

JUICE 2011

Joint User Interoperability Communications Exercise

The U.S. military continues to build off of the advances in satellite communications development. With more than enough "juice" powering the communications backbone of a recent exercise, soldiers, Marines, sailors and airmen trained and advanced their tactical and communications skills in a joint and realistic operational environment during the Joint User Interoperability Communications Exercise (JUICE) 2011.



USARPAC Vehicle use in JUICE COTM exercises

In its 18th consecutive year, the JUICE command operations center was headquartered in Aberdeen, MD, and tasked with helping warfighters, government agencies and Allied nations to communicate in a joint, integrated fashion. The June exercise was conducted across locations in North America, Asia and Europe with an objective to evaluate new and emerging technologies to see how they operated in a joint task force environment. JUICE also validates the tactical concept of operations and management/reporting processes for interoperability with the Department of Defense (DoD) Global Information Grid in support of deployed soldiers, Marines, sailors and airmen. The exercise is sponsored by the U.S. Army PEO C3T, CECOM Life Cycle Management Command Software Engineering Center in concert with Strategic Command (STRATCOM) and hosted by the Executive Agent Theater Joint Tactical Networks (EA-TJTN). JUICE simulates real-world scenarios and battlefield settings, and similar to the previous 17 exercises, this year's JUICE didn't disappoint.

JUICE played host to U.S. military agencies, the Department of Homeland Security (DHS), numerous federal, state and local organizations, and more than six Allied or coalition nations. Considered one of the top 10 DoD exercises, JUICE facilitates collaboration among DoD, DHS and other organizations to train on developing a joint response to warfighter scenarios, natural and man-made disasters, and humanitarian relief.

JUICE 2011 - Joint User Interoperability Communications Exercise

The exercise demonstrated just how versatile and dependable satellite technology has become, with the help of industry partners like iDirect Government Technologies, Inc. (iGT). The satcom provider participated in JUICE and focused on the four tiers of the tactical edge of the joint information environment: fixed centers, mobile centers, mobile platforms and dismounted users. iGT's JUICE objectives were divided into four functional areas to successfully support a broad selection of participant missions:

- United States Army Pacific Command (USARPAC) validation of network operation and communications interoperability while on the move
- Air Force, Air Force Reserve and Air National Guard operation of Theater Deployable Communications (TDC) Initial Communications Element (ICE) v3.0 Hub/Spoke Satellite Architecture
- National Guard Joint Incident Site Communications Capability (JISCC) system participation
- Riverbed and LifeSize third-party product interoperability and performance testing

iGT was on site to demonstrate several critical satellite capabilities. During the 18-day exercise, the iGT platform was put to the test, successfully proving its ability to meet multiple cores and emerging military requirements.

The iGT satellite communications network consisted of two satellites: AMC-21 and TeleStar-14, and four teleports located in California, Maryland, Texas and Virginia. Terminals were located in eight states: Florida, Georgia, Oklahoma, Maryland, Hawaii, Maine, Arkansas and Virginia.

At the Aberdeen Proving Ground, the U.S. Army Communications and Electronics Command, Life Cycle Management Command, and Executive Agent for Theater Joint Tactical Networks JUICE 2011 Command and Control Center used an iDirect Model 12200 4-slot hub, configured with four iDirect Evolution® eM1D1 line cards operating two versions of the iDirect iVantage® Network Management System simultaneously, commonly referred to as "split hub operation."

Communications on the Move Demonstration and Support

Utilizing satcom support from iGT, the first test scenario provided secure hub-to-vehicle transmissions to tactical units in the field. A transmit carrier extended from Maryland was able to communicate with USARPAC Communications on the Move (COTM) vehicle located in Oahu, HI, and with the Revenge Advance Composite's (RAC) combatant craft located in Tampa, FL. USARPAC's command vehicle was installed with an e8350 Evolution modem and used the COBHAM/TRACSTAR satcom antenna for connectivity. Warfighters benefitted from having seamless, high-speed broadband connectivity across a single satellite hop, whether on land, in the air or installed on high-speed vessels.

iGT provided a single uplink that was shared by both COTM remotes using Binary Phase Shift Key (BPSK) with a spread factor of two and Turbo Product Code Modulation, with a usable information data rate of about 850 Kbps. The test was started with an information rate of 512 Kbps, which grew in bandwidth by 100 Kbps until reaching the 850 Kbps limit.



iDirect 15100 Satellite Hub

Due to rainy conditions and heavy cloud cover, each of the two remotes experienced some degradation in service, a scenario that was completely unavoidable based on the receive and transmission capabilities of antennas used during testing. iDirect's iVantage software package, which ran on the network management server at the hub location, would automatically increase a remote transmit power experiencing the degradation of service. However, the heavy cloud cover caused the remote to drop completely out of the network until conditions improved.

Despite the weather impediment, all of the tests were successful using the hub equipment, which included a 4-slot ruggedized chassis with Dell Poweredge® servers and a Single eM1D1 Card connected to a L3 3.9M Multi-band Lightweight Medium Aperture Antenna. The voice and data quality were exceptional.

The iVantage Global Network Management System split-hub feature demonstrated in JUICE 2011 enables satcom network operators to support a variety of terminals of different ages and software releases within the same architecture with unified network operations.

iGT Support for TDMA Satcom Support for Air Force Forward Command

Seven remote regions – including Robbins Air Force Base, Aberdeen, 117th in Savannah, GA, Tinker Air Force Base and MacDill Air Force Base – were linked together via secure satellite communications. Using the same 4-slot chassis and iNFINITI™ and M1D1 cards in the first two slots, a hub carrier at 4Mbps provided connectivity to the remotes on an outbound channel. Each of the seven remotes in the network shared a single in-route frequency at 2Mbps transmitting personal traffic on specific time slots. The network operated on a single L3-GCS 2.4M Hawkeye lite radio frequency (RF) terminal. Using legacy-based iDirect software Version 7.1.2, this satcom network operated in full transmission security (TRANSEC) mode. iGT's Network Management Server (NMS) required each remote operating in this TRANSEC network to authenticate to the NMS Certificate Authority in order to join the network at a routing or layer 3 level.

The test successfully demonstrated, in a modular deployed solution, the capability of mirroring the network topology currently installed in Defense Information Systems Agency (DISA) teleports worldwide. The network provided satellite communication on different software, line cards, antenna and network while maintaining the same chassis for connectivity.

National Guard Joint Incident Site Communications Capability (JISCC)

iGT utilized DISA teleports to provide successful satellite connectivity support to the National Guard. Although this network was not monitored or operated by JUICE personnel on site at Aberdeen, but rather by teleport technicians, the National Guard remotes in Arkansas, Maine, Hawaii and Virginia successfully maintained NIPRnet and SIPRnet connectivity to the DoD cloud, which was back hauled over terrestrial links to the JUICE network.

The National Guard Bureau JISCC and USAF TDC ICE v3 satcom terminals effortlessly and reliably joined the JUICE 2011 network in accordance with testing schedules. iGT iNFINITI® model 7350 satellite router-based National Guard JISCC very small aperture terminals were in Hawaii, Maine, Arkansas and Virginia. JISCC traffic connected to the JUICE 2011 network through DISA Camp Roberts, CA, and Northwest, VA, teleports, as well as a commercial teleport operated by SkyPort in Texas, operating iVantage IDS v7.1.2.



Revenge Advanced Composites (RAC) Combatant/ Patrol Craft used during JUICE COTM exercises

