

Technology Watch

### **Space School; U.S. Air Force Lab Simulates Feel of Operations Centers**

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A secure phone rings inside a U.S. Air Operations Center. Officers scurry to coordinate the UAVs, reconnaissance planes and satellites that are used behind the scenes in the war in Iraq. CNN is on one screen.

On the phone, a commander says he suspects insurgents have installed improvised explosive devices (IEDs) along a critical roadway. A sandstorm is complicating the collection of airborne imaging. Can a space sensor see what's going on?

A space specialist snaps into action. Looking at a display, he sees that the best satellite sensor for that job is not available for some reason Maybe it's broken. Maybe someone is jamming communications. Or maybe it has a bead on Osama bin Laden. The specialist doesn't have time to care. He begins analyzing the IED problem for the commander using other options he's been trained to understand.

This hypothetical drill captures one of the thrusts at Air Force Space Command's \$1.2 million Space Power Laboratory in Colorado Springs, Colo., an Air Force contractor said. A reality of war, obviously, is that not everything goes right. Sensors break, or they're busy with higher-priority tasks.

"How do you deal with a degraded environment and still get the job done?" Dennis Murphy, a retired Air Force colonel, said. "We're focused on that more and more."

Murphy is manager of the **modeling and simulation** services division of Alion Science and Technology, McLean, Va., which built the Space Power Laboratory for Air Force Space Command. The highly classified room was set up in 2005 in Colorado Springs to simulate the space elements of an actual Air Operations Center (AOC). Its computers and work stations are modular, so they can be assembled to simulate other non-AOC configurations as well.

Murphy and his Air Force colleagues call scenarios such as the Iraq drill "pop quizzes." To make them especially realistic, the Space Power Lab has the same desktop workstations, software, wall-mounted displays and even telephones as American AOCs around the world.

During an exercise, students view simulated satellite tracks, orbits and images, and practice analyzing and coordinating space capabilities for commanders on the ground. They might have to do that someday in the crunch of a life-or-death battle.

#### Space Commission Roots

Air Force Space Command established the Space Power Lab in response to the 2001 Commission to Assess U.S. National Security Space Management and Organization. This panel of experts, which was chaired by Donald Rumsfeld before he became defense secretary, called for creation of a "cadre of space professionals" similar to the cadres of U.S. naval and air experts. Not all of the commission's recommendations have been followed, but Air Force Space Command jumped on the cadre call.

The command set up a National Security Space Institute (NSSI) to teach officers everything from satellite acquisition strategies to satellite operations and space law. The Space Power Lab was opened in 2005 as a key

element of the NSSI.

Approximately 2,000 students a year attend the NSSI, though not all of them participate in exercises at the 30-person Space Power Lab. In just two years, the lab has become the heart of the NSSI.

"The Space Power Lab is as much a part of the NSSI as your telephone is of your office," said Army Lt. Col. Richard Wolfe, the mission support director at NSSI, and the school's liaison to the Army.

The lab is housed inside a leased building with walls and computer systems specifically designed to protect top-secret information so students and instructors can freely discuss the attributes of military satellites and the so-called "national assets," or spy satellites. Air Force commanders are considering a proposal to move the lab and NSSI from its leased home onto the grounds of Peterson Air Force Base in Colorado Springs.

The possible move, however, appears to be another step toward formalizing creation of a "space cadre" as envisioned by the Space Commission. The space commissioners noted that leading pioneers of American naval and air power, including Hyman Rickover, Curtis LeMay and Hap Arnold, could not have succeeded without thousands of skilled people below them. The same needs to happen in the space arena, they said.

"The NSSI was born and raised -- and from its inception has existed -- during a time of war. So, we are very focused on preparing the individuals that go through this organization for their wartime role," Wolfe said. "Every rotation, we're learning more and more how to effectively employ space capabilities and better support the war fighter."

The overarching goal of NSSI is to "integrate space capabilities into the ground war fight," Wolfe said. The lab's curriculum is continually adjusted with real-world anecdotes.

#### Trying To Communicate

Wolfe's assignment to NSSI might be a product of an important lesson. Most space assets belong to the Air Force, yet Army ground troops, arguably, have the greater need for them. Commanders from different services haven't always communicated well with each other, and at times that has gotten in the way of incorporating satellites into the battle as effectively as possible.

"There's the rub," Wolfe said. "Services speak differently, and space is technically complicated and rapidly developing. You've got all the different elements in play at the same time. We need to understand better ways of communicating."

As an Army officer trained as an expert in space capabilities, Wolfe is continually working to improve operational communications through his role as the liaison to NSSI. He has plenty of firsthand insights of his own through deployments in support of U.S. troops in Afghanistan, Iraq and the Horn of Africa.

Those lessons often have as much to do with human communications as with the technical capabilities of space systems. Decisions about whether or how to apply space assets, for example, can be unavoidably complicated, which makes efficient communications critical.

"It's not as easy as simply making one phone call and getting one answer. There's a lot of coordination that has to happen. There's a lot of different perspectives. There's different service interests and needs. That all needs to be fused together," Wolfe said.

AOCs are a curious mix of new and traditional communications technologies. Telephones can seem old-fashioned in our e-mail world, but they remain critical for fast, efficient military communications. With e-mail, "You don't know what the guy's tone is," Wolfe said.

The Space Power Lab has become a forum for teaching those real-world lessons to the next generation of space experts.

"It allows us to fuse that data and teach the relevancy downrange in a more effective way than table-top exercises or simple narrative examples would do," Wolfe said. \*

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