



# SPACE to GROW

New Satellite Communications Operations Center  
maximizes capabilities of Wideband Global SATCOM Satellites

*by Derald Franklin*

**T**he new Wideband Satellite Communications (SATCOM) Operations Center (WSOC) at Joint Base Pearl Harbor-Hickam, Wahiawa, HI, is the first of a new generation of satellite control facilities, with much-needed space for expanding missions and the modern wideband control systems required to fully use the expanded capacity of the military's new Wideband Global SATCOM (WGS) satellites.

"We replaced the 1980s-era satellite control capability that we had at Camp Roberts, CA, with this state-of-the-art \$25.3 million facility here at Wahiawa," said LTG Richard P. Formica, Commanding General, U.S. Army Space and Missile Defense Command/Army Forces Strategic Command (USASMDC/ARSTRAT). The team at Wahiawa will manage the satellite payloads and "provide critical communications, navigation, and other

space-based capabilities to our warfighters," Formica said.

"Inside this center, and within the WSOCs around the world, dedicated Soldiers, civilians, and contractors will coordinate and control the vast majority—in fact, virtually all—of the military's wideband SATCOM capacity that is used to support U.S. combat forces in Iraq and Afghanistan, our fleet forces afloat, and

## WGS IN ORBIT

The new WSOC has visibility to more Pacific region satellites, including the military's new WGS satellites, one of which is shown here. "This enables the best support and coverage for PACOM [U.S. Pacific Command] theater wideband satellite communications requirements," said LTG Richard P. Formica, Commanding General, USASMDC/ARSTRAT, who added that the Wahiawa WSOC is the designated test facility for payload control validation for future WGS launches. (Illustration by Mark Wall.)



### MANAGING SATELLITE OPERATIONS

A Soldier of the 53rd Signal Battalion works on the operations floor in the newly dedicated Wideband Satellite Operations facility in Wahiawa, HI. (U.S. Army photo by D.J. Montoya, 1st Space Brigade Public Affairs.)

Soldiers, Sailors, Airmen, and Marines stationed around the world who work daily to defend our great Nation,” he said.

### SATELLITE CAPABILITIES

Each WGS satellite has a throughput of approximately 4.75 gigahertz of bandwidth, equating to 2.1 to 2.5 gigabits per second of communications. That’s about 10 times the bandwidth capacity of a Defense Satellite Communications System (DSCS) satellite, enough capacity to transmit approximately 3 million web pages per second, 400 Predator video feeds per second, or 0.5 high-resolution CT (computed tomography) medical scans per second.

“A single WGS satellite equals the bandwidth capacity of the entire 10-satellite DSCS constellation,” said Dan Hannan, USASMDC/ARSTRAT Senior Technical

Manager. “We’ll be able to support many, many more warfighter missions with WGS compared to DSCS.”

SSG Michael Clifton agreed. Clifton is a 25S SATCOM Systems Operator/Maintainer with Delta Company, 53rd Signal Battalion, 1st Space Brigade, which staffs and operates the WSOC 24-7. With the combination of WGS satellites and the new wideband control systems, “If warfighters call up with issues, our operators can pull things up and respond a lot faster,” he said.

COL Jeffrey Mockensturm, Project Manager Defense Communications and Army Transmissions Systems (DCATS) in Program Executive Office Enterprise Information Systems (PEO EIS), said that controlling WGS satellites, compared with legacy DSCS satellites, is “a

geometric leap in terms of complexity of the mission for these satellite controllers.” For one thing, DSCS satellites transmit in only X-band, while WGS satellites transmit in both X-band and Ka-band, but the difference is more than that, Mockensturm said.

“The WGS satellite is so much more complex,” he said. “WGS is not just a bigger pipe, but more pipes and the ability to switch between pipes on the bird, coming up on one frequency and going down on another. In the case of Ka band, we have dual simultaneous polarity, making two channels from one.”

“Thanks to WGS, ground forces who are using an X-band terminal or radio have the capability to communicate with other forces who are using a Ka-band terminal or radio,” said Michael McGarvey,

DCATS' Product Director Wideband Control. "That means warfighters on a battlefield won't have to wait in a queue for channels to open up."

"That's called 'cross-banding,'" added David Morrissey, DCATS' Acting Deputy Product Director Wideband Control. "It provides the warfighter faster, readier access and is a big deal in places that don't have land-line infrastructure, such as Afghanistan."

### MANY PIECES, PLAYERS

The Naval Facilities Engineering Command Hawaii oversaw the construction of the Wahiawa WSOC, with USASMDC/ARSTRAT tasking three project management offices of PEO EIS to provide the operating equipment and systems.

PEO EIS' DCATS Satellite Communication Systems (SCS) product office installed a satellite terminal that had been refurbished at Tobyhanna Army Depot, PA, as the auxiliary satellite control terminal at Wahiawa while the Camp Roberts WSOC remained operational. "That way there was no loss in satellite coverage of the Pacific while we were installing the terminal at Wahiawa," said Dwayne Cartagena, DCATS' SCS Product Leader.

The SCS product office provided an AN/GSC-52 satellite terminal to serve as the WSOC's auxiliary satellite control terminal, supplied baseband equipment, and linked the WSOC's Interconnect Facility to three nearby AN/FSC-78 satellite terminals and two nearby Ka-Stars (Ka-band Satellite Transmit and Receive System) satellite terminals.

PEO EIS' DCATS Wideband Control product office provided the wideband control systems at the Wahiawa WSOC. These systems included a patch and

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test facility; Common Network Planning Software (CNPS), which allows planning of links for maximum WGS satellite throughput; the Global Satellite Configuration Control Element, which sends payload commands to WGS satellites and gets telemetry information back; the Wideband Global Spectrum Monitoring Subsystem; the Replacement Frequency Modulated Orderwire, which provides a secure interface between the WSOC and tactical satellite terminals; the Replacement Radio Frequency Interface Subsystem, which does frequency conversion between the WSOC and satellite terminals; and the Wideband SATCOM Operations Management Subsystem, which provides a workstation allowing Soldier operators to access any wideband control system, whether it controls new WGS or DSCS satellites.

### INSIDE THE WSOC

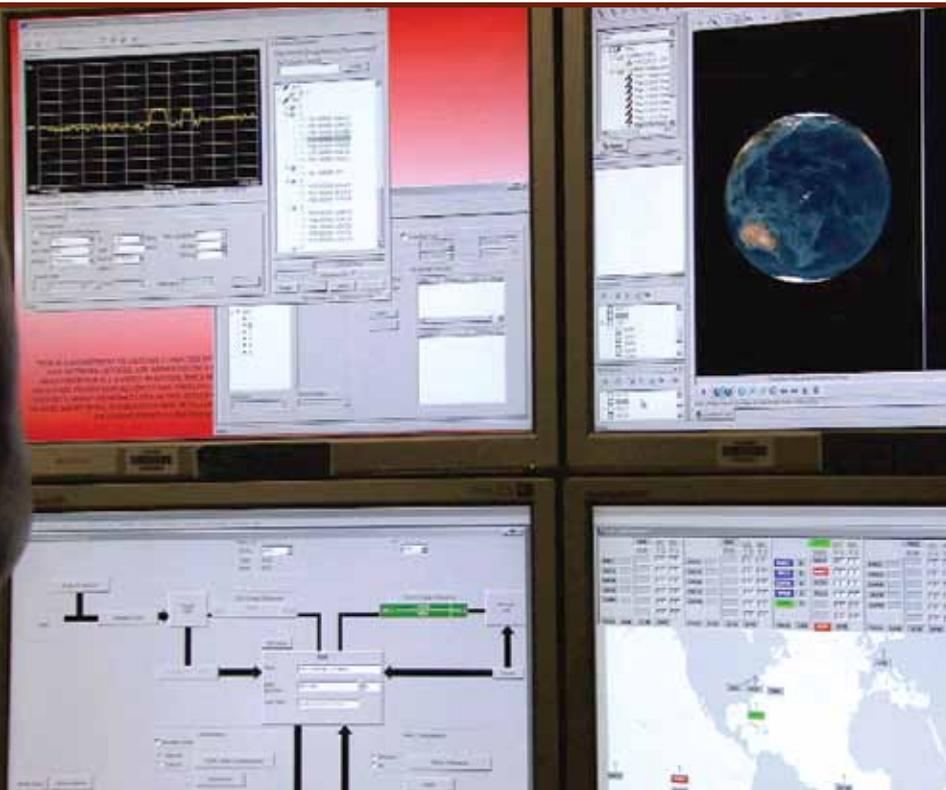
"CNPS has more integration with other systems and is more automated. Everything's tied together; we don't have to do work-arounds," said Clifton.

Configuration Manager Bill Westgate, who designed the layout and supervised the installation of wideband control equipment racks and workstations, said that "certain systems had to talk to other systems, both red [unencrypted] and



### BUILT-IN BACKUP

Workers install a radome over the auxiliary satellite control terminal at the Wahiawa WSOC. (U.S. Army photo by Steve Wikoff.)



#### ACCESS POINTS

The new WSOC at Wahiawa, HI, hosts workstations, such as those shown here, allowing Soldier operators to access any Wideband Global SATCOM wideband control systems along with Defense Satellite Communications System legacy wideband control systems. (U.S. Army photo by Rob Lorkiewicz.)

black [encrypted], so I had to locate them to facilitate that.”

The new 28,244 square-foot Wahiawa WSOC employs a standardized floor plan that allows sufficient space for satellite operations; equipment areas; offices; training, conference, fitness, and supply rooms; and even rooms set aside to support future missions. The facility is nearly three times the size of the 9,600-square-foot WSOC at Camp Roberts that it replaced.

“It’s an orders-of-magnitude difference,” said Steve Wikoff, USASMD/ARSTRAT Operations Analyst at the Wahiawa WSOC. “The operations floor at Roberts was pretty cramped. We couldn’t get any more equipment in there.”

The biggest challenge for PEO EIS’ Command Center Upgrades/Special Projects

Office (CCU/SPO) was in sequencing deliveries of equipment, furniture, and other materiel from multiple project managers. “As much as possible, we sequenced it so that materiel was shipped directly to the site and then staged in the proper area within the building, without having to be sent to a warehouse,” said Ray Lorenzo, CCU/SPO Project Leader.

“It was a pretty compressed schedule to meet the IOC [initial operational capability] date of December 23,” said Cartagena.

#### MODERNIZATION MODEL

Formica said that the layout of the Wahiawa WSOC will serve as a template for modernization of WSOCs at Forts Detrick and Meade, MD, and Landstuhl, Germany, over the next three years. Meanwhile, DCATS’ Wideband

Control product leaders will continue to provide more capabilities, allowing operators to tap the increased potential of WGS satellites.

Morrissey said that, as funding permits over the next few years, DCATS’ Wideband Control product office plans to provide additional wideband control systems, such as the Remote Monitoring and Control Element, which will allow remote control of WGS satellite payloads and remote spectrum monitoring of satellite terminals not co-located at the WSOC; the Power Control Management Subsystem, which will measure the quality of signal strength and automatically increase the power, as needed, when the signal is attenuated due to atmospheric conditions; the Joint Management and Operations Subsystem, which will provide situational awareness of Internet protocol over SATCOM for WGS; and the Wideband SATCOM Trend Analysis and Anomaly Resolution Subsystem, which will provide situational awareness of all networks over WGS.

“Our goal is to continue to provide USASMD/ARSTRAT with the wideband control tools required to perform their payload configuration and control mission,” said McGarvey.

“This is no small task, and our Soldiers and civilians take pride in their ability to maintain that lifeline that secure communications bring to those who are serving in harm’s way,” said Formica.

*DERALD FRANKLIN is the Project Leader for Satellite Spectrum Monitoring Systems for the DCATS project office, as matrix support from the U.S. Army Communications-Electronics Research, Development, and Engineering Center. He holds a B.S. in computer science from Thomas Edison State College.*