

Integrated Defense Systems  
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## FCS System of Systems Integration Laboratory

Boeing's state-of-the-art System of Systems Integration Laboratory (SoSIL), located in Huntington Beach, Calif., opened in January 2005 to support the U.S. Army's Future Combat Systems (FCS) program. The FCS Lead Systems Integrator team of Boeing and Science Applications International Corporation (SAIC) and industry partners are using the 140,000-square foot facility to validate hardware and software and refine technologies that will give America's soldiers the edge on the 21<sup>st</sup> century battlefield.

The SoSIL is a large-scale communications network for modeling and simulation, hardware and software integration and virtual operational testing, and also offers a "soldier-in-the-loop" capability. Long before the FCS family of vehicles and sensors and associated software are deployed, they are integrated and tested in the SoSIL. The SoSIL can be linked to other government and industry test facilities and is the central node for safe, real-time transmission of test data across geographically dispersed FCS sites.

For FCS test events, engineers and technicians harness the lab's massive computing power and leverage modeling and simulation tools to create an extensive three-dimensional digital battlefield. Terrain, weather, electronic jamming effects and other elements are manipulated to ensure testing is conducted using varied conditions. Into this virtual battlespace, SoSIL engineers load and integrate software models depicting many of the FCS platforms under development.

During testing, role players participate from enclosures, called "wireframes," that replicate all the manned ground vehicles (MGV) on the battlefield. In front of each participant's seat is a warfighter-machine interface (WMI), the evolving FCS control and display technology that allows human beings to take part in virtual combat. The wireframe seats are arranged in the same positions that Army crews will occupy in the manned FCS ground vehicles.

For the FCS unmanned aerial vehicles, rack-mounted computing hardware hosts individual UAV simulations. The Class IV UAV simulation is controlled by a MGV

operator who uses one of the common crew stations for UAV control and mission tasking. This capability includes developing and uploading the UAV's mission plan, monitoring mission progress and modifying the mission profile in real time. The Class I UAV simulation can either be controlled from the MGV, similar to the Class IV, or controlled from a hand-held Centralized Controller operated by a dismounted soldier. In the SoSIL, the Centralized Controller is simulated using one of the wireframes that displays the WMI and allows the operator to control and receive sensor data in a simulated battle.

Test activities are closely monitored by the FCS team, including Army representatives, in the SoSIL's Test Operations and Control Center (TOCC). Team members can monitor specific vehicles or soldiers as well as interject new data into the scenario from the TOCC.

To date, integration and testing in the SoSIL has helped not only to mature technologies, but to reduce program risk as well. As the program evolves, the SoSIL will continue to play a key role in advancing FCS systems toward implementation and in turn help lead the Army toward a more capable and flexible future force structure.

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May 2007

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