



MILITARY VEHICLE DEVELOPMENT TESTING & ENGINEERING

Over 40 Years of Military Vehicle Development from the M-1 and the LAV to the HMMWV, MTRV and LVSR, NATC knows Military Vehicle Systems & Requirements

NATC PROVIDES ONE-STOP SOLUTIONS

- Test and Validation
- Evaluation
- Systems Integration
- Certification
- Prototype Fabrication
- Design
- Early Operational Assessment
- Technology Insertion
- Virtual Duty Cycles / Virtual Proving Ground
- Operational Mission Simulation Scenarios



Certified Simulators of Military Courses at:

- U.S. Army Aberdeen Test Center, MD
- U.S. Army Yuma Proving Ground, AZ
- MCAGCC Twentynine Palms, CA



NATC TESTS TO WORLDWIDE STANDARDS

- SAE
- ASTM
- FCC
- MIL-STD
- STANAG
- DOT
- EC / ECE
- ISO
- FMVSS

More than 3,000 miles of measured test courses, and access to nearly one million acres ranging from 10,000 ft. mountain passes to live sand dunes, NATC can test and validate vehicle systems for operation virtually anywhere in the world.

FACILITY ASSETS

- Test Courses – 3k Mi. of Paved / Unpaved
- 3 Full-size Environmental Chambers
- Fungus, Conditioning, Corrosion Chambers
- EMC / EMI Chamber
- Tilt Table – 800 sf., 350,000 lb. Capacity
- Skid Pads – SN 25 to 85 (wet to dry)
- Rail Impact / Transportability Facility
- Repair, Fabrication, and Mechanical Facilities
- Instrumentation and Data Acquisition Labs
- Small-wheeled Vehicle / Motorcycle Dyno
- Photo and Video Lab



MILITARY SYSTEMS TEST AND ENGINEERING

- RAM-D Evaluations
- Altitude
- Threat Assessment
- Ride Quality
- Swimming / Fording
- Rail Impact
- Vehicle Survivability
- Stability
- Battlefield Simulators
- EMC / EMI
- Braking Performance
- Man Rating
- Full Load Cooling
- Weapons Firing
- Vehicle Development
- Environmental
- Thermal Signature
- NRMM Predictions
- Acoustic Signature
- Safety Certification
- Armor Effectiveness
- Explosives Arenas
- Vehicle Mobility (0.7 CI)
- Human Factors Engineering
- Weapons Effectiveness
- Rail Impact / Transportability
- Safety Assessment and Release
- Life Cycle Cost Estimates
- Operations and Maintenance Cost Impact Of Component Improvements
- Electronic TIR Download
- Mission Based Spare Use Prediction
- Fix Forward System Development
- Vehicle Health Monitoring
- Performance Specification Development
- Corrective Action Report Engineering Review

VEHICLE DYNAMICS - Development and Validation

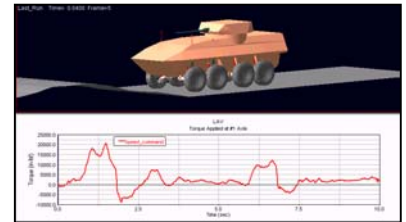
- First Article Testing
- Durability
- Ride Characteristics
- Vibration
- Handling Characteristics
- Braking
- Suspension Design
- Cornering
- Fuel Economy
- HVAC
- Noise / Acoustic
- BSR / NVH
- World Wide Duty Cycle
- Durability
- Technology Integration
- FMVSS
- Trailer Tow Interface
- Coast Down
- Full Load Cooling
- End Limit Handling
- Tire / Vehicle / Road Interaction
- Accelerated Corrosion Tests



TIRE TESTING - Globally recognized expertise in tire testing:

- Driving Traction / Drawbar
- Rolling Resistance
- Soft Soil Mobility
- Battlefield Live Fire
- Battlefield Debris
- CTIS Compatibility
- Run-flat Compatibility
- Beadlock Performance
- Treadwear and Durability
- Mechanical Reliability
- SAE J2014
- Evaluation
- Retreadability
- Repairability
- Thermal Profile
- Mountability

ENGINEERING SERVICES



- CAE / CAD
- Structural Analysis
- Fatigue Analysis
- FMEA / FEA
- Model Validation
- Failure Analysis
- I-DEAS / CATIA
- MATLAB / ADAMS
- OrCAD Schematics
- Test Plan Development
- Pavement / Asphalt Studies
- Accident Reconstruction
- Shaker Drive File Development
- Prototype Design and Redesign
- Non Destructive Inspection (including X-ray)
- Virtual Proving Ground Environment
- Instrumentation and Sensor Development
- Data Analysis / Training

TEST COURSES AND FACILITIES

A unique variety of soil types and terrain configurations are used to establish both traditional test courses and road simulators representative of conditions worldwide.



- WesTrack – 1.8 mi. banked oval track
- Reference ride quality courses
- Shock / vibration courses
- Prepared slopes up to 60 percent longitudinal, 40 percent lateral
- Shallow / deep fording, swimming areas
- Smooth to severe cross-country, battlefield simulators
- Sand and soft soil mobility areas
- Traction soil bins
- Dedicated mission scenario vehicle performance and handling events
- Hybrid electric vehicle test support

ACCELERATED LIFE CYCLE TESTING

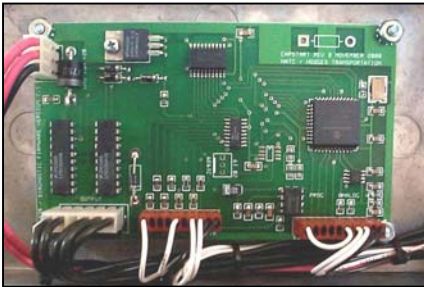
Accelerated life cycle evaluations to worldwide operational environments at a single location. Reduces vehicle development risk, provides certified real-world testing. Simulate the complete mission profile of a vehicle in as little as twelve weeks.

POWERTRAIN DEVELOPMENT AND TESTING

- Electronic engine integration
- Cold start optimization
- Cooling analysis
- Small-wheeled vehicle / motorcycle and 500 hp chassis dynamometers
- Environmental extremes

ADVANCED CAPABILITIES AND CONCEPTS

Our technical staff provides engineering and design support for concept development and helps integrate new systems into existing vehicles.



- Integration of Commercial "Off the Shelf" systems to meet tactical missions
- Interoperability – Knowledge of all vehicle systems
- Transportability
- Manual Validation
- Rapid Prototyping
- Early Operational Assessment
- Reliability Growth
- Modification Workorder / MI development and Implementation
- IETMS
- Mass Properties
- Alternate Fuels Technology / Electric / Hybrid-Electric
- Direct and Indirect Field of View
- Anti-lock Braking Systems
- Traction Control Systems
- Electronic Braking Systems
- Electronic Stability Control Systems
- Central Tire Inflation Systems
- Active and Semi Active Suspension Systems
- Autonomous Vehicle Control
- Thermal Imaging / Thermal Profiling
- System Interface Among:
 - Electronic Engine Controls
 - Electronic Transmission Controls
 - Automatic Transmission Retarders
 - Engine Exhaust Brakes
 - ABS / TCS Controls
- On-Board Diagnostic System / J1939 / Prototype Systems
- Global Positioning Systems / Integration

- Test Incident Reporting through Direct Download

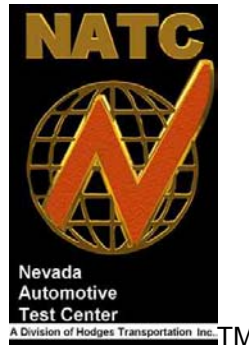
DEDICATED WINTER TEST AND VEHICLE DYNAMICS AREA

97-acre dedicated winter test facility in West Yellowstone, MT featuring a 160,000 sf. vehicle dynamics area, plus a 500,000 sf. area for evaluation of tire traction, braking, and cornering on a variety of snow and ice surfaces ranging from powder to hard pack (CTI 50-90).

DRIVER TRAINING AND EDUCATION



- New equipment operator training and support
- Operational evaluations to determine ability to implement the technology insertion
- Commercial Driver's License (CDL) training
- Catastrophic tire failure control
- Off-road operational techniques to optimize use of vehicle capabilities
- Instrumentation and data analysis training



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