U.S. ARMY

DEVCOM GROUND VEHICLE SYSTEMS CENTER

U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND GROUND VEHICLE SYSTEMS CENTER

Vehicle - Customer Orientation

GVPM T&I

PEVEL GSPEL Laboratory

CELL4 PSL Laboratory

CELL5 PSL Laboratory

CELL9 PSL Laboratory

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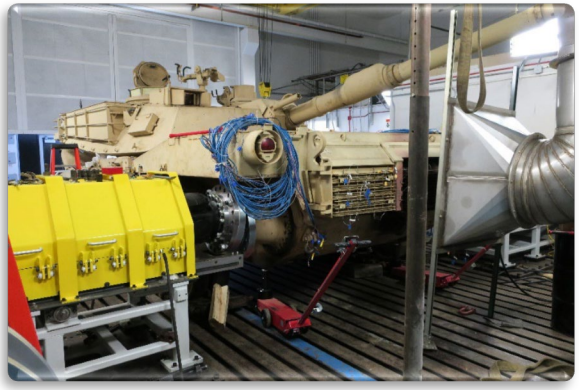


SPECIFICATIONS

Tracked Vehicle Performance Testing

Wheeled Vehicle Performance Testing

The GVPM Test & Evaluation Laboratory enables comprehensive vehicle-level performance and durability testing on both wheeled and tracked vehicles. The laboratory's reconfigurable dynamometers support up to a 5-axle wheeled vehicle with 34,000 lbf·ft (per wheel) and tracked vehicles up to 285,000 lbf·ft (per side). The lab offers controlled environmental conditions with temperatures ranging from -60°F to 160°F, humidity levels from 0 to 95 %Rh, wind speeds up to 60 mph, and solar load up to 1,200 W/m^2

SPECIFICATIONS

Powertrain

Wheeled Vehicle Dynamometers

- Speed: +/- 1,000 RPM
- Torque: +/- 34,000 lbf-ft (per wheel)
- Power: +/- 160 hp (per wheel)
- Wheel Stations: up to 10 wheels (5 axle)

Tracked Vehicle Dynamometers

- Speed: +/- 4000 RPM
- Torque: +/- 285,000 lbf-ft (per side)
- Power: +/-2500 hp (per side)

General

- Chamber Door: 14 ft (W) x 14 ft (T)
- Size: 20 ft (W) x 20 ft (T) x 75 ft (L)
- Floor Capacity: 100 tons
- Crane: 25 tons
- Multiple Vehicle Build-up Bays
- Fuel Measurement System
- 900 VDC, 1 MW Bidirectional Power Supply
- Hydrogen Supply Line

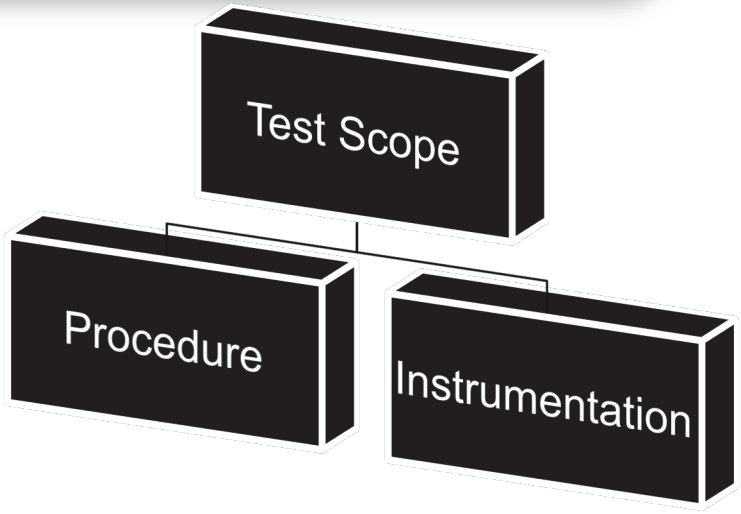
Environmental

- Temperature: -60 to 160°F
- Wind: 0-60 mph
- Solar: 0-1,200 W/m^2
- Humidity: up to 95% RH

Design of test scope

Defining the test scope is one of the most critical steps in the early stages of a test program. The scope comprises two primary components: the test procedure and the test instrumentation. The test procedure outlines the methods and types of tests used to evaluate vehicle performance, while the test instrumentation identifies the measurements required and their locations throughout the procedure. Together, these elements align to address the customer's information objectives. Both are tailored to match the complexity of the problem being solved. Ultimately, the test scope serves as the foundation for generating an accurate cost estimate for the test program.

Procedure	• How will the vehicle be tested?
Instrumentation	• What parameters will be measured?



Design of test scope

Idle Fuel Efficiency

- What is the fuel burn rate while the vehicle is parked?
- How do accessories (i.e. HVAC, electrical power) impact fuel burn?

Road March

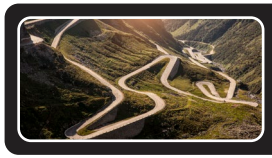
- What is the vehicle's mission range?
- What is fuel consumption at typical convoy speeds?

Acceleration

- What is the time to max speed?

Speed on Grade

- What is the vehicle's sustained max speed (i.e. 0% grade)?
- How steep of a hill can the vehicle climb?



Drive Cycle

- How many miles before powertrain failure?
- What is fuel consumption over the OMS/MP?

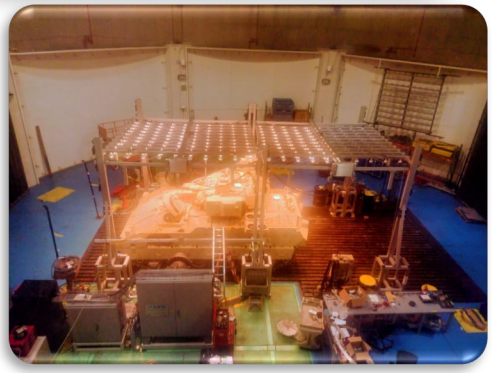
Full Load Cooling

- What is the vehicle's maximum operating temperature?
- How much torque can the vehicle produce?

Arctic Readiness

- Does the vehicle start in extreme cold?

Customers have the option to select test procedures from a standard set of mobility performance tests, supply a specific set of test procedures, or request recommendations from GVPM based on their information goal.



Design of test scope

Customers may choose from a standard level of test instrumentation, specify their own instrumentation requirements, or request tailored recommendations from GVPM based on their information objectives.

Essential

- J1939 CAN bus channels for safety monitoring only

Test Specific

- Additional channels added to J1939 CAN bus to study a particular vehicle system

Total Package

- Temperatures, pressures, flow rates, voltages, currents, and speeds measured of powertrain components

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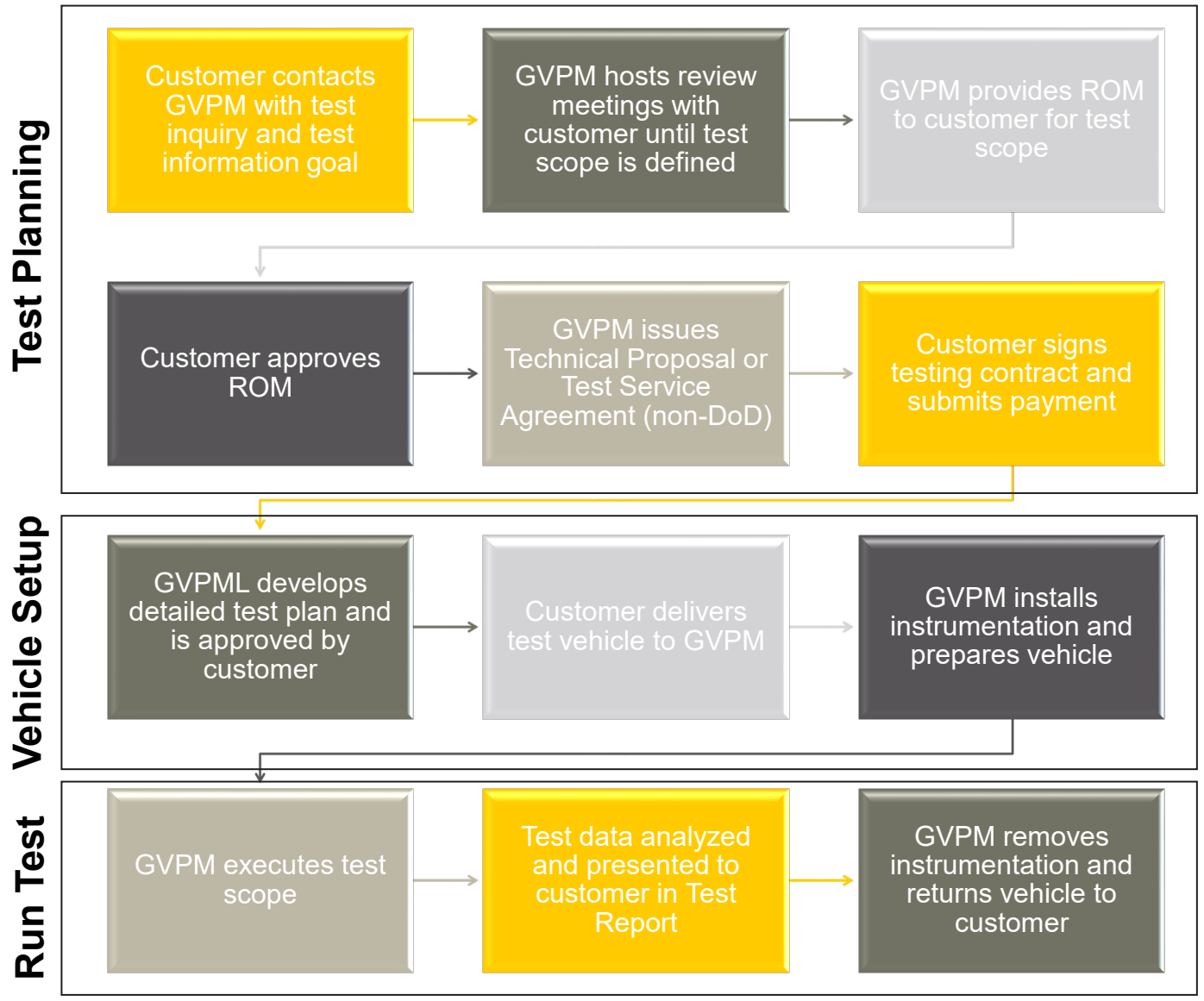
Test Request Process

GVPM is typically booked 3 to 6 months in advance. While cancellations are rare, occasional openings may allow for immediate scheduling. Estimated lead times can vary greatly depending on the scope of testing.



Customer supplied information

Electrical

- Ignition circuit for E-STOP
- Circuit diagram of vehicle charging system
- Accel / Brake pedal pinout

Mechanical

- Road-load force equation or raw coast down data
- Hub or sprocket drawing
- Fluid diagrams of powertrain cooling circuit with expected flow rates / pressures
- Critical operating limits (i.e. max coolant temp, peak torque, max engine speed, min oil pressure, etc)

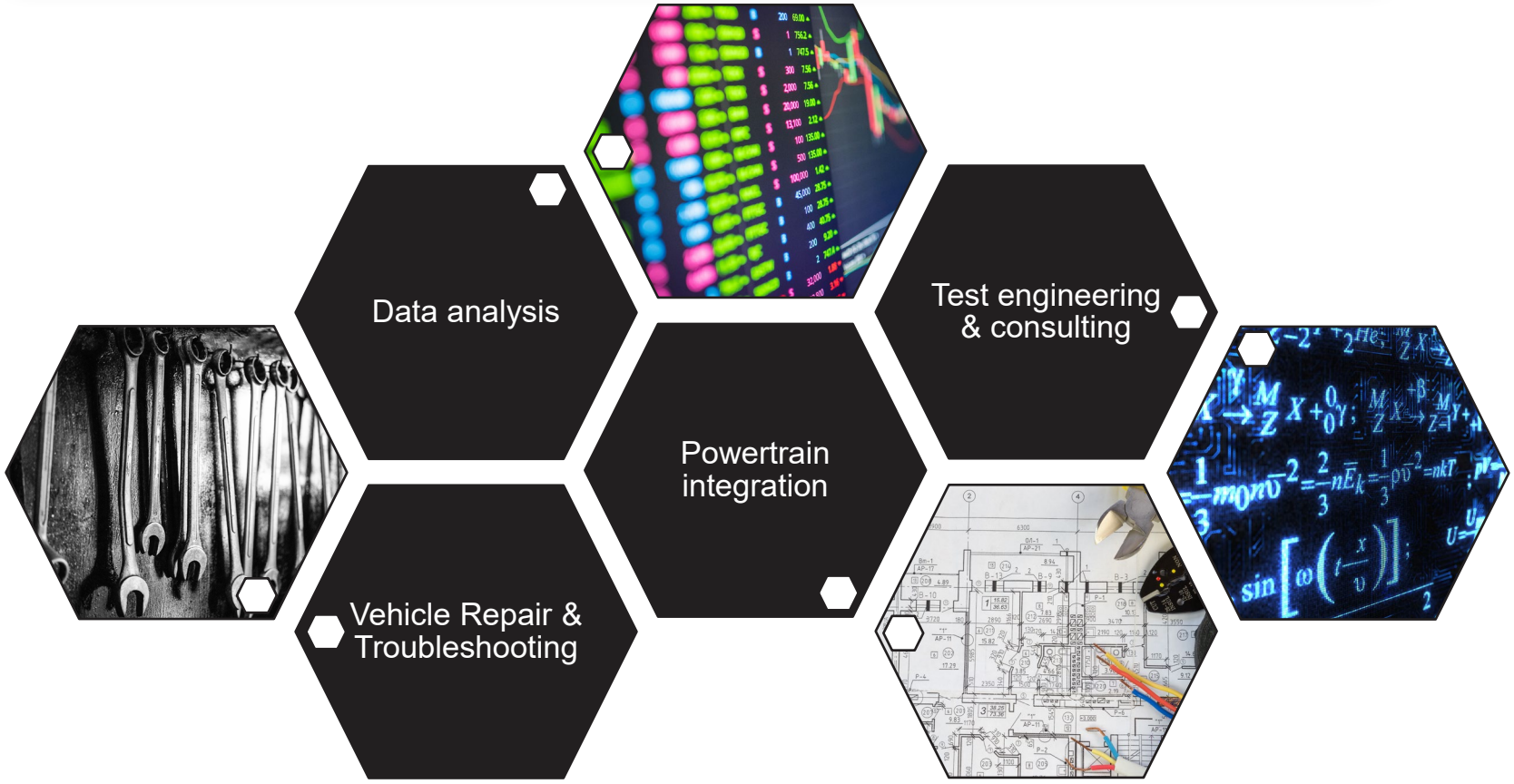
Misc.

- J1939 CAN bus database file
- Operator's manual

In addition to supplying the test vehicle, the customer will also need to provide several data items (see example list) for instrumentation selection and dynamometer configuration.

Other test services

Even if you are not testing in PEVEL or PSL, please ask us about our other testing services.



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