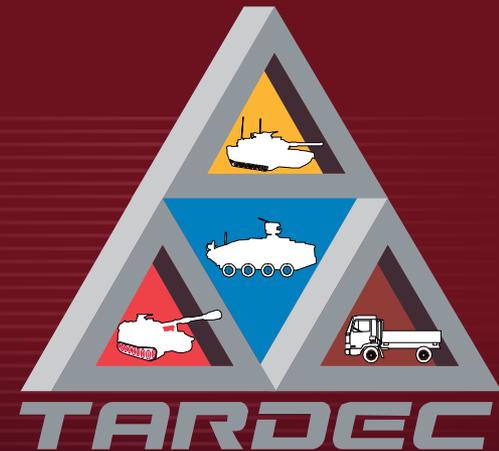




# Fuel Efficient ground vehicle Demonstrator (FED) Program Overview



**TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.**

**FED Team**

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**September 30, 2008**

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# Report Documentation Page

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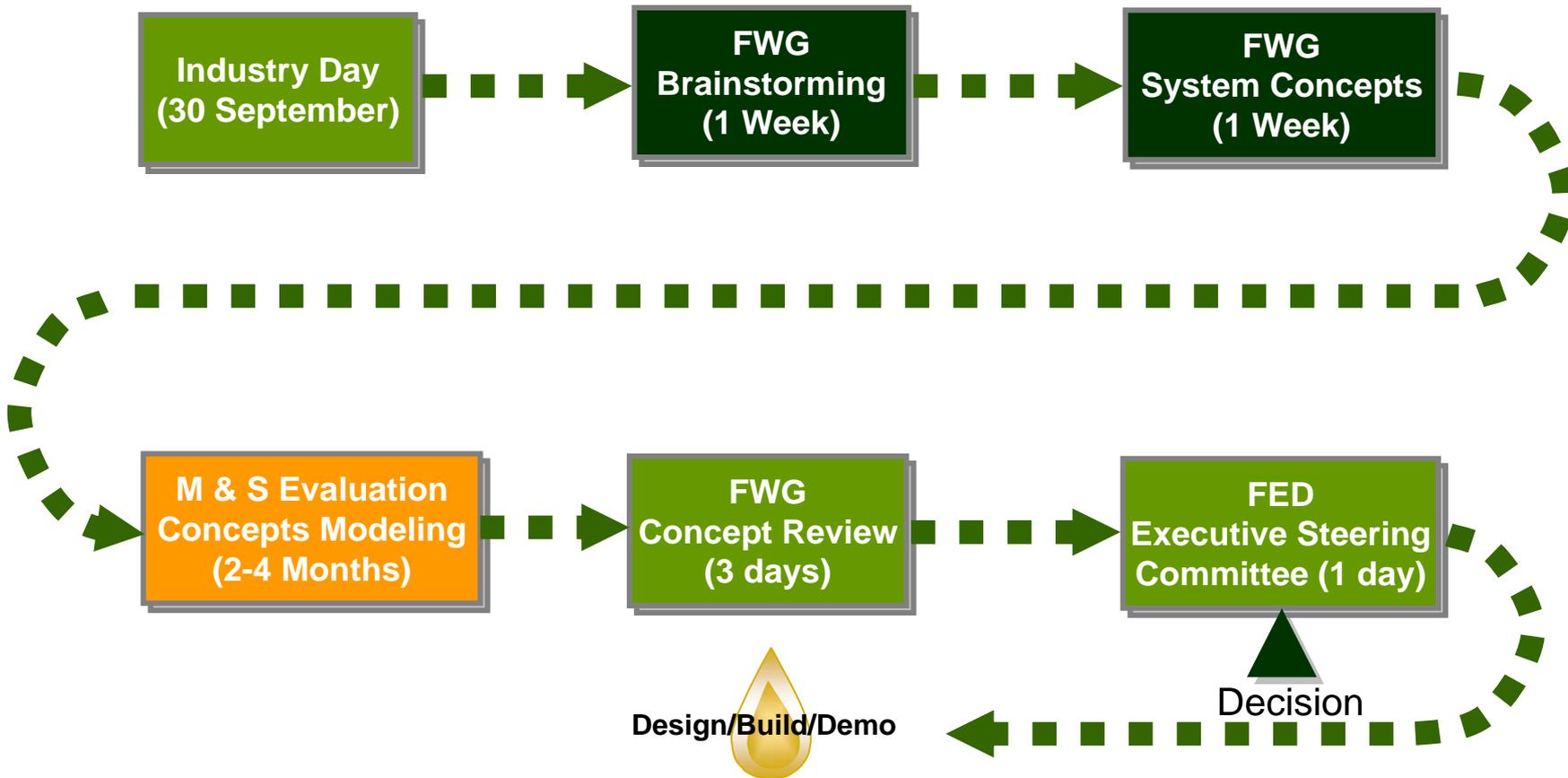
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The Fuel Efficiency Demonstrator (FED) Program was initiated by OSD to address energy conservation needs highlighted by the Defense Science Board: Energy Security Task Force. The overarching goal of the program is to improve military vehicle technology to reduce fuel consumption on the battlefield, and reduce our dependence on oil.

The technical objectives of the FED are:

- Demonstrate a tactical vehicle with significantly greater fuel economy than an M1114 HMMWV while maintaining tactical vehicle capability.
- Integrate emerging fuel efficient technologies to demonstrate potential capabilities for the next generation of military trucks.
- Consider higher risk/higher payoff technologies to attain the most fuel efficient vehicle possible.





Time: One Week

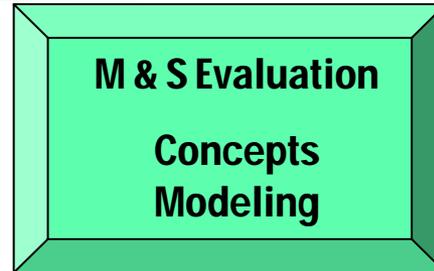
- **Participation by Invitation**
- **FWG Subject Matter Expert Subgroups (6 total)**
  - Technology Discovery
  - Technology Worksheets
  - Technology Ranking
- **FWG as a whole**
  - Subgroups Brief Results to FWG
  - Technology Discovery
  - Technology Ranking
- **List of Technologies Formulated**
  - Technology Ranking
  - Those below the line get to make case for technology ranking
  - Finalize List

- **Government Subject Matter Experts (SME) Led Teams**
  - Senior SME Lead
  - Junior SME's "Actively" Assist
  - Government SME's recommend Industry SME's and other Government Support (e.g. ONR, DOT, DOE, etc.)
- **Sub-Groups:**
  - System Integration / Operational Changes
  - Powertrain/Engine (Hybrid drive, advanced transmissions)
  - Alternative Materials (metallic and non-metallic)
  - Auxiliary Power / Electrical Loads
  - Fuel / Lubricants
  - Chassis / Suspension

## FWG Session #2

Time: One Week

- **FWG Subject Matter Expert Subgroup Homework Validation Briefed**
- **Revisit Below Line Technologies if Required**
- **FWG as a Whole Verifies Technology Ranking**
- **System Teams Formed (6 tech subgroups become 3 system subgroups)**
  - Concepts Generated
  - Consumption, Efficiency, Combination (3 total “concepts” per team with rationale)



Time: Two Months

## Automotive Simulation Evaluation

- Characterize the concepts by Fuel benefits
- Predictive Performance
- Predictive Fuel Economy and Fuel Consumption

## Concepts Modeling Evaluation

- Physical Concepts with Weights
- Assess Technology Integration and Timeframe of Availability
- Schedule remote IPRs

## Baseline - Performance:

- **M1114 HMMWV equipped with Fragmentation Kit 5 Phase 2**
  - Must perform at GVW with four primary crew seats and have a capability that minimizes degradation of current baseline vehicle: gradeability, speed on grade, acceleration, speed, vehicle control, range, braking, payload and electric power source requirements.



## Baseline – Fuel Economy and Consumption:

- **Leveraging Hybrid Electric Vehicle Evaluation and Analysis (HEVEA) program**
  - Using Test Operating Procedure (TOP) to develop test plan and fuel economy/consumption goals
  - Surrogating data to build M1114 composite drive cycle fuel efficiency numbers
- **Consider peacetime/wartime operations**
- **Drive cycle being derived from the JLTV concept vehicle on a SWA convoy escort mission**
- **Coordinate with NVFEL (National Vehicle & Fuel Emissions Lab) to define a EPA fuel economy drive cycle for this weight class vehicle**

**The baseline will be used as a guide for developing concepts. Reasonable trades can be made if they will result in a significant reduction in fuel use.**

- **Submit resume to the FED website**
- **SME's will participate by invite only**
- **What will be expected of a SME**
  - Attend two, week long working group meetings in Warren, MI
  - Work with a team of other experts to rank and select technologies
- **Why should you get involved**
  - Work side by side with government, industry and academia experts
  - Ability to influence future Army programs.

- **Submit Technology to the FED website**
  - Complete technology form as completely as possible
- **If your technology is selected for possible integration into a concept the following may be requested (if available).**
  - Physical model
  - Mathematical model
  - Physical test data

- **Results:**
  - Technology transferred to the Army, Marine and Air Force vehicles will yield fleet fuel efficiency benefits.
  - Drive national fuel efficient objectives into DoD vehicle programs.
- **Payoff:**
  - Compile a Central Database of fuel economy findings.
  - Show the Nation the Army intends to reduce dependency on fuel.
  - Identification and Demonstration of fuel efficient technologies, techniques and tools.
- **Check Website for updates**

***Taking the risk to attain Energy Security benefits!***

