

Visual Simulation Laboratory: Massively Parallel, Interactive, Cognition-Driven Analysis



S&T Campaign: Assessment & Analysis
Science & Technology of Assessment

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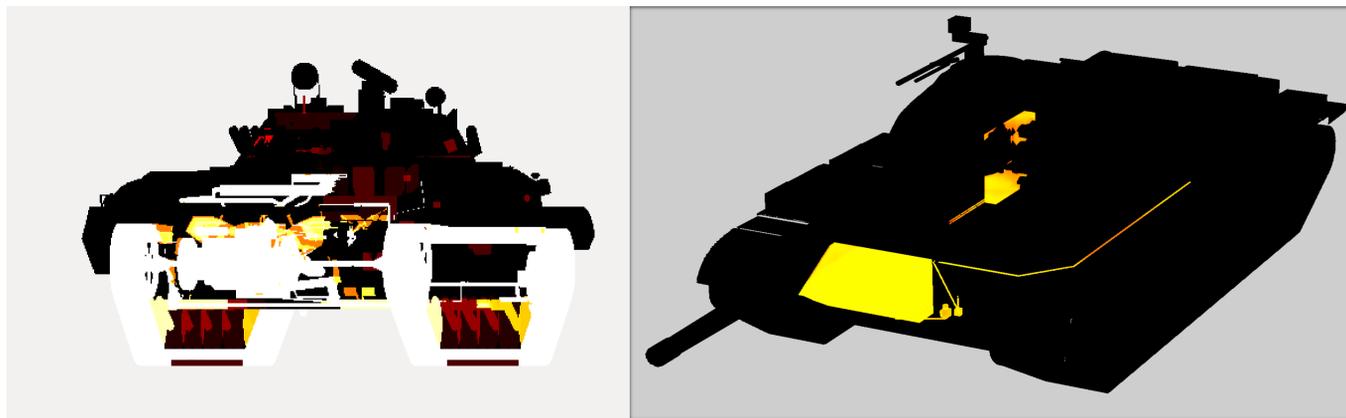
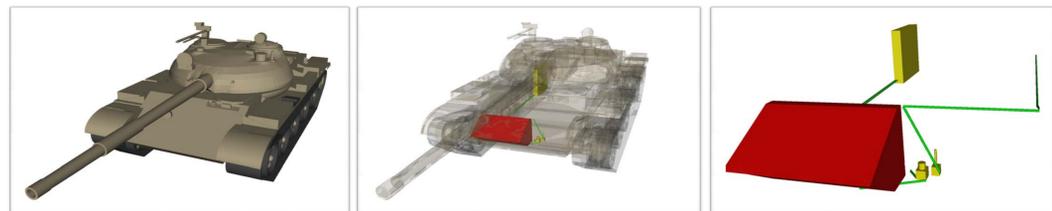
Research Objective

- Couple massively parallel computation and interactive visualization to create steerable, cognition-driven physics-based simulations.
- Identify means of interactively leading observers to understand simulation results as they are computed and thus allow users to steer the computation.



ARL Capabilities Available to Support Collaborative Research

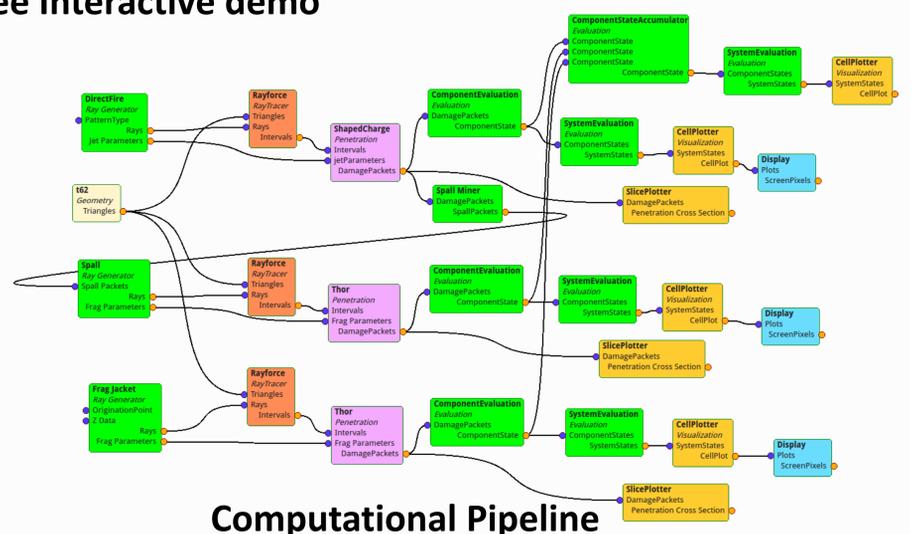
- Complete CAD geometry for military systems.
- Collaborative facility in Belcamp MD.
- Bullet-Ray Vision Paper
- Significant modeling accomplishments to date:
 - Ballistic threat/target interaction
 - Radio-Frequency propagation
 - Interactive CFD computation
 - Munition-specific simulation algorithms.



Example Vulnerability/Lethality Analysis
See Interactive demo

Challenges

- Placing massive computational power at the direct, interactive disposal of the human analyst (not batch).
- Communicating evolving simulation status to the end user in an effective, compelling manner.
- Transitioning legacy algorithms to leverage modern computational hardware architectures to deliver optimal performance.

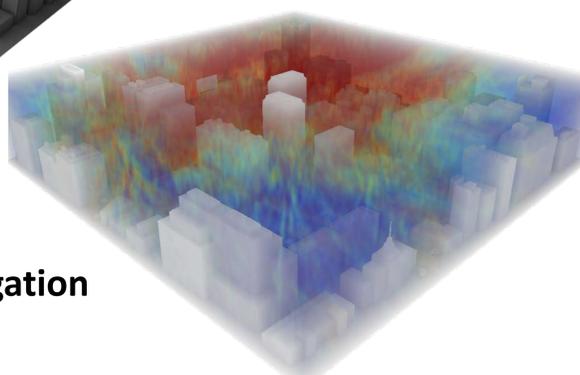
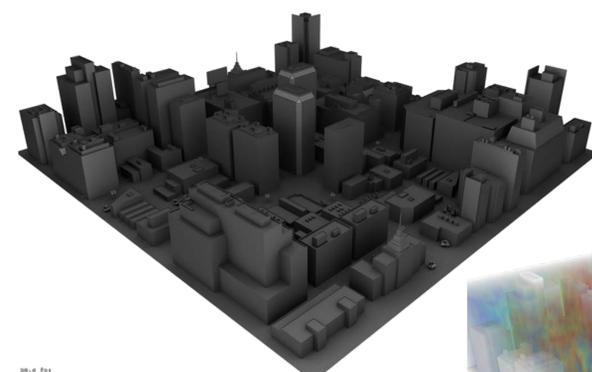


Computational Pipeline

Complementary Expertise / Capabilities Sought in Collaboration

- Massively parallel computation
- Large-scale graphics rendering
- Visualization (both 2-D & 3-D)
- Human-computer interaction & usability
- Cognition & perception

Current Collaborators



Simulation of RF Propagation
in Urban environments

ARL 100