The Air Force derives great value from its complex experiments, which will continue even if Joint Forces Command is shut down.

During an intensive joint experiment a few years ago, a new Air Force communications concept was tested against a series of real-world and simulated scenarios at the testing range near Nellis AFB, Nev. Air Force planners hoped their idea would successfully marry up a range of communications tools needed in combat.

Forces in Southwest Asia at the time needed a way to join disparate data links and cellular voice systems which didn’t plug in to one another, and allow a main server to store the data from these devices and share it with forces from an Army unit on the ground to a pilot in the air.

The Battlefield Airborne Communications Node, known as BACN to the troops, proved successful.

BACN was just one innovation that underwent testing during Joint Expeditionary Force Experiment 2006—an effort run by the Langley AFB, Va.-based US Global Cyberspace Integration Center, now known as the Air Force Command and Control Integration Center.

“We are the focal point for Air Force experimentation,” said Col. Todd
A great deal of the center’s work, such as the successful BACN effort, finds its way quickly to the front lines in Southwest Asia. “We delivered that on a leased platform; now they need it so much we are pulling new capability in,” Whitlow said. The center this year will experiment with products and enhancements to add to the BACN tool. Air Force plans call for integration of BACN onto long-loiter platforms such as the RQ-4 Global Hawk remotely piloted aircraft.

Feeding Off the Input

With Secretary of Defense Robert M. Gates’ announcement last summer of the planned closure of US Joint Forces Command at Norfolk, Va., questions about the future of service-level integration and experimentation efforts have returned.

From the Air Force perspective, those involved with the tricky work of tying together networks and capabilities say they don’t expect much to change, regardless of whether JFCOM remains open or closes. From his perspective at the AFC2IC, Whitlow said, the Joint Staff will still put out joint taskings for needed capabilities, and the center will address them. “Some things we obviously don’t know,” he added. But “the truth is,” that process comes from the Joint Staff; it “still puts out the warfighter gaps, [and] we feed off those inputs,” he said.

What JFCOM calls “joint concept development and experimentation projects” are derived from combatant commanders and service challenges and needs submitted through the Joint Staff’s assessment process, according to Maj. Gen. Joseph Reynes Jr., the director for joint experimentation at JFCOM. Speaking with reporters after
a meeting of senior NATO and allied leaders in Brussels, Belgium, he noted JFCOM helped coordinate a two-year multinational and interagency effort called Multinational Experiment 6 that focused on developing and improving tools and capabilities to help counter irregular warfare threats, from intelligence sharing to campaign assessment tools.

In the Joint Area

The lessons from MNE 6 will go into NATO doctrine, Reynes said, and DOD and the allies now have a better understanding of the difficulties faced in irregular environments. An example he highlighted was a successful effort to develop a software program to allow all coalition partners—not just NATO nations—to get visibility into the logistics networks, requirements, and assets used today to support efforts in Afghanistan. “Before this, everyone had to do this manually, if you were outside of the NATO system,” he noted, adding that the tool is being fielded directly from the experiment to NATO’s International Security Assistance Force headquarters in Afghanistan.

“Now when we go into action, we will have better visibility in these environments.... We will more effectively move parts around and support our allies,” he said when asked about the implications of the tool for deployed airmen. “The logistics transparency will be beneficial to us as airmen, because we will be able to be more effective and more efficient in support of coalition forces.”

Efforts such as MNE 6 are assembled from ideas that start down at the service and combatant command level. Each service has an experimentation plan, and JFCOM provides the direction for overarching gaps in capabilities between services, Whitlow noted. “We look at those gaps, and we use that to derive experiments.”

Joint experimentation is not confined to the dictates of JFCOM planners, either, and he doesn’t anticipate this aspect changing regardless of JFCOM’s fate. The services are all “working hard in the joint arena,” Whitlow said of past JEFX
JEFFX Brings Home the BACN

The Joint Expeditionary Force Experiment (JEFFX) franchise, now entering its 13th year, is a series of live, virtual, and constructive experiments designed to rigorously assess and recommend certain tools needed to plug gaps in capabilities between the Air Force and other services. The program is credited with proving and speeding critical concepts and technologies, such as the Battlefield Airborne Communications Node, to the front line.

Today, BACN is operational in the skies over Afghanistan, helping patch together a vast network of US and coalition communications networks, radios, and data links to speed valuable intelligence-surveillance-reconnaissance information to and from commanders on the ground and operations centers far from the battlefield.

BACN works as an airborne server on a leased civilian airliner, storing and sharing data for a wide range of users. It allows troops with different radios to speak with one another over long distances, or past obstructions such as building or mountains. Ground-based units can call an aircraft above, and share accurate targeting information on beyond-line-of-sight targets. Via BACN, aircraft without data links can connect with newer aircraft equipped with modernized links.

In addition to BACN, JEFFX is hailed for shepherding the Strategic Worldwide Integration Capability, a tool for planning and executing global strike missions, and for Project Suter, a command and control tool for targeting networked threats with both kinetic and nonkinetic operations.

efforts and coordination with other entities such as the Navy’s US Fleet Forces Command’s Second Fleet. Everything they do, “it really doesn’t change for us,” he said. “If we are not operating joint, then what are we doing?”

The AFC2IC, in addition to being the caretaker of JEFFX, works with organizations across the Air Force, from Electronic Systems Center at Hanscom AFB, Mass., to the 505th Command and Control Wing at Hurlburt Field, Fla., Whitlow mentions, in addition to the test community and the respective commands. All of these organizations have large stakes in the outcome of their experiments, as do other service organizations involved, such as Second Fleet. “All these partners help us with bits of technology and procedures. They’ve all got equities in this,” he said.

Experimentation venues, unlike exercises, are arenas where USAF and others can bring in new technologies or procedures and try them out—and for every one that succeeds, many will fail. While JEFFX efforts at the AFC2IC are funded by USAF, partners such as the Navy are critical to making them work, Whitlow added, as there will be planning conferences—which examine certain technologies and what can be done with them in various environments—and in some cases shared assets. Whitlow indicated a JEFFX effort later this year will run side by side with the Navy’s Trident Warrior, a sea-trial experiment series. “We will share airplanes and assets and networks, and as we both look towards our objectives, we will share resources and synergize,” he said.

The AFC2IC has themes it establishes for JEFFX. Fiscal 2010 focused on irregular warfare activities, and 2011 is stressing degraded space capabilities.

“We want to see what happens when you degrade the capability you’re getting from space,” Whitlow said.

“How would we operate without all of this marvelous technology we’ve gotten used to?” he said of upcoming experiments. How would USAF, the Navy, and other services address not being able to access tools such as the GPS constellation or communications satellites?

While OSD is now pressing services hard to ferret out operational efficiencies, the JEFFX experiments have already focused on many of the same issues. “We have been working on efficiencies for a number of years in a joint capacity,” Whitlow said. He highlighted a recent experiment in Fiscal 2010 between the Air Force and Army that tested the process of combat air control, and how those lessons and procedures could be passed on to the next unit taking on a troop rotation. Between close air support and other support missions, coordinating artillery, and other issues, there is a great deal of cooperation needed between the two services. “It’s a matter of how we coordinate that airspace and get our procedures more efficient,” he added.

Integration efforts through experimentation will grow in importance in the coming years, not diminish, regardless of JFCOM’s fate, according to USAF’s senior integration and information technology official.

Lt. Gen. William T. Lord, the Air Force’s chief of warfighting integration and chief information officer, wonders what happens to stakeholders of a big program such as the now-cancelled Transformational Satellite Communications System (TSAT). What is the impact of that on systems such as BACN, the Mobile User Objective System (MUOS), the Navy’s ultrahigh-frequency satellite communications system designed to replace legacy UHF
systems and improve access, mobility, and quality of service), and a host of other programs and systems? Making sure the services and coalition allies can all plug in and talk with one another is important to the success of future operations, and since USAF maintains and develops much of the networks from orbits to ground stations, it must tackle these problems.

When asked during a November meeting with reporters what the Air Force would do differently if JFCOM were shuttered, Lord said he didn’t know, but noted the work of the Air Force Agency for Modeling and Simulation, one of the organizations that collaborates on JEFX experiments and works under his chain of command. “We do think there is some live, virtual, and constructive work that we can use, along with the distributed mission operations stuff, to model things that maybe can get after some of that experimentation that potentially could go away … if Joint Forces Command does disappear,” he said.

Blending live and virtual simulation is crucial to proving concepts, Whitlow said. “The things I cannot do modeling and sim for, I have to live-fly.” The goal is a realistic operational environment, but some pieces have to be replicated and simulated and must plug into live efforts at the same time.

With USAF facing budget reductions and tasked with maintaining high-end platforms for years to come, a great deal of synergy can be obtained by networking platforms together, Lord said. “I think we’re good at [networking] the terrestrial layer and we’re good at the space layer. We need to get better at the aerial layer,” he said. As the Air Force’s senior leader for communications, Lord said the air piece is the part of the spectrum he wants to solve and will push hard for solutions in the near term.

“What happens when you put effective blades, which are routers, on devices that are traveling at Mach 3? Or in a missile at Mach 6?” he asked.

**Tying In AirSea Battle**

Similarly, how do airmen and other troops get in and out of a network, or use the nontraditional intelligence-surveillance-reconnaissance capability of an F-35? As an F-35 collects intelligence data in its stealth mode, and then returns to secure airspace, how do airmen get that fighter to broadcast and share its information? “What kinds of networks are available?” Lord asked. “What’s the wave form of those networks? There are a lot of programmatic things associated with that.”

Lord said he will focus in the near term on sorting out wave forms and communications such as the Tactical Targeting Network Technology concept, software programmable radios, and other tools. There are many questions that need answers: How does the Joint Tactical Radio System fit in? Is the Multifunction Advanced Data Link going to be the network of the future? Is it Link 16, or Link 11? A B-1B heads back to Nellis after flying a JEFX bombing mission. Future experiments will focus on improving AirSea Battle capabilities, which lean heavily on long-range platforms.

“All of that … needs to get integrated and architectured and that’s what I’m going to go after,” Lord said.

The emphasis on tying together networks does not surprise those who work in USAF experimentation. Connectivity and command and control are crucial to almost all experimentation efforts and capabilities, Whitlow noted. Command and control “rubs up against everything,” he said.

Cyber warfare and network protection may be getting a lot of attention, and experiments with capabilities such as tactically unbreakable communications with unmanned systems involve cyber tools, but they all tie in to C2 and the ability for air, space, sea, and land forces to reach and control capabilities.

Future experimentation will involve some of USAF’s newest doctrinal concepts, such as the AirSea Battle. In Fiscal 2012, JEFX experiments will focus on solving questions and gaps related to integrated missile defenses and AirSea Battle. Currently, a team at AFC2IC is assembling strategy and plans for experiments, and coordinating combat forces talks with the Navy.

“Those develop a lot of the things we’ll work with that will be very tightly integrated with the Navy,” Whitlow said, “and we won’t be doing much without them.”