Advanced Materials for Military Ground Platforms

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

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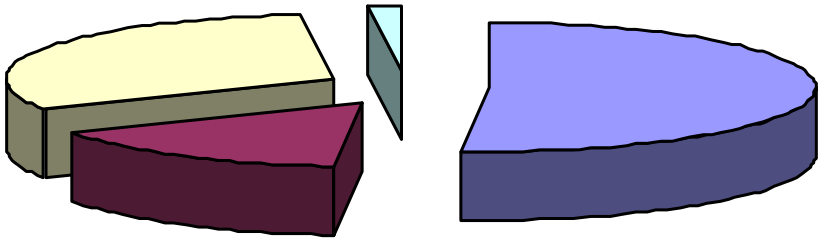
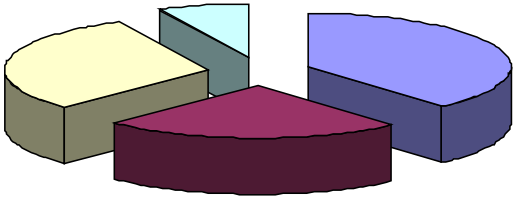
Part of the Materials Challenge

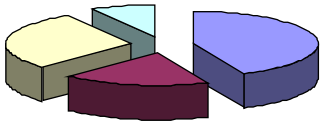


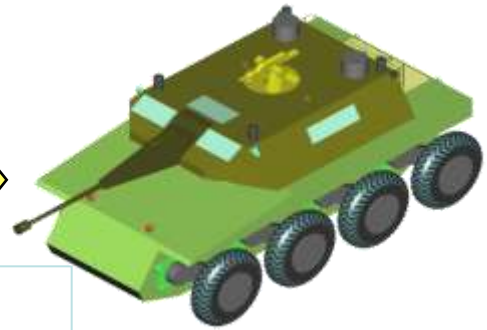
70 ton vehicle--
36 tons for structure & protection

- Structure & Protection
- Lethality
- Mobility
- Other



40 ton vehicle--
15.5 tons for structure & protection



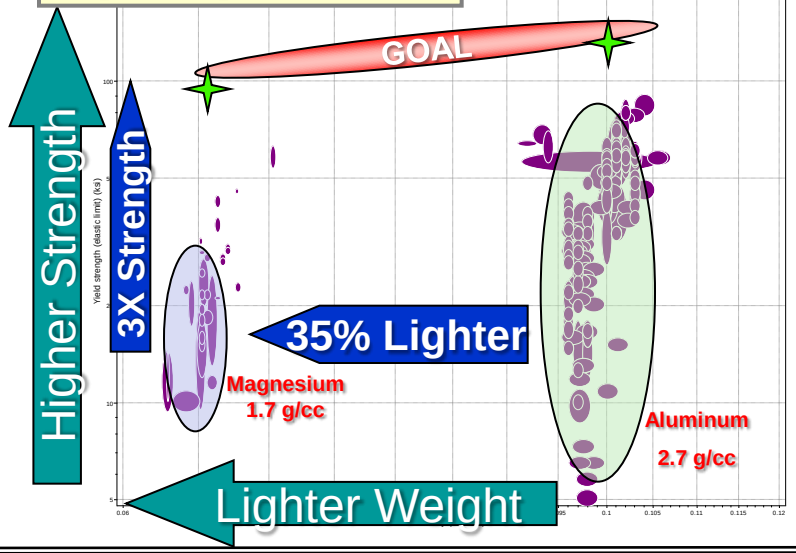


20 ton vehicle—
8.6 tons for structure & protection!

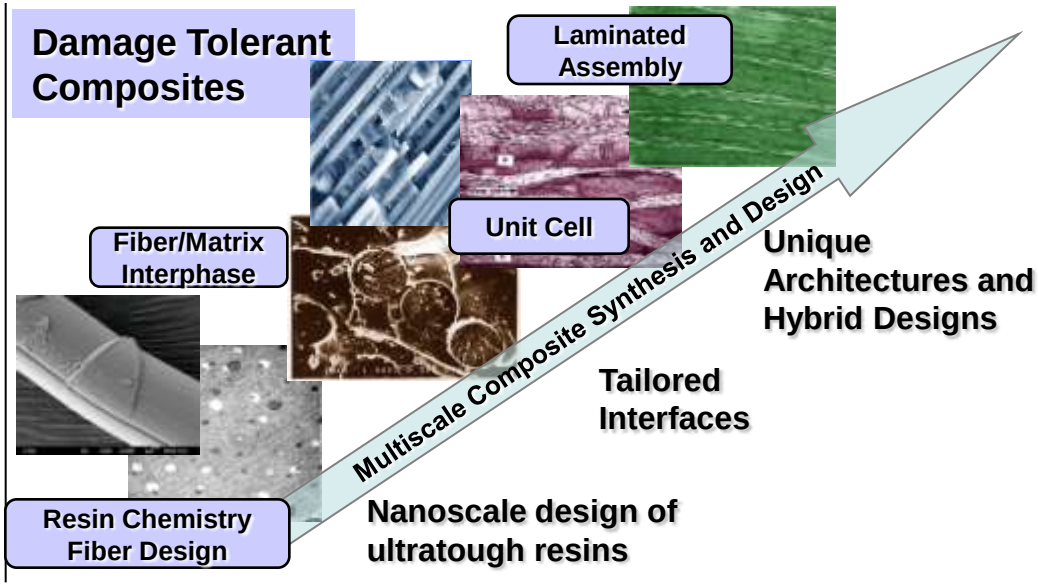
BUT ALSO NEED MORE POWER AND REDUCED THERMAL LOAD

Complexity of Material Needs

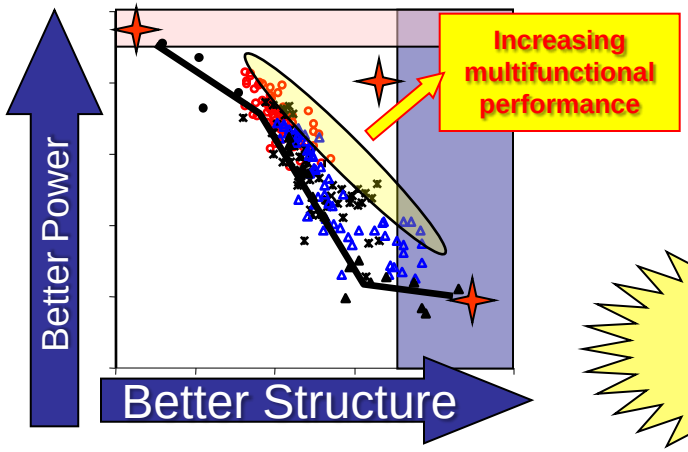
Lightweight Metallics



Damage Tolerant Composites



Multifunctionality: Structure plus …



Reduced Parasitic Mass

Lighter System Weight

Transparency

New Transparent Materials
- Continuous-fiber transparent composites
- Nanoscale transparent composites
- Index matching using active materials

Materials Performance Metrics
- Translucence, haze & clarity
- Strength and damage tolerance
- Durability and reliability

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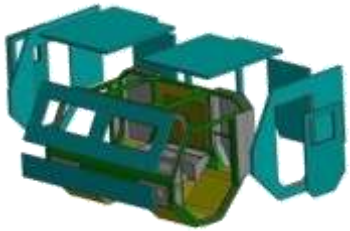
Advanced Materials Applications

- advanced structural and propulsion systems
- power electronics and electric motors
- lightweight armor
- fire suppression
- optical limiters



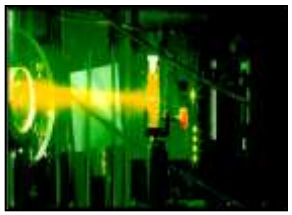













Some Materials of Interest

- ultra high strength steels
- aluminum
- titanium
- magnesium
- Ni and Co superalloys (engine applications)
- PZTs
- metal matrix composites
- ceramic matrix composites
- polymer matrix composites
- ultralight engineered materials (e.g. foams, honeycomb, and sandwich materials)
- ultra high strength fibers
- resins and adhesives

Enabling Technologies (Structures)

- Modeling of Composite Materials for Energy Absorption
- Nondestructive Evaluation Tools for Evaluation of Composite Structures
- Nondestructive Evaluation Techniques for On-Line Inspection of Structures
- Durability of Lightweight Composite Structures
- Composite Crash Energy Management
- Joining of Dissimilar Materials
- Adhesively-Bonded Composites
- Evaluation and Prediction of the Performance/Durability of Dissimilar Material Joints