



S&T Campaign: Sciences for Maneuver *Logistics and Sustainability*

Robert Haynes, Ph.D., (410) 278-8035, robert.a.haynes43.civ@mail.mil

Mark Bundy, Ph.D., (410) 278-4318, mark.l.bundy2.civ@mail.mil

Todd Henry, Ph.D., (410) 278-7650, todd.c.henry2.civ@mail.mil

Research Facility

Investigate novel concepts for extremely lightweight, adaptive, durable, damage-tolerant structures enabled by advanced materials and designs for Army Future Vertical Lift. Ongoing research encompasses a wide range of basic research to address the following topics: durable, high-strength composite/metallic and multifunctional damage-tolerant structural configurations and designs; nonlinear and physics-based computational methods; advanced probabilistic algorithms for fatigue life management with increased prediction accuracy and reduced computational time; and additive manufacturing of multifunctional fatigue-resistant lightweight components.

Equipment Available

- Mechanical Testing
 - 4 of 22-kip servohydraulic load frames, 6" stroke, 1 to 30 gpm servovalve capacity
 - 1000 Hz load frame, 5.5 kip, 1" stroke
- Fixturing
 - Hydraulic grips for specimen thickness 0"–0.75"
 - Compression platens
 - ASTM D695: End-loaded compression
 - ASTM D5379: V-notch shear
 - ASTM D6484: Open hole compression
 - ASTM D6641: Combined-loading compression
 - ASTM D6671: Mixed-mode bending
 - ASTM D7137: Compression after impact
 - ASTM D7264: 3 or 4 point bending
 - Thermal chamber
 - 1" and 2" gauge length extensometer
- Instron 5965 Tabletop Screw-type, 5 kN (1 kip) axial tension/compression, 1256 mm (49.5 in) vertical test space
- Digital Image Correlation: Correlated Solutions Vic-2D and Vic-3D, 5 megapixel stereovision cameras
- Additive Manufacturing
 - Stratasys Dimension Elite 3-D printer
 - Makerbot Replicator 2X
- Electrical Characterization
 - Cascade Microtech Semiautomatic Probe Station
 - Keithley 4200 semiconductor characterization system
- Other Equipment
 - Arbin battery analyzer
 - Newport solar simulator
 - JAZ UV-Vis spectrometer



Axial Fatigue Mechanical Testing Systems



1000 Hz High-cycle Fatigue Mechanical Testing System



Arbin Battery Analyzer