



U.S. ARMY  
**RDECOM**

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



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

Mr. Lee Butler, (410) 278-9200  
[lee.a.butler6.civ@mail.mil](mailto:lee.a.butler6.civ@mail.mil)

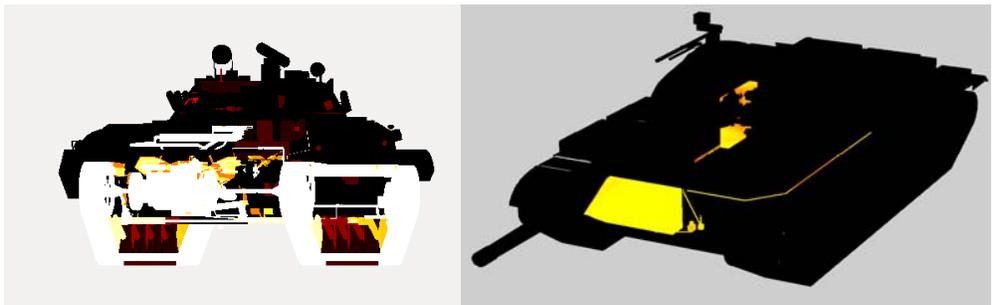
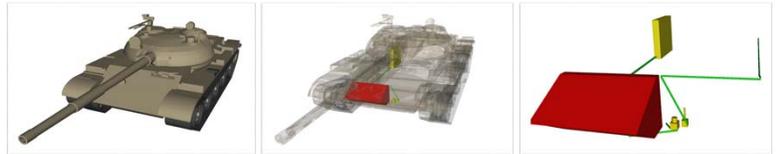
## Research Objective

- 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

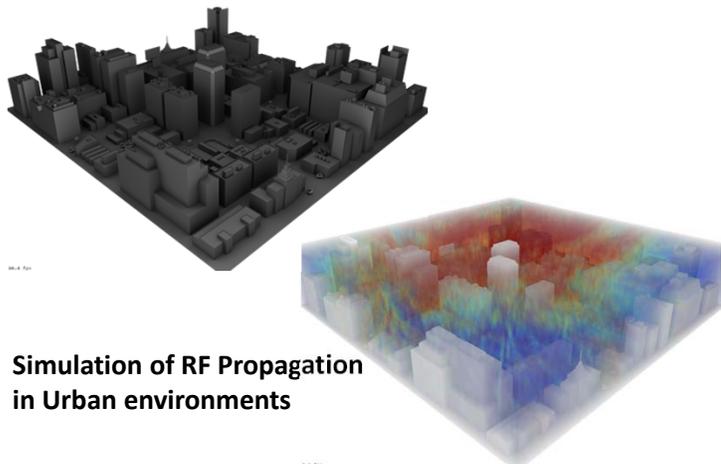
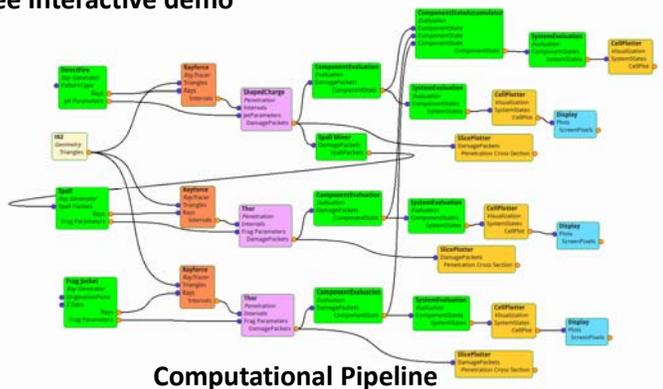
- Complete CAD geometry for military systems.
- Collaborative facility in Belcamp MD.
- Bullet-Ray Vision Paper
- Significant accomplishments to date:
  - Ballistic threat/target interaction
  - Radio-Frequency propagation
  - Interactive CFD computation
  - Munition-specific simulation algorithms.



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.



Simulation of RF Propagation  
in Urban environments

## Complementary Expertise / Capabilities Sought in Collaboration

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

Current Collaborators

