Tactical Missile Signatures collaboration between AEDC and MSIC began in 1998. This sharing of capabilities minimizes cost while efficiently managing a diverse skills pool with decades of missile experience.

⭐ Located on Arnold AFB, TN, AEDC facilities offer the most advanced and largest complex of flight simulation test facilities in the world; including 58 aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells, space environmental chambers, arc heaters, ballistic ranges, and other specialized units, including the Missile Signature Archive. Twenty-seven test units have capabilities unmatched elsewhere in the U.S. Facilities can simulate flight conditions from subsonic velocities to Mach 20.

⭐ MSIC is located in Huntsville, AL, at the heart of Army missile research and development programs. It provides current and comprehensive scientific and technical intelligence to U.S. decision makers, weapon system developers, and military field commanders worldwide.

Sensor Testing
War-Fighter Training
Threat Fly-Out Scenarios
Altitude
THREAT MATRIX
Aspect Angle
Mach No.
Signature
Modeling

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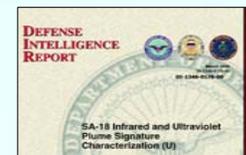# Tactical Missile Signatures

Arnold Engineering Development Center
&
Missile and Space Intelligence Center

Arnold Engineering Development Center (AEDC)

Advanced Missile Signature Center (AMSC)

Missile and Space Intelligence Center (MSIC)

Successfully performing diagnostics and target signature collections since the 1960s, AEDC provides:

Providing data management services and plume subject matter expertise to DoD since 1989. Capabilities include:

Established as part of the U.S. Army Ballistic Missile Agency in 1956, MSIC has been a Defense Intelligence Agency production activity since 1992

Engineering units measurements of ultraviolet/visible/infrared signatures of test articles in sled, static, wind tunnel and free-flight environments

Radiometric data analysis tools and software development

National Institute of Standards and Technology (NIST)-traceable radiometric calibration services

Intrusive and nonintrusive flow-field diagnostics

Electro-optic infrared (EO-IR) instrumentation and diagnostic system development

Available Instrumentation includes:

• **Imagers**
• **Radiometers**
• **Spectrometers**
• **Meteorological**
• **Trackers**

4 TBytes digital database of EO-IR spatial, spectral, and temporal tactical missile signatures

Analysis expertise in image processing, atmospheric effects, plume radiation, and flow fields

Modeling and simulation expertise using government standard codes for missile body and plumes, anchored to measured data

Common software tools developed for use with multi-spectral source data

Film/Video/Multi-media digitizing and processing

Online access to unclassified archive by registered users

Statistical analysis of sputtering intensity levels in motors for incorporation into modeling codes

Digital hyperspectral Enhanced Missile Signature (E-MSIG) database formed from modified Joint Army, Navy, NASA, and Air Force (JANNAF) modeling codes and measured full spectrum signatures

AEDC-MSIC ALLIANCE

Flow-field predictions of missile propulsion systems and exhaust plumes

Model extrapolation of missile signatures to other regimes and threats

Development of code extraction tools

Algorithm development for false alarm testing, hardware-in-the-loop (HWIL) modeling, and missile warning sensor validation

Adding temporal variation to modeled images to reflect eject, ignition, boost, and sustain events, and sputtering.

Merging hard body and plume signatures in models

Developing software to convert plume signature codes into hyperspectral output for fast extraction by HWIL models

Rapid Deployment Team exploits DoD tests to improve the empirical target database by coordinating member data collectors using common EO-IR instruments, with standard data structures and processes