U.S. ARMY COMBAT CAPABILITIES DEVELOPMENT COMMAND – DATA & ANALYSIS CENTER

The Soldier and Squad Trade-space Analysis Framework (SSTAF)

Ron Bowers

Lead, Soldier Lethality Analysis Team

DEVCOM Data and Analysis Center

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SOLDIER AND SQUAD TRADE SPACE ANALYSIS FRAMEWORK (SSTAF)

SSTAF provides a high-resolution unified representation of Soldier state and capability

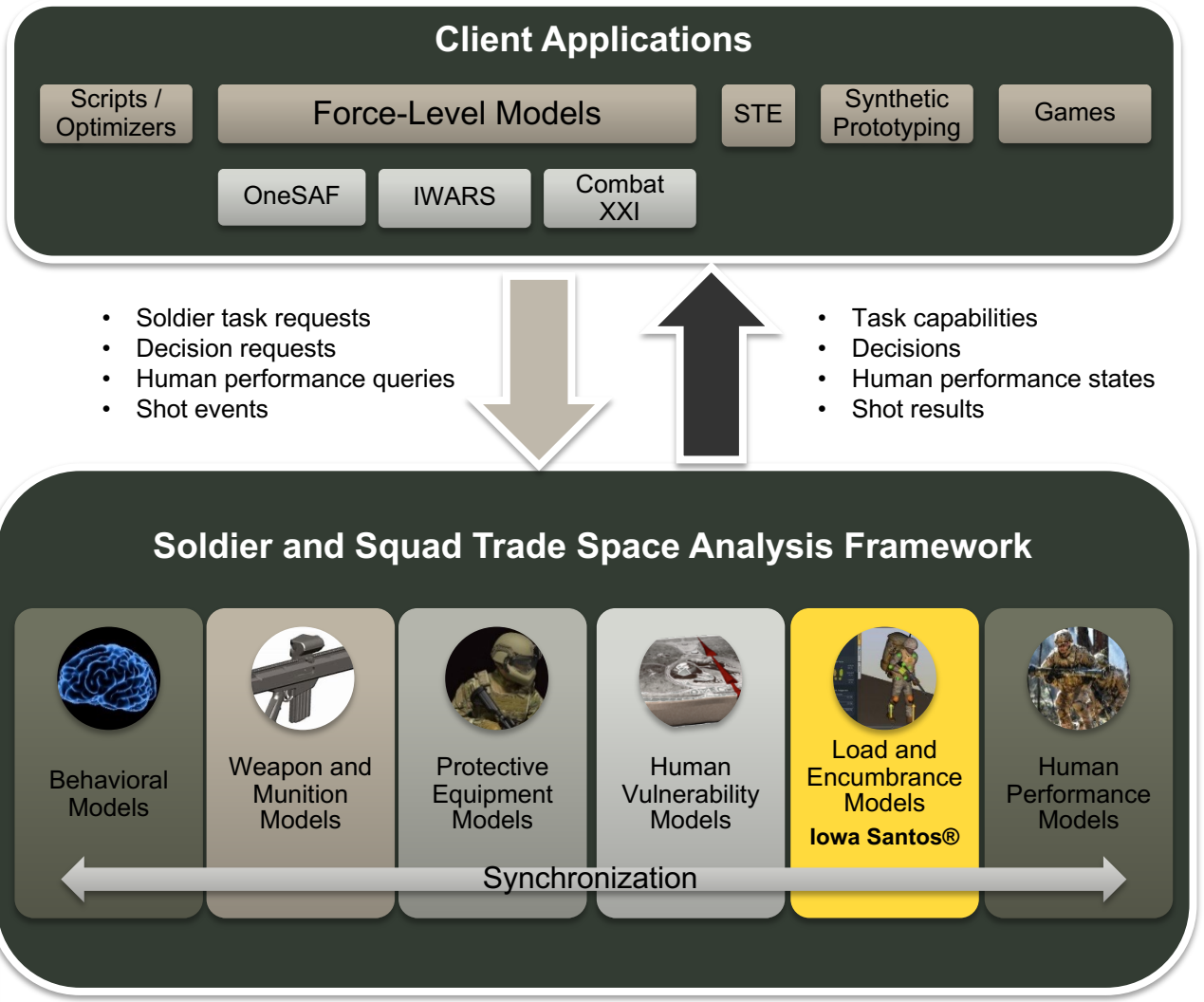
Concept

Treat the Soldier as an integrated system where all aspects of performance are coupled and equipment choices have both benefits and cost to enable trade space and other analyses.

Approach

- Change Soldier state and capability according to simulation events and modify the behavior of sub-models according to the current state.
- Integrate the effects of fatigue, burdens and encumbrances.
- Enable flexible anthropometric and human performance configurations.
- Provide a flexible interface usable by both interactive systems such as STE and Early Synthetic Prototyping (ESP) as well as force-level models.

The goal is to accurately simulate real Soldiers and Squads.



SQUAD OVERMATCH

Analysis Builder

➢ Select Scenario

➢ Manually Configure Squads

Squad Leader	TL-A	R-A	GR-A	...
Anthropometrics:	Male, 25 yrs, 1.85 m, 99.7 kg			
Weapons:	M4, 270 rds; M17, 34 rds			
PPE:	VTP, TEP, IHPS			
Other:	IVAS			

Avatar

➢ Configure Parametric Runs

Blue Force Distribution:	US Close Combat
Blue Draw Mode:	Normal
Blue Weapon:	Fixed by Position
Blue PPE:	Fixed [VTP, TEP, IHPS, TCEP]
Red Force Distribution:	Andalasian Irregular
Red Draw Mode:	Uniform
Red Weapon:	Fixed by Position
Red PPE:	None
Iterations:	10000

Analysis Execution

OneSAF

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Soldier & Squad Trade-space Analysis Framework

(SSTAF) Provides High-Resolution Human Performance Modeling

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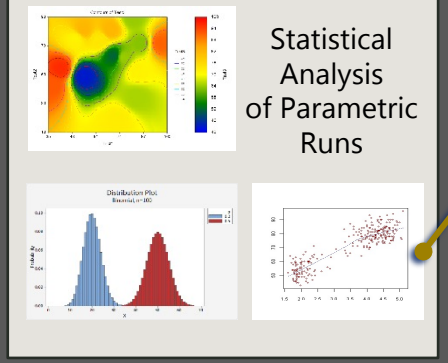
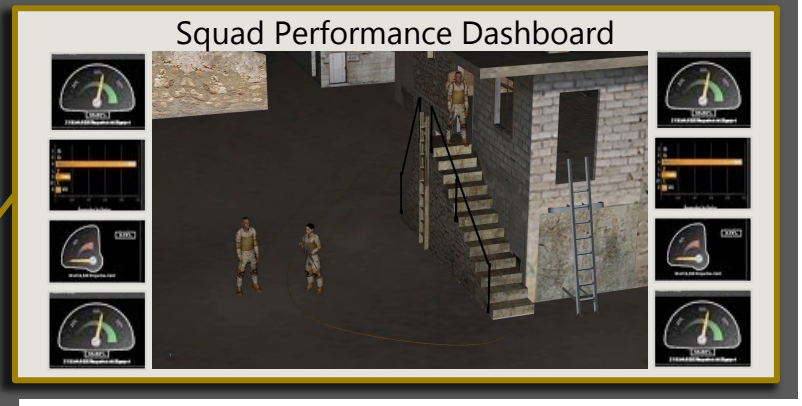
Analysis Results

- Summary of All Scenarios



- Visualization & Metrics of a Selected Scenario

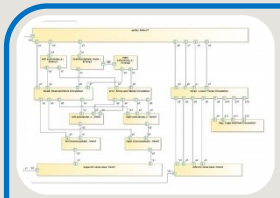


Army Impact

✓ Design Trades
✓ Mission Planning
✓ Acquisition Decisions

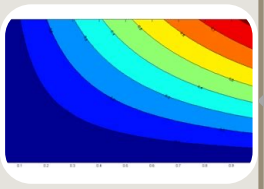
THE BIG PICTURE: ACCELERATING DEVELOPMENT OF SOLDIER EQUIPMENT

Materiel Development


System Behavior


Geometric Models


Weights and Moments

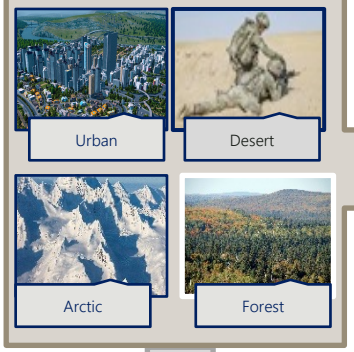

System Performance

Digital Engineering Artifacts

- *Mission Needs*
- *Use Cases*
- *Doctrine*
- ➔ *Requirements*

- *System Utility*
- *Deficiencies*
- *Possible Remedies*

Human-System Interaction Concerns



Model the Soldier performing the mission in the environment

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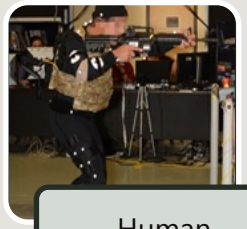
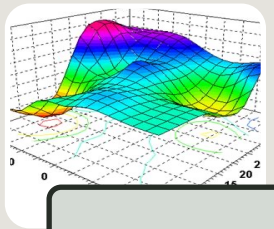
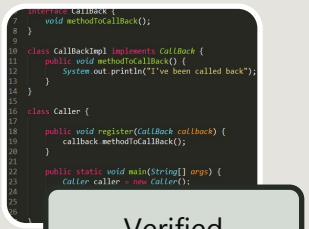
Analysis

Human Models


Human Experiments

Test – Model- Test


Validated Models


Verified Implementations

Modeling and Simulation Gaps