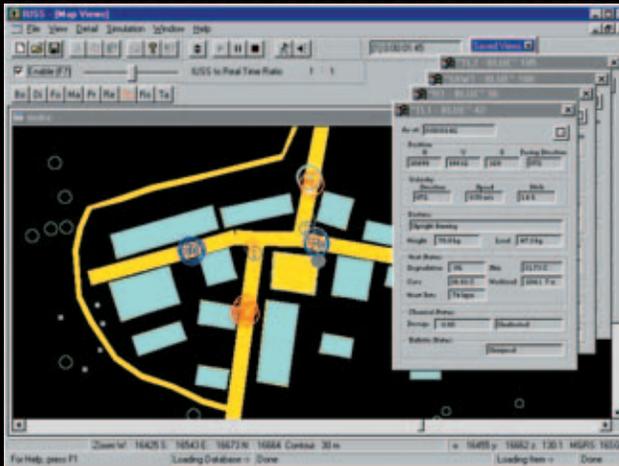


Modeling the Digitized Battlefield

Object Oriented Representation of the Battlefield:

Accurately representing battlefield conditions requires that numerous complex factors be taken into account. To this end the IUSS includes the following data types:

- **WEAPONS** — **Indirect Fire** (kinetic and bursting munitions, chemical weapons, smoke and minefields) **and Direct Fire** (small arms)
- **RESOURCES** — **Units/Personnel** (platoon, squad, fire team), **Attributes** (weapon/sensor capabilities, thermal load, ballistic injury, chemical exposure, situational awareness), **and Equipment** (weapons/ammunition, clothing, protective equipment, sensors)
- **ENVIRONMENT** — **Terrain** (3D representation, 2D plan view display, features and obstacles, line of sight) **and Dynamic Weather** (temperature, humidity, wind speed and direction, cover/solar load)
- **TASK NETWORKS** — **BOS-T** (move tactically, stationary, defend, attack) **and Combat Resolution** (Lanchester force on force algorithms)



In generating individual combatants for Distributed Simulations (DS), the model of choice is the **Integrated Unit Simulation System (IUSS)**. The IUSS provides the only DS-compliant tool to model both individual and small units in high resolution combat and operations other than war. The IUSS uses an object oriented programming paradigm which can support analysis, distributed simulation, mission rehearsal, and operational decision aids. The IUSS object hierarchy represents the digitized battlefield, quantifies the integrated effects of multiple battlefield stressors, and measures the response of the individual dismounted combatant to those stressors. The IUSS is the only tool currently available to represent complex psycho-physiological factors in a distributed simulation environment.

IUSS MISSION SCENARIOS: The IUSS models combat according to the **Battlefield Operation Systems — Tasks (BOS-T)** defined in the **Army Training and Evaluation Program (ARTEPs)**. These BOS-Ts are further decomposed into Battle Drills and individual soldier tasks, as required, to represent the complex interplay between the soldier's equipment, training, and reaction to the battlefield. By following this paradigm, the process of defining IUSS scenarios duplicates actual mission planning procedures, and the IUSS execution of these scenarios is a faithful representation of the soldier's training and operational procedures.

IUSS APPLICATIONS: High resolution simulation of dismounted combatants with small arms requires representation of the individual soldier, modeling target acquisition, weapon function, and terminal effects, all constrained by behavioral effects due to fatigue, thermal burden, and other battlefield stressors, with calculation of such factors as error budgets, terrain effects, line of sight, projectile fly out, target damage and potential for suppression. This degree of resolution is critical to analysis of the capabilities of future Land Warrior systems, for example, assessing the incremental improvements to small unit lethality afforded by the proposed Objective Individual Combat Weapon.

IUSS-DIS Architecture

The Benefits of Linking the IUSS and the Distributed Simulation (DS):

- **IUSS is the only existing high resolution constructive simulation of dismounted soldier interaction with battlefield environment, hazards, and threats.**
- **Dynamic aggregation of detailed soldier performance information into format accepted by existing DS simulators and other macro level simulations.**
- **Provides realtime analysis of simulation variables using off-the-shelf commercial software.**
- **Executes in better than real time on a PC for a platoon-sized force of individual dismounted soldiers.**

