



Increasing knowledge and capability through proper experimental design and analysis!

Report Documentation Page

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Purpose:

- Development of health assessment models and algorithms for common automotive components through seeded fault and durability analysis at the component level
- Identification of sensor strategies that could be implemented in a ground vehicle application to allow for accurate diagnosis of impending faults
- Evaluation of the potential Return on Investment (ROI) for implementing these technologies in a vehicle
- Collaboration with AMSAA to evaluate the developed algorithms in a vehicle environment

Products:

- Prognostic and Diagnostic algorithms for selected failure modes
- Sensor strategy for vehicle implementation
- ROI Analysis

Payoffs:

- Provide critical insight into sensors required for diagnosis of component health and prediction of Remaining Useful Life (RUL)
- Allow for replacement of the component prior to a failure that could potentially damage or dead-line a vehicle
- Provide Government owned knowledge that can be applied across a variety of vehicle platforms

| Schedule | FY09 | FY10 | FY11 |
|----------------------------|---|------------------------------------|------|
| CAT C7 Engine | [Green bar spanning FY09, FY10, and FY11] | | |
| Allison 2500 Transmission | | [Green bar spanning FY10 and FY11] | |
| Prestolite 130A Alternator | | [Green bar spanning FY10 and FY11] | |
| Li-ion and PbA Batteries | [Green bar spanning FY09 and FY10] | | |

- **Diagnostics / Prognostics:**

- Tools and techniques for development
 - Software Tools (Glyphworks, LabVIEW, Matlab)
 - Prognostic techniques (Usage Models, Signature Analysis)
 - Development Methodologies (DOEs, Seeded Fault, Durability Test)
- Outside looking in approach
 - Use of broadcast CAN and external sensor data only
 - Limited access to proprietary parameters
 - No access to internal ECU variables
- FMEAs for common automotive components
 - Powertrain (Heavy Duty Diesel Engines and Transmissions)
 - Electrical (Batteries, Alternators, Starters)
- Data Formats
 - Open standard, compressible



HEMTT



FMTV



STRYKER

- **Vehicle Health Aggregation**

- Use of health data to inform intelligent system management
- Effective user display and alert schemes (colors, fonts, etc)



Maintenance Support Device



Embedded Smart Displays



Communications System