Airborne Instrumentation Platform (SEAIP)
- Ground based sensor testing
- Spectral characterization of targets and environments
- Testing of detection, acquisition and recognition systems
- GPS tracking test support with the Low-Cost, All-purpose, Instrumentation Tracking System (LOCAITS)
- Ground and aerial target support

Test Area 3 at Redstone Arsenal provides an open air instrumented range environment that serves as the primary range for field sensor test operations. The range encompasses more than 2,000 acres, with elevated pads ranging in height. Test Area 6 offers integration facilities and limited fabrication and machining capabilities. The Hatton Mountain Sensor Test Facility provides a 8.7 Km line-of-sight to the end of Test Area 3. RTC has an inventory of over 15 types of obscurants & countermeasures that are available for field sensor and seeker testing, signature measurement, etc.

CORE COMPETENCIES

- Primary Operations Center for TMO tactical vehicle testing
- 30+ Years Field testing sensor systems
- Execute field testing of cutting edge technologies for all DOD efforts
- Quality testing environment for DOD and non-DOD customers
- Excellence in providing air/ground obscurant testing
- Premiere range site for flare effectiveness testing
- Full Scale FOB Outdoor Entry Control Point facility for testing






CAPABILITY HIGHLIGHT

Field Signature Capabilities

- Infrared Signatures
- Thermal Contrast (ΔT)
- Spectral Radiometry
- Reflectance
- Laser Tracking/Scoring
- Field Calibration
- Ancillary Data







SEAIP



 POINTING ACCURACY 35 μ rad	 PAYLOAD 80lbs	 AIRSPEED 180mph
 FIELD OF REGARD +/-130° AZ; +65°/-115° EL	 OPERATING RANGE -40° C to +70° C	

LOCAITS



 TIME ACCURACY 20ns	 VELOCITY 0.03m/s	 POSITION 2cm CEP
 TRANSMIT DATA RATE 20Hz	 ON-BOARD COLLECTION RATE 200Hz	 ATTITUDE 0.07°

U.S. Army Redstone Test Center

Warhead System Testing

Warhead System Testing at RTC evaluates lethality and performance using both dynamic and static test techniques. Two monorail rocket sled tracks of 1,000 ft and 2,000 ft are used to conduct dynamic warhead system tests against a wide array of armor or masonry targets of various construction as well as range and custom-built, special-purpose targets.

Static testing includes penetration tests against rolled homogenous armor plates and arena tests to evaluate fragment velocity & dispersion properties. Additional specialized test equipment and facilities include an 8-in Air Gun delivery system and Supersonic Rocket-on-a-Rope for warhead assessments. Each of these capabilities provides a controlled and repeatable delivery method at known angles-of-attack and accelerations/velocities. All testing is supported by state-of-the-art instrumentation including high-speed digital imagery, flash radiography, and digital instrumentation.

CORE COMPETENCIES

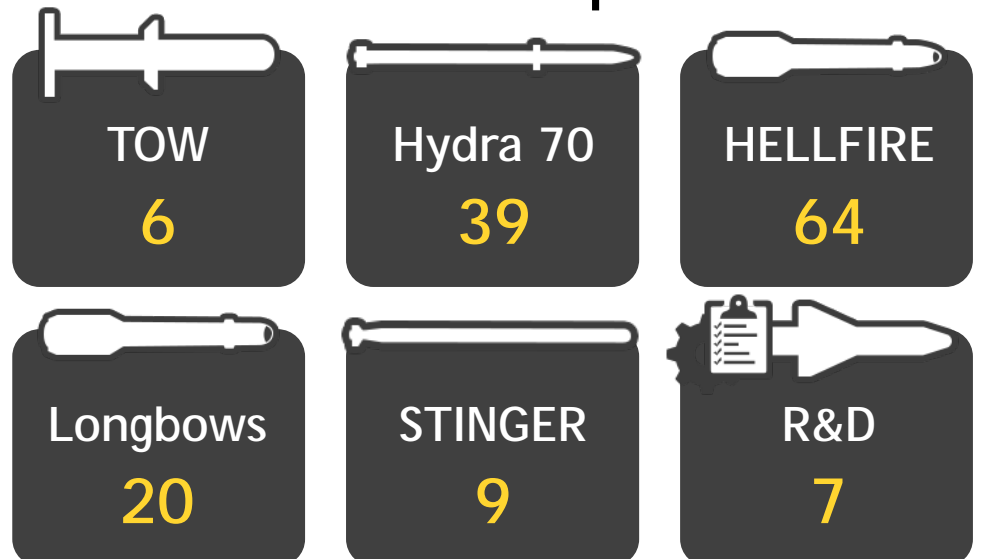
- Warhead Lethality & Performance via Dynamic Monorail Sled Tracks
- Static Warhead Penetration
- Static Warhead Arena Testing
- Air Gun Warhead Effects
- Supersonic Rocket-on-a-Rope for S&A/Fuze and Sensor Testing
- Reverse Ballistics Testing
- Behind Armor Debris Tests
- Advanced Instrumentation Design & Development
- High Speed Videography
- Custom Targets to Include Brick, Masonry, & Adobe Target Walls and RHA Armor Plates
- Meteorological Data & Forecasting

CAPABILITY HIGHLIGHT

Rocket-on-a-rope

A new capability available at the RTC is the implementation of a controlled-trajectory delivery method utilizing high-strength dual ropes and air-breathing, mini turbo-jet engines. This new delivery capability can propel a 50-lb payload at controlled speeds up to 100 m/sec along a range of up to 600 m. The system can be used to effectively evaluate warhead components and sensors.

Warhead Tests per Year



MAILING ADDRESS

U.S. Army Redstone Test Center
Building 4500, Martin Road
Redstone Arsenal, AL 35898

WEBSITE

rtc.army.mil

EMAIL

rtc.contactus@mail.mil

Email Response Policy:

Our policy is to respond to emailed questions or requests within two working days. If it will take us longer to give you a complete response, we'll email you within those two days with an estimated date for the complete response.

PHONE

(256) 876-3552

U.S. Army Redstone Test Center
Redstone Arsenal
Huntsville, Alabama



[/RTCUSA](https://www.facebook.com/RTCUSA)



[/RedstoneTestCenter1](https://www.youtube.com/RedstoneTestCenter1)