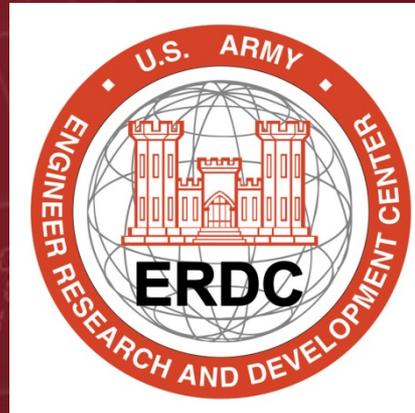




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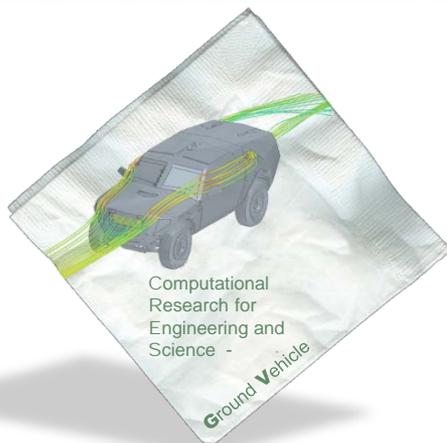
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CRES-GV Overview

Computational Research for Engineering and Science – Ground Vehicles

15 June 2012

Project Lead:
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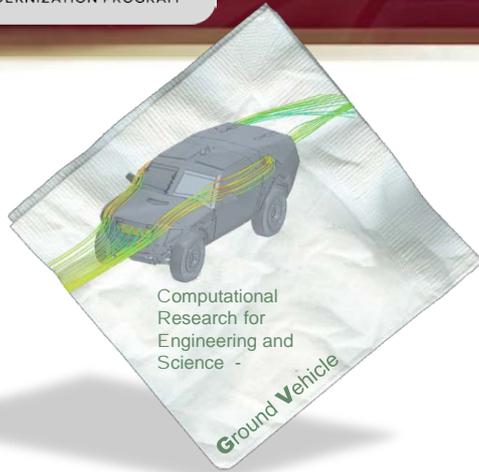
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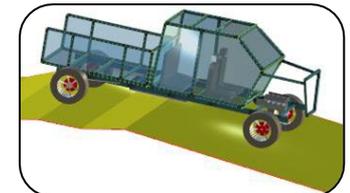
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- New HPCMP project
- **Goal: Physics-based M&S to substantially improve the acquisition process and results**
- HPC = faster design, test, innovation loop
- Accelerate solution exploration
- Eliminate fragile point designs

Preliminary Product Ideas:

1. **Mixed-Fidelity Multidisciplinary Physics Solver Suite**
 - Fast answer with less model preparation.
 - Capable of sustained 72 hour turnaround
2. **Optimization Tool**
 - Focus on robustness optimization, not point solution
3. **High-Level Systems Tradespace Tool**
 - GTRI / Ricardo type tool: "Collaborative Visualization"
4. **Concept Definition Tool**
 - Pre detail-design CAD w/ physics
5. **Improved Soldier-in-the-loop "Try it Before You Buy It"**

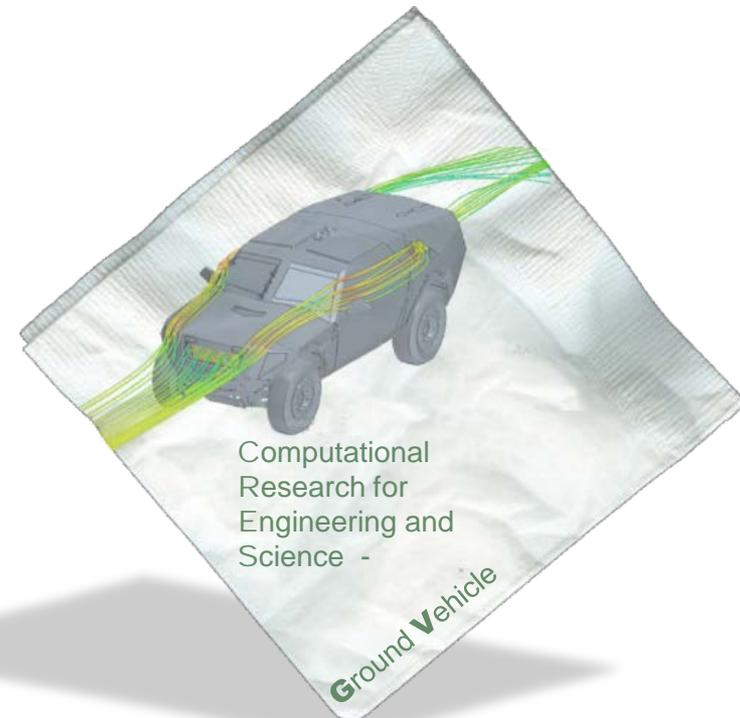


CMTS – Detailed CAD not necessary for up-front design and analysis

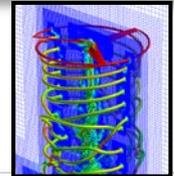


Ride motion simulators greatly enhance soldier-centric design

- HPCMO is the major funding source and proponent
- FY 12 for PM buy-in / initial planning with ERDC
- HPCMO to fund at higher level in out years
 - Contractors to write commercial-quality code
 - Possibly upgrade commercial codes
- Team thus far:
 - TARDEC Lead: Rob Smith
 - ERDC Lead: Randy Jones
 - Dan Kedziorek (HPC)
 - Russ Kouba (Concepts)
 - Pradeep Mendonza (Systems)



- Computational Research and Engineering Acquisition Tools and Environments (**CREATE**) Program
- Air Vehicles (AV)—Air Force, Army & Navy
 - Aerodynamics, structural mechanics, propulsion, control, ...
- Ships—Navy
 - Shock vulnerability, hydrodynamics, concept design
- Radio Frequency (RF) Antennas—Air Force, Army & Navy
 - RF Antenna electromagnetics and integration with platforms
- Mesh and Geometry (MG) Generation
 - Rapid generation of mesh and geometry representations needed by analysis



Design concept

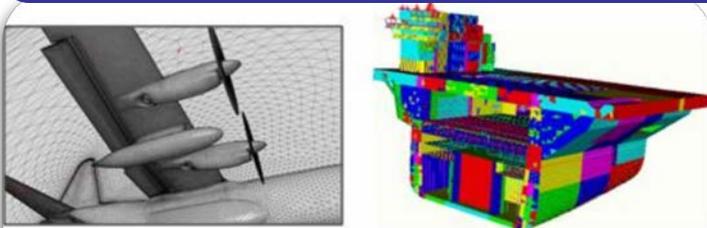


Seakeeping and resistance



Shock vulnerability

CREATE tools will support all stages of acquisition from rapid early stage design to full life-cycle sustainment



Aircraft and aircraft carrier meshes



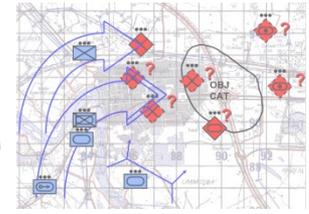
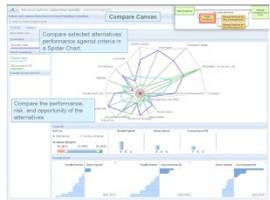
Military platforms with antennas

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Goal: Knowledge Based Acquisition



Ground Vehicle CRES

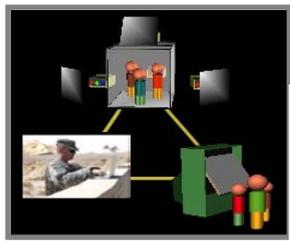


ASEC S.E. Tool Captures and Drives Process

Quick Turnaround Physics- Based M&S

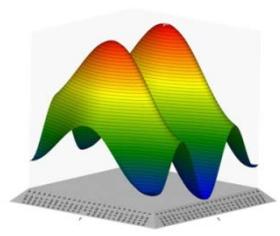
Operational Models based on accurate data = Better requirements

Intuitive Concepting / Massive Collaboration



- BETTER Concepting CAD "3-D Back of the napkin"
- Users co-design with physics-based feedback

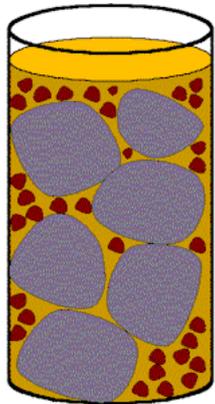
Better Designspace Exploration



Soldier-in-the-loop
- Duty Cycle Characterization
- Key to Soldier Centric Design

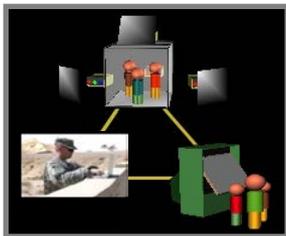


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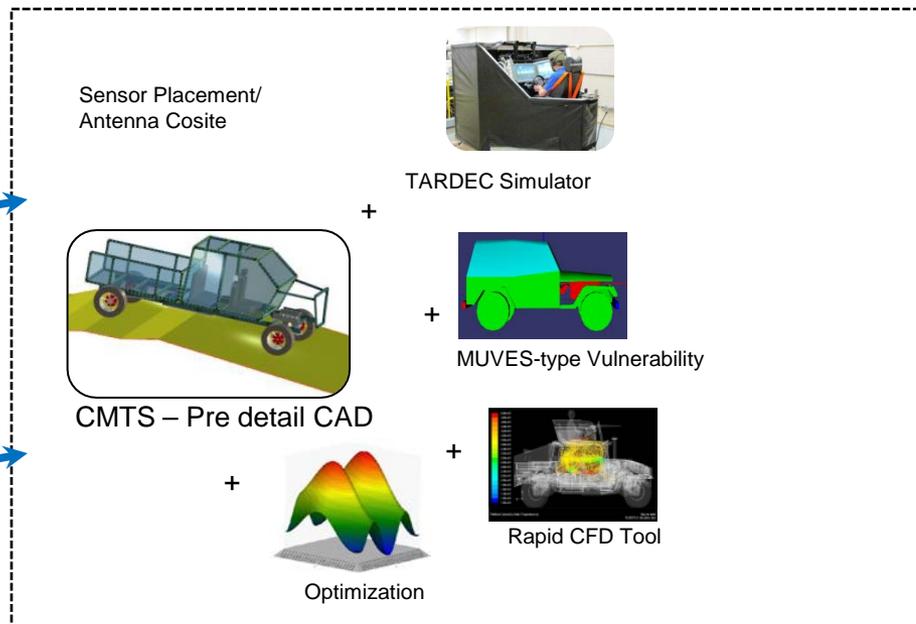


- Powertrain
- Survivability (blast, penetration, MUVES)
- Thermal
- Antenna/ sensor placement / EMI
- Duty cycles/ human factors
- Mobility & Vehicle dynamics (and weapon system)
- Stress / fatigue

Intuitive Concepting / Massive Collaboration



GTRI COVE



TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

