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Advanced Technology Laboratories

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Technology: Modeling and Simulation of Complex Systems

Getting it Right the First Time – CSIM

Introduction

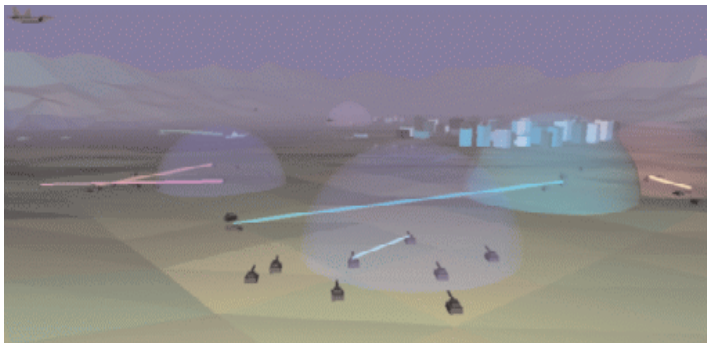
Imagine:

- Planning adjustments to large mobile networks of warfighters, manned and unmanned vehicles and aircraft in response to both natural and man-made changes in the operating environment.
- Designing complex hardware and software systems and being able to predict their performance.
- Accurately visualizing the performance of systems-of-systems in a synthetic world.

There is a clear advantage in being able to predict test, modify and/or redesign systems prior to deployment or even before the first circuit board is wired. Although the list above includes widely different challenges, there is one immediately available solution that can deliver these capabilities—Lockheed Martin Advanced Technology Laboratories' (LM ATL's) CSIM.

Multi-Purpose Simulation

CSIM is to systems designers what a wind tunnel is to aircraft engineers. It can also describe a network of computers and sensors or a mobile network of vehicles, aircraft and individual warfighters. CSIM will quickly and accurately check the performance of the virtual system and let planners or designers add, remove, or change hardware, software and/or operating conditions in the environment and visualize the results.



This is a simulation of a wireless communication network with events between aircraft and ground-stations. CSIM allows entities to move as the simulation progresses in time.

This proven toolset can realistically model and validate complex distributed architectures such as those for command and control, communications, real-time on-the-move networks, and avionics systems. CSIM can evaluate overall systems concepts and select the best design candidates before committing resources for detailed implementations.

CSIM is especially suited for the evaluation of rapid on-the-move communications networks to assist in mission planning. CSIM can simulate complex systems-of-systems consisting of thousands of hardware components and software tasks. It can also simulate the operation of very large wired and mobile-wireless networks much faster than real-time. This ability enables the evaluation of many contingency plans well-before mission orders are issued.

The simulation suite includes libraries of predefined models representing several domains including hardware/software architectures, queing systems, vehicles, wireless and LAN IP networks, continuous systems and human factors and crew manning models. Models can be quickly combined with new components and environmental elements to simulate and test the performance of innovative technologies integrated with existing systems. CSIM is, in fact, a general-purpose modeling technology for creating multi-entity synthetic worlds.

A Discriminator

Although CSIM has many applications, all are supported by a common tool suite, and LM ATL provides training and support. The proprietary CSIM technology license is available without charge to Lockheed Martin business units.

CSIM is valuable to Lockheed Martin as a discriminator—LM ATL has repeatedly demonstrated that CSIM promotes concurrent design of complete systems and accelerates prototype development.

For more information:
www.atl.lmco.com/proj/csim/

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