

Component Performance and Vulnerability: Propulsion and Drive Train

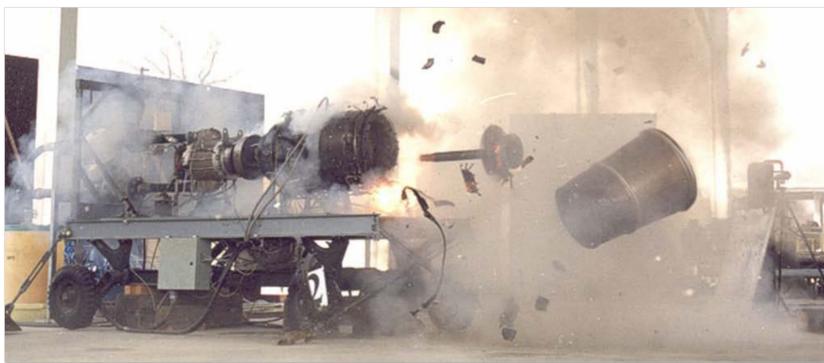


Assessment & Analysis
System Engineering and Experimentation

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Objective

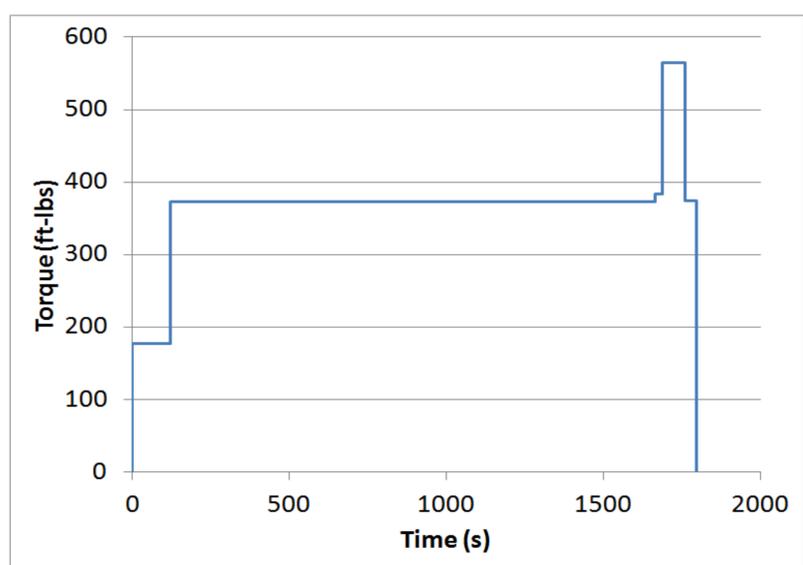
- For new propulsion/drive train materials, components and technologies, assessment of performance improvements, prognostic/diagnostic capabilities, and ballistic vulnerabilities.
- Use experimental results to drive design and fielding decisions



Catastrophic failure of a T-55 engine

Challenges

- Military platforms have continuously increasing requirements for performance, life-cycle, and protection.
- Propulsion and drive train systems increasingly use novel materials and technologies that lack damage-tolerance characterizations.
- High-risk containment and failure tests require specialized equipment and facilities.



Sample tail-rotor driveshaft load spectrum

ARL Facilities and Capabilities Available to Support Collaborative Research

- Unique test and experimentation capabilities enable both operational and destructive testing of drive-train and propulsion technologies.
- Ability to remotely execute ballistic tests on individual components, transmissions, engines, and full-scale aircraft under dynamic and realistic loading conditions.
- On-site fabrication of custom test fixtures and components.



RC-12 ground test vehicle with a PT6A-41 engine

- Ballistic survivability, when specified, has influenced modern turbine engine designs significantly without hampering performance, weight or cost.
- Improvements in performance and prognostic/diagnostic capabilities do not have to be detrimental to ballistic survivability.



Torsional loading platform for operating drive train components

Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration

- Innovative research to address: performance improvements, prognostic/diagnostic capabilities, and ballistic vulnerabilities of propulsion/drive train materials, components and technologies.