



UNIFIED COMMUNICATIONS BETWEEN DEVICES & NETWORKS: WAVE

JOINT INCIDENT SITE COMMUNICATIONS CAPABILITY PROGRAM



| **WAVE™**



MOTOROLA SOLUTIONS

ANY DEVICE. ANY NETWORK. COMPLETE INTEROPERABILITY

WAVE's robust capabilities augment Joint Incident Site Communications Capability (JISCC) radio communications, ultimately extending reach to PC's and smartphones both locally, at an incident site, and globally wherever IP network connectivity is available.

CERTIFIED TO MEET YOUR AGENCY'S REQUIREMENTS

A software based solution, WAVE is designed to allow seamless interoperability between disparate devices. WAVE interoperates between myriad devices including: Tactical Radios, Land Mobile Radios (LMR), PC's and laptops, smartphones, traditional cellular phones, analog and voip phones, paging equipment, and broadcast systems such as Giant Voice.

Running completely on COTS/GOTS, WAVE does not require any proprietary hardware, allowing budget spend and resources to be maximized. Using software that is FIPS 140-2 compliant, WAVE creates a secure and flexible way to interoperate among operations, along with advanced Encryption Standard (AES) up to 256 bits. Receiving numerous Certificates of Networkiness (CON) and Authority to Operate (ATO) to run on various defense networks, WAVE continues to be the premiere choice for defense agencies across the globe.

WAVE is also Joint Interoperability Test Command (JITC) certified, which allows the solution to be effortlessly deployed on the Defense Information System Network (DISN – NIPR or SIPR) as well as connectivity to the Defense Switched Network (DSN).

JOINT INCIDENT SITE COMMUNICATIONS CAPABILITY

Joint Incident Site Communications Capability (JISCC) is built for emergency preparedness allowing for a preemptive strike against disaster and its consequences. The JISCC solution maximizes effectiveness by bridging first responder communications systems and delivering high-bandwidth capability anywhere. Providing satellite IP connectivity and RF network interoperability, JISCC enables command and control to be established hours after any disaster.

Standard in design and interoperable with other US Department of defense systems, JISCC includes a voice interoperability gateway, enabling first responders to use handheld radios to communicate with each other. This improves situational awareness, increases cross-agency productivity, eliminates duplicate efforts and saves lives in an emergency.

The JISCC solution is easily transported to any disaster area so that critical communications can be promptly restored. JISCC temporarily enables users to leverage voice, data and critical services by bridging communications gaps immediately.





UNIFIED COMMUNICATIONS

Device agnostic and interoperable with prior hardware investments, WAVE's Joint Incident Site Communication Capability (JISCC) provides additional capabilities leveraging the existing hardware investment. By deploying WAVE, the JISCC enables full unified communications that span all physical and geographical barriers.

Beyond extending radio nets to PC's and smartphones, WAVE has robust telephony capabilities that allow a user to dial directly into DTMF password-protected channels so that a traditional telephone user can have a conversation with a push-to-talk (PTT) radio user. The Advanced Desktop Communicator is the dispatch version of the two PC-based WAVE clients and allows for operator-assisted patching.

Dispatch operators have the ability to utilize a built-in soft phone that can ultimately call anyone on the publicly switched telephone network (PSTN). Thus the user can call into dispatch and be patched into any combination of resources connected to WAVE. The system can also be configured to act as 'crash call' system where WAVE calls a preconfigured

list of phone numbers and brings everyone together into a single, unified conference bridge, including PC and radios users, all talking securely in real time.

With WAVE's powerful recording, playback, and archiving capabilities, it can be configured to record each individual transmission on a channel, with provided time and date, which is ultimately writeable to a disk. The user can add metadata to the recordings, making searching and filtering effortless.

WAVE stores archived recordings indefinitely or can be configured to purge data after a specified time interval. Using scripts, WAVE can offload recorded audio onto a storage area network (SAN) device or forward the audio to be used in a hardware-based recording system. The Web UI allows for playback of all recorded audio in WAVE and can be accessed from any computer that is able to reach the WAVE servers.



WAVE DESKTOP & ADVANCED DESKTOP COMMUNICATORS

Microsoft Windows-based, WAVE clients come in two variants.

1. Desktop Communicator, designed for users who need access to voice networks.
2. Advanced Desktop Communicator, designed for users who need dispatch roles and functions.

Both clients provide two-way simultaneous PTT access to all configured radio nets and can transmit to a single channel, or simulcast to multiple channels. Preconfigured alerts can be transmitted across a channel and also include an instant replay capability, allowing the user to instantly click back up to 30 minutes and listen to any transmissions missed.

This is a separate feature from the full-time, server-side recording, which records and archives all transmissions on every WAVE channel. Both clients can also act as VoIP soft phones- registering directly with a PBX to initiate and receive telephone calls. Setting the Advanced Desktop Communicator apart is its ability to patch together any number of resources anywhere, at any time. This is an extremely powerful feature that allows the user to combine two more disparate radio nets and have them appear to the handheld radio users as a single, unified talk group.





EXPANDING JISCC CAPABILITIES

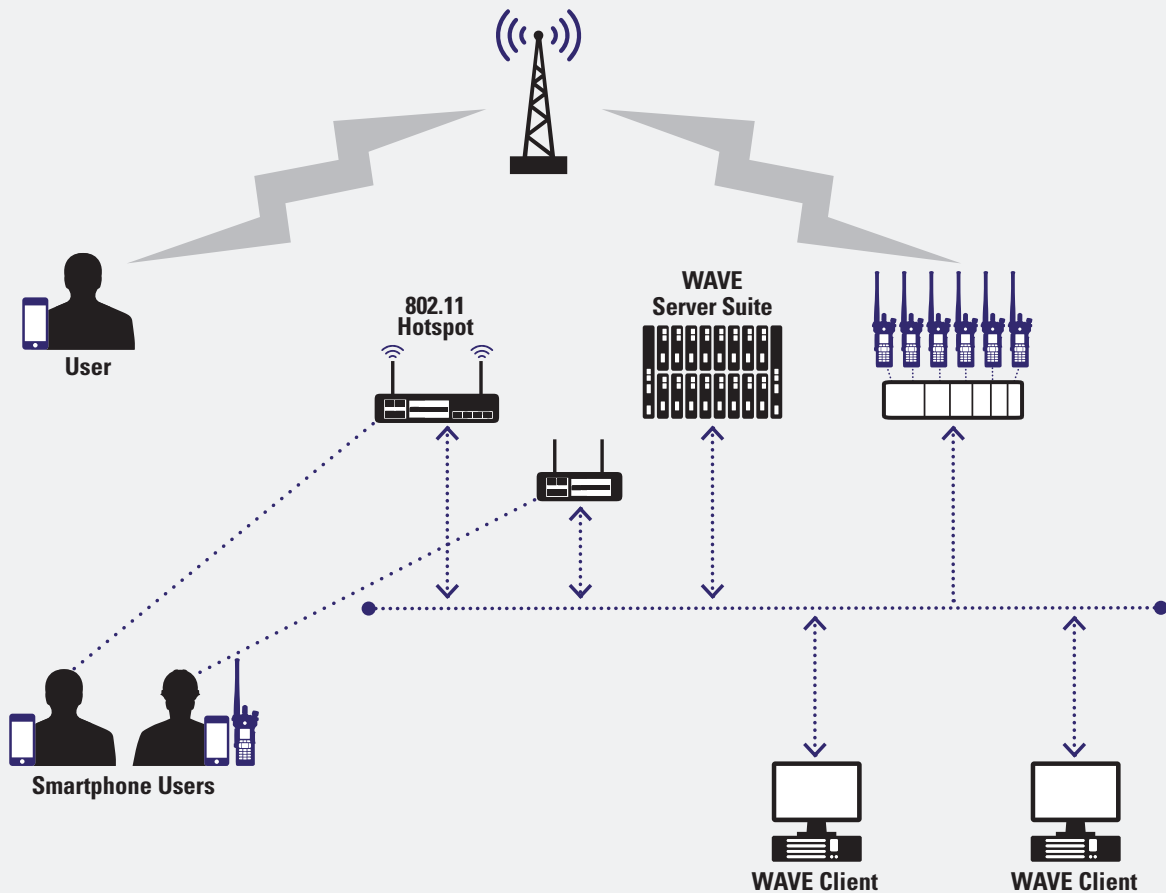
Using the existing JISCC voice interoperability gateway (ACU-1000 and ACU-5000), devices work as the hardware layer to physically connect radios and convert their audio to a digital IP stream. WAVE can extend RF traffic from the JISCC radio network to JISCC PC's, smartphones and tablets using wired connectivity, wifi (802.11x) and private LTE in the immediate area surrounding the system. Donor radios tuned to a specific talk group are connected to the ACU device, which converts audio received from the radio to a digital IP stream. This IP stream is then transmitted across the local JISCC IP network to the WAVE server suite. WAVE servers open available audio to the standard workstation used within the JISCC running WAVE client software. Smartphone and tablet users that are within wifi or LTE range of the deployed system, can access all connected radio nets and have two-way PTT conversation with any radio user.

WAVE client software, specifically the WAVE Advanced Desktop Communicator, allows for on-the-fly patching of any connected radio nets. Therefore, during an incident, radio nets used by local first responders, can be temporarily patched to any other radio nets in use. This capability is available regardless of external IP communication. SATCOM is not required and each JISCC would contain a full WAVE domain consisting of a WAVE Management, Media, and Proxy Server.

The WAVE Management Server is the configuration front-end of the system and uses Microsoft IIS to serve pages where configuration is made. Meaning the system can be configured from any PC with connectivity to the network and changes can be made anywhere.

The WAVE Media Server processes audio received from the users device within the WAVE Domain (PC's running WAVE client software, LMR radios, and Smartphones). Delivering audio to several users, the Media Servers are a free component within WAVE, ultimately trunking audio allowing scalable growth. The WAVE Proxy Server accepts connections from smart devices running the WAVE Mobile Communicator for Android or iOS, including the browser-based WAVE client.

DEPLOYED JISCC AREA OF OPERATION – SATCOM BACKHAUL TO HQ



Once SATCOM or backhaul links have been established to the Joint Force HQ and the Joint Task Force HQ, WAVE can extend RF communication from the deployed JISCC site over the backhaul to PC's and smart devices used by other command and control personnel at HQ.

WAVE servers extend, or supernode, multiple audio streams over backhaul's for secure, reliable, and bandwidth-efficient transmission. WAVE Media servers multiplex audio streams for efficient delivery over the backhaul to other WAVE Media Servers, which demultiplex and deliver it to all interested parties using IP multicast.

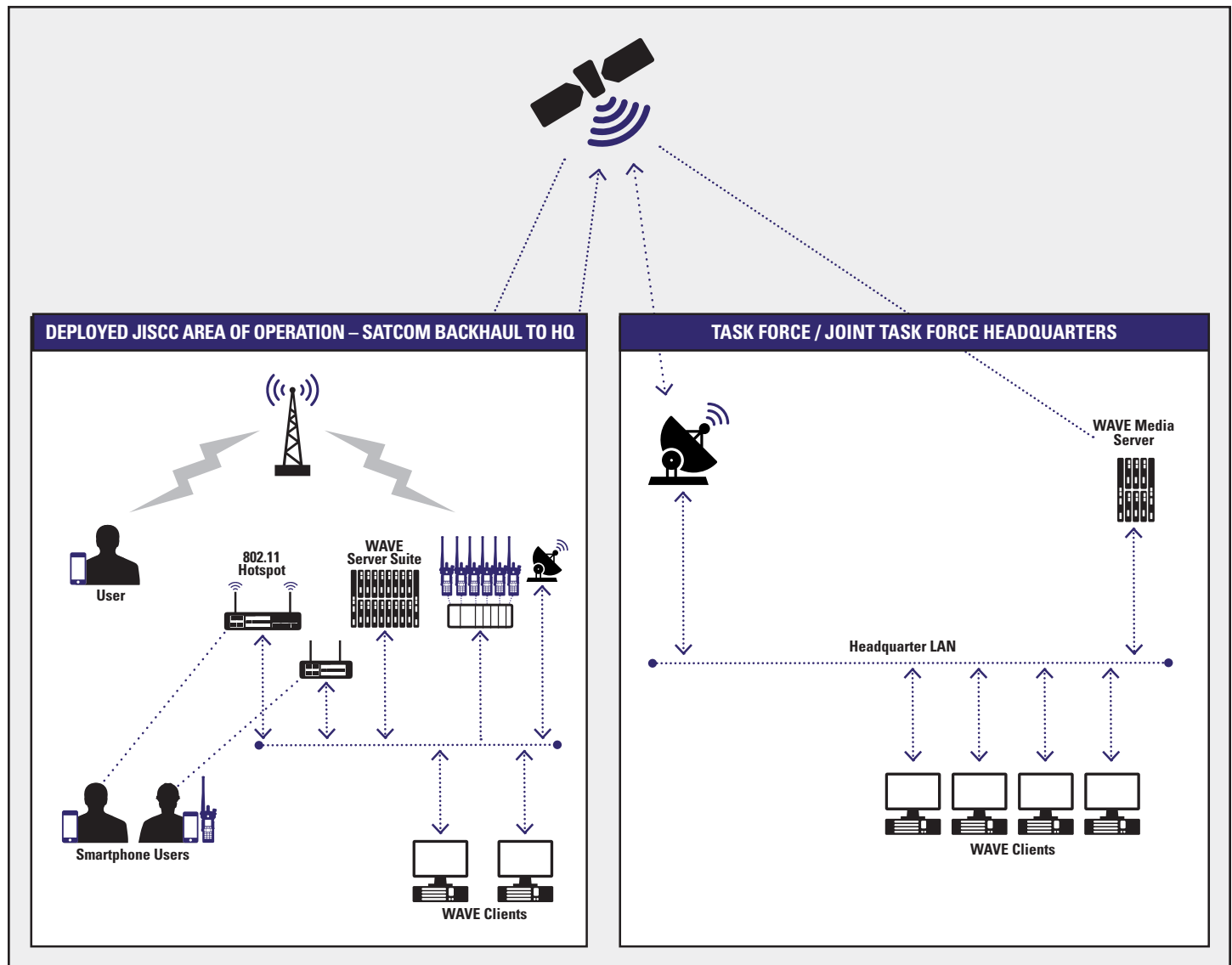
Media Servers permanently installed at the Joint Force and Joint Task Force Headquarters would receive connections from deployed JISCC sites as backhaul links are established and come online.

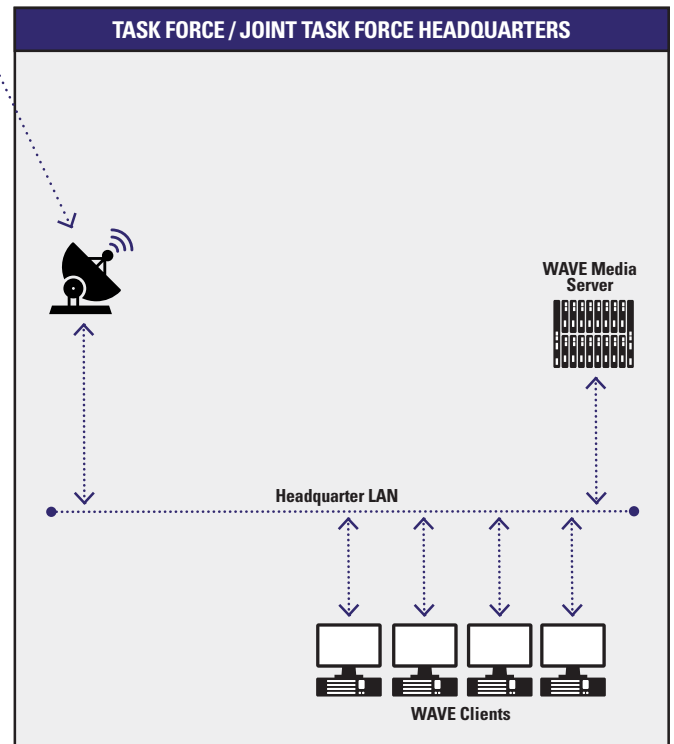
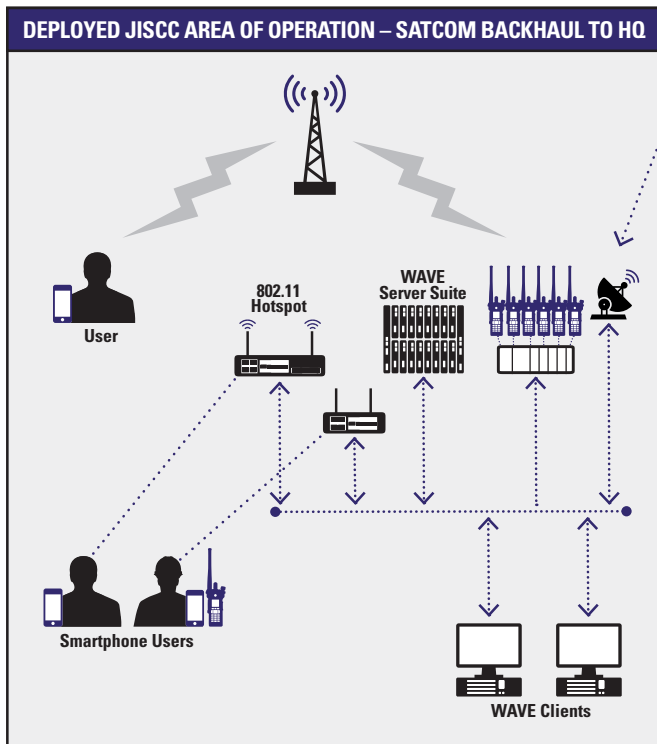
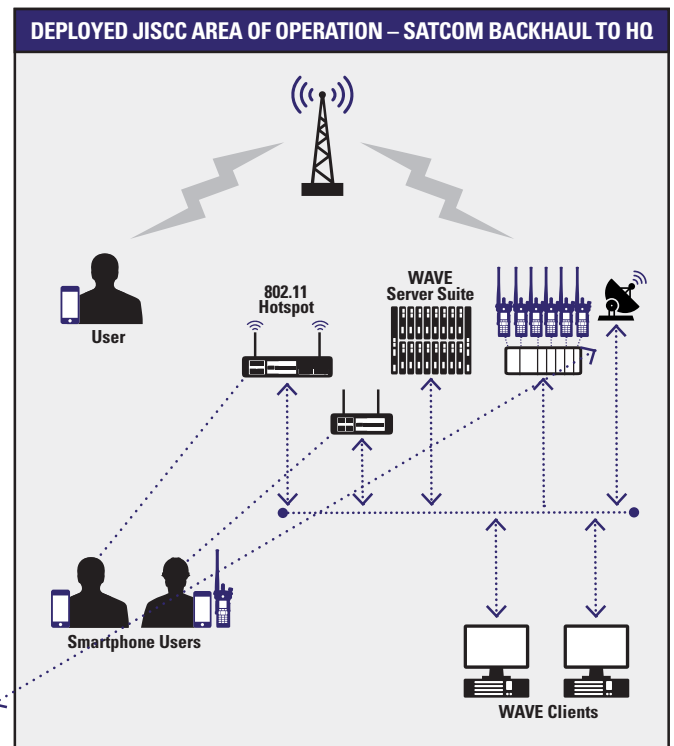
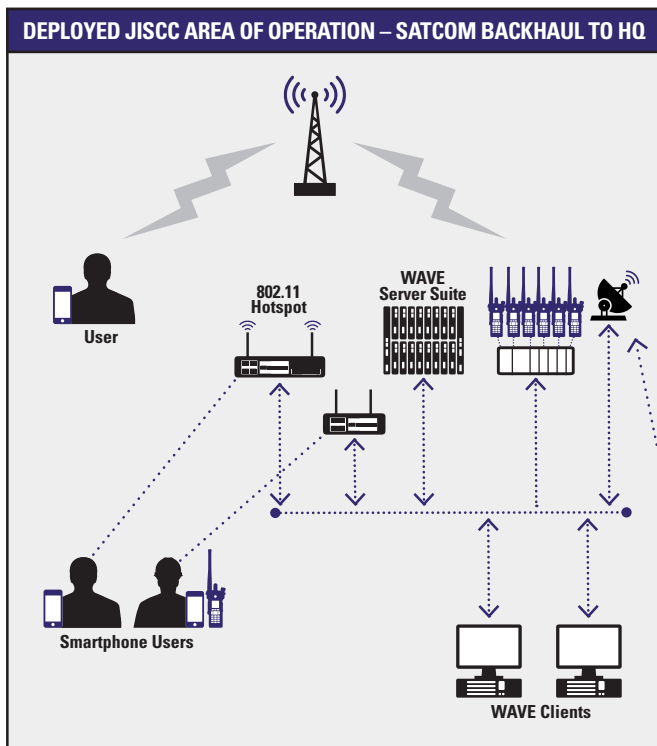
When a large disaster occurs, such as large hurricane's that hit our U.S. coast, it is necessary to deploy multiple JISCC systems to various geographically separated locations. Relief agencies, including FEMA's Mobile Emergency Response Support (MERS) may be present. A WAVE domain within a deployed JISCC system using inter-domain supernoding can federate WAVE servers running on different JISCC systems, while maintaining local connectivity and connectivity to TF and JTF headquarters.

Each deployed JISCC system can now choose to publish any or all of their connected radio nets to other JISCC systems running WAVE over

an IP-based connection, regardless of distance. Other authorized users can subscribe or publish resources across multiple JISCC systems and grant access to other responding agencies. FEMA MERS responded to both Hurricane Harvey and Irma, along with other Federal agencies utilizing WAVE.

WAVE Servers from FEMA MERS can be temporarily trunked to WAVE Servers within a JISCC to provide true communications interoperability without prior coordination and configuration. WAVE equips users with a single interface for complete unified communication that span unlimited distances and agencies.





Learn more at www.MotorolaSolutions.com/ConnectingDefenseTeams

