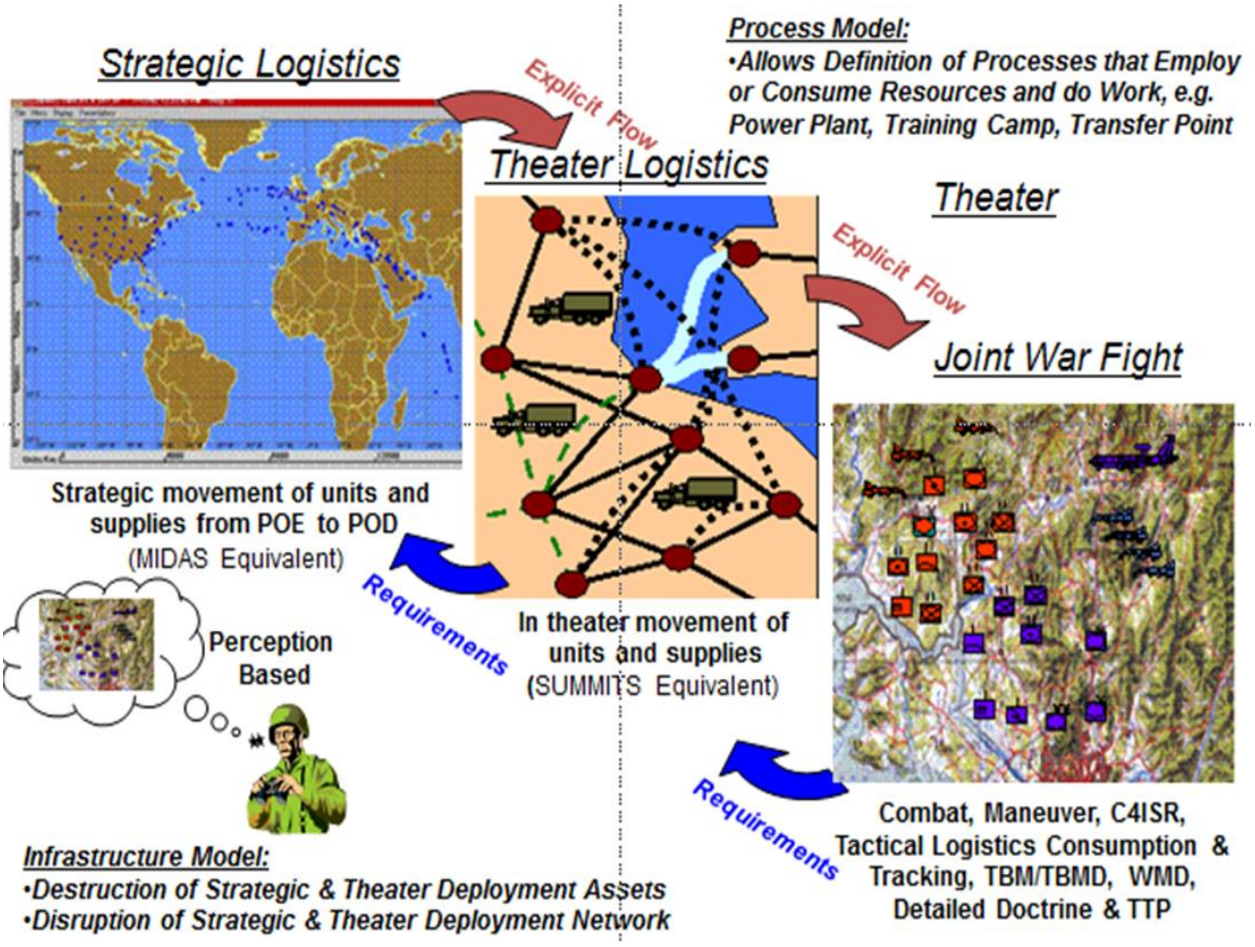
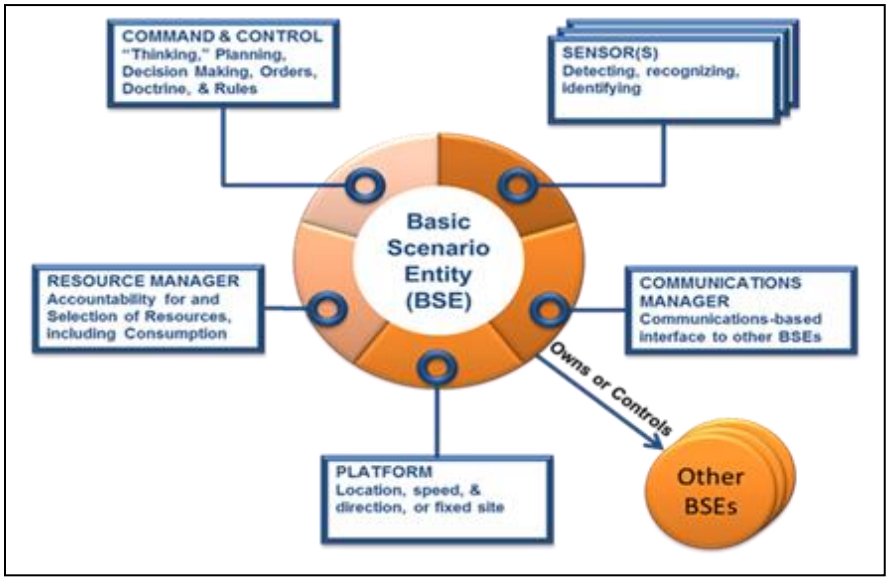
Simulation-Supported Wargaming at the Campaign Level

In his 2015 memo and article, former DepSecDef Bob Work stated in that "…players should be able to observe and live with the consequences of their actions in the face of a thinking and reacting competitor... Actions must have tangible consequences that are determined by the actual performance of weapons and sensors in the real world, backed by a rigorous adjudication process..."

The wargaming community has for years sought "in-stride adjudication" yet, from 2006 to 2010, the Joint Forces Command (JFCOM) (J9) Experiments and Exercises Division conducted simulation-supported wargaming using the government-owned Joint Analysis System (JAS), a minimally aggregated Campaign model with all weapon types explicitly represented, countable, and subject to destruction. JAS employed large numbers of computer agents and all information was passed in English readable messages over simulated communications, which were vulnerable to disruption. JAS is "data driven" meaning that almost all data can be input by the user and is not embedded in software. That includes the rules for JAS computer agents' behavior and a supplemental agent Knowledge data base containing doctrine and Tactics, Techniques, and Procedures (TTP) for agents assigned to specialized tasks such as fire support coordinator or transportation manager.



Agents, acting as Commanders, operate on the information they receive in status reports and map-based Common Operational Pictures (COP) and then set priorities and issue orders. When JAS is paused, humans can take the place of the agents' and receive the same information, make their own decisions, and issue orders. When JAS is restarted, the agents, including subordinates, fire support, logistics, etc. would then execute those orders as if they came from their superior agents.



Meeting DepSecDef Work's other 2015 dictum is even harder, "The best wargames seek to create an environment for applying critical reasoning techniques and diagnosing the characteristics of competition under the "fog" and "friction" of war where incomplete and imperfect knowledge prevails."

The computer agents' decisions are based on perceptions gained from the status reports and sensor inputs, as are those of the humans who take their places. Ground truth is also captured to evaluate the differences between ground truth and the perceptions to assess the cause of specific misses and disconnects.

JAS has several advantages for conducting advanced, perception-based, analytical wargaming:

1. The JAS simulation GUI/HCI and data tools support wargame preparation, building scenarios and ensuring that key questions are asked and that pauses are planned for critical decisions by humans.

2. JAS records all inputs necessary to rerun a wargame and since human inputs use the same meta-data as the computer agents, JAS can rerun a wargame at high speed with all human inputs executed by computer agents and get the same results as the original wargame. Then changes can be made, e.g., weather, enemy forces, etc. and the wargame can be replayed by humans or be run as a Monte Carlo simulation creating distributions of outcomes.

3. JAS allows rapidly reviewing the decisions made in a post-game AAR or potentially even a "half-time" review of what difficult decisions might be upcoming. Global. map-based video replay is recorded and can be played back at speeds and resolutions appropriate to the wargame, e.g., slow surface, or air/space. JAS uses a WGS 84 globe; ships, aircraft & space vehicle can circle the earth.

4. Recorded JAS scenarios or completed wargames can be electronically, "packaged" (pre-compiled) and sent to players' home stations, where they can rerun the game without requiring a software license. This means individuals or teams can replay the game or make changes and replay the game, potentially finding better solutions or more challenging red force responses.

JAS supports both a high-speed, event-stepped, multi-domain simulation and a detailed perception-based wargame. with explicit Land maneuver and C4ISR effects, including cyber and I&W. JAS can start pre-war preparing the battlespace and escalate from skirmishes to major engagements to full scale war with the option for WMD use. JAS has also federated to a mission-level model to view platform-level detail and simulated Non-combatant Evacuation Operations (NEO) during war.

When used together, the combination of simulation & wargaming allows improvements in both and promotes studies and analyses with the opportunity to employ the best of both analytical tools.

JAS is currently archived at OSD/CAPE and available on approval to both government and government-sponsored industry and FFRDCs. Let's revive it.

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