A BRIEF LOOK INSIDE

One Force Mobile Collaboration - Cutting Edge Communications for the First Responder

Imagine all your agency could do...
...with improved situational awareness, in-the-field collaboration among responding agencies, and real-time tracking of responding assets and personnel.

Raytheon’s One Force™ Mobile Collaboration is a complete end-to-end system that provides all of these and more: secure real-time communications and situational awareness plus a suite of robust capabilities for Smartphones and mobile data computers. Its ability to “Push and Pull” critical information is an essential tool for successful emergency and day-to-day responses.

Groups of OFMC users interact through a comprehensive set of capabilities that include voice, drawing tools, text chat, real-time position tracking, streaming video, and image sharing – all within a secure and robust infrastructure.

The One-Force™ System provides instant information at your fingertips with features that include Chat, Collaborative Planning, Report Messaging, “Multi” Media Transfer, Route Planning, Situational Awareness, Streaming Video from Surveillance Cameras, View Sharing, an Intuitive User Interface, Map Overlay Downloads, 3D Maps and Flexible Icon Selection.

continued on page 2
OFMC also offers optional features including Weather, Secure Voice, Multi Lingual, Secure File Transfer and Augmented Reality.

Mobile phones and tablets are emerging as dominant influences in Emergency and Disaster Management due to their low cost - and when coupled with an appropriate application, their easy ability to coordinate missions and augment existing voice communications.

One Force™ Mobile Collaboration Concept

A True "Bring Your Own Device" System

The OFMC’s supporting server system employs flexible IP Networking options in its messaging mechanisms, allowing its users to mix and match networks, such as Cellular, Tactical Radios, and Wi-Fi hotspots. It operates on Android, iOS and Windows devices using standard IP protocol on 3G/4G Cellular, Low Data Rate Radio, Tactical Radio and WiFi networks.

Raytheon recommends and supports a “Bring Your Own Device” approach for maximum flexibility. This allows customers to bring existing computer inventory (particularly Windows PCs) into the Mobile Device ecosystem, while still taking advantage of the rapid development and ideal mobile experience of the iOS and Android platforms. Further, any employee-owned device can be integrated into Command Center operations, regardless of mobile platform type.

Benefits:

- Improves situational awareness and communication between units - enabling faster decision cycles and improved response.
- Pushes critical information to responders - when they need it.
- Increases efficiency of department assets during both routine and emergency operations.
- Networked personnel may operate as independently dispersed yet mutually supporting units – sharing information to rapidly focus the response.
- The fully integrated system, supporting both existing and emerging technologies, maximizes capabilities of all component platforms and systems.

The OFMC system will augment your agency’s voice and data interoperability, increase situational awareness, provide infield collaboration between responding agencies, and allow real time tracking of infield responding assets and personnel. For additional information please email Raytheon JPS Communications at publicsafetysales@raytheon.com
Receiver Voting Restores Talk-In Coverage LOST to Narrowbanding

A Situation Repeated Around the Country

Communications Managers have had to deal with a rash of user talk-in complaints ever since their analog LMR systems were narrowbanded from 25 kHz to 12.5 kHz. Areas that had been marginal are now “dead” leaving portables completely unable to talk back.

Typical Installation – Four Channel Repeater System with four voters (in upper left). Each channel has seven voting receivers – the local receiver plus six remote receiver sites to ensure excellent talk back throughout the desired coverage area. Photo courtesy of Steve Dubberstein of Communications Service

There is a Solution – Receiver Voting

Lost talk-in coverage can be restored and marginal coverage transformed to excellent through the implementation of a receiver voting system. If the radio system already has receiver voting, additional receive sites can be installed to cover newly marginal areas as well as those now completely lack talk-in capability.

In contrast to a repeater-only radio system, a voted system makes use of multiple voting receivers strategically placed throughout the desired coverage area. Whenever a field transmission is made, the voter gets receive audio from every voting receiver that picked up the transmission. The voter continuously selects the best of these signals, which it passes on to the repeater and/or dispatcher. This expands the talk-in coverage area to wherever a portable can reach one of the voting receivers.

Note also that a voting system can also allow the placement of additional transmitters in remote areas for increased “talk-out.”

The Essential Facts

- Narrowbanding from 25 kHz channels down to 12.5 kHz caused at least as much coverage area shrinkage as would a 25 kHz channel experiencing a 3dB power decrease (power cut in half). Plus – keep in mind that this is the best case; actual measured results are often closer to 6 dB.
- After narrowbanding, LMR towers no longer talk out (transmit) as far as they did prior. This is minor compared to the fact that narrowbanded portables are no longer able to be heard at all from some areas where 25 kHz portables had been at least marginal.
- Fortunately, you have the cost-effective option of using analog receiver voting to restore lost coverage and remove the noisy audio problem.
- Sometime way down the road (2030? 2035?) the FCC will mandate 6.25 kHz channel equivalent for VHF & UHF. The change to 6.25 can ONLY be accomplished by migrating to digital.

continued on page 4
The FCC has stated that this migration will be mandated only after municipalities realize the “economic value” out of the recent migration to 12.5. That’s why the next deadline is far off in the distant future. Considering the rapid changes in technology, it’s prudent to retain and improve what you have while we all wait to see what the future of communications will hold. Analog Receiver Voting is an excellent and inexpensive tool to make the most out of your current investment in analog LMR.

Analog radio is not going away anytime soon. In June 2014 an Urgent Communications article covered Thurston County’s “new” analog system and Mission Critical Communications Transmissions had a lead article about analog’s continuing value.

JPS released the SNV-12 in 1998 and it quickly became the industry leading analog receiver voter (also called a voter comparator). The modular SNV-12 applied what was then the relatively "new art" of real-time digital signal processing to improve upon the received signal quality measurement previously performed by analog circuits. Superior voting capability was not the only advantage of the digital approach – it was also key to the SNV-12’s ability to offer a wide array of user-configurable options to optimize the overall communications system.

This introduction was followed by multiple no-charge software upgrades and backwards-compatible module hardware improvements, which together gave the current unit the flexibility to deal with almost any system complication that you are likely to experience.

In 2007 IP connectivity was added to the SNV-12 allowing many new features. Among them are the ability to monitor voted audio and a web browser interface to remotely control all basic functions and obtain statistics on each voting receiver site.

Along with its ability to select and pass on the cleanest received audio, the SNV-12's feature set includes a wide array of transmit functions. These include automatic and manual transmit steering, and the ability to have multiple transmitters on a single channel, with a set of voting receivers groups around each transmitter.

The SNV-12 Remains the Premier Analog Voter

SNV-12 Analog Receiver Voter. The unit shown has a full complement of 12 SVM-2 Site Voter Modules. As many as three chassis can be daisy-chained together, allowing a voted channel with up to 36 voting receiver sites!

SNV-12 Features Technicians Love

- Extremely simple initial setup with minimal equipment required (Technicians tell us this is a big plus of the SNV-12)
- Browser interface allows dialing in from home to monitor audio and disable problem sites
- Front panel has LEDs and test points for basic level checks and adjustments
- Multiple squelch/unsquelch detection methods supported: Pilot Tones (also called idle tones) of 2175 (Motorola Solutions) or 1950 (Harris/GE) with a Pilot Tone Generator module available for use with receivers that don't provide pilot tones. E&M squelch detection also supported
- Allows equalization of incoming lines
- Supports simulcast (and TX steering)
- Detects and generates EIA Keying Tone sequences
- Supports Console Priority (that is, console audio can be set to take precedence over retransmit of voted audio)
- Variety of audio delay capabilities
- Front panel speaker allows monitor of receive and transmit audio
- Many years of experience = SNV-12 has fixes for most "problems"
- Phone support available to all customers - from experts who have helped customers configure voters for years

PTG-10 Pilot Tone Generator. This small unit can be installed at the voting receiver site to translate the receiver's COR output into a crystal controlled pilot tone. The tone travels over the same medium as the Rx audio and informs the SNV-12 of the receiver's squelch/unsquelch status. This allows inexpensive receivers that don't have their own pilot tone capability to be used in a voting system – without an additional signal line.

SNV-12 Capabilities Communications Managers Appreciate

- Field proven, over 5000 channels in service
- You can use a browser to log in (password protected) to check system stats, and disable a problem site remotely if necessary. The CPM-3 (with IP interface) came out in 2007 and it can be inexpensively added to most fielded SNV-12s – contact Raytheon for assistance if voter shelves were purchased pre-2000
- When expanding, you can simply add more channels (or sites) identical to the installed base, no new hardware to spare or learn how to configure
- Basic operations such as Force Vote or Site Disable can be performed from the front panel; no computer is required
- Automatic Fault Timeout removes RX site “frozen” by stuck transmitter, keeping the channel available for other users

continued on page 5
Summing It All Up

Talk-in problems were created when analog systems were narrowbanded. Mission critical communications demand the ability of officers in the field to communicate when necessary. Receiver voting can improve talk-in with maximum return on your investment – far less expensive than a major infrastructure build out to add channels or a forklift overall radio system change.

The Main Take-Aways:

- Some channels that weren’t voted may now require it.
- Systems that already employed voting may now need more voting receiver sites. In general, an analog voted channel may need 15-25% more sites after being narrowbanded than it required when wideband – to simply achieve the same coverage and signal quality previously enjoyed.
- Help your customers improve their talk in coverage with new SNV-12s or by adding more voting receiver sites to your existing system!

Ed O’Connor
Founder of Simulcast Solutions, LLC
Manufacturer’s Representative for JPS Communications

Training Schedule

We offer classes at our facility in Raleigh, North Carolina, that include lectures and hands-on training. The schedules for the free ACU technology and WAIS open classes are below. To register, please contact us at: publicsafetysupport@raytheon.com.

- Cancellations may result if class student minimums are not reached.
- Travel and room & board expenses are the responsibility of the trainees.
- Onsite dealer training is also offered. Please contact us for more information.

ACU Technology Training Classes Cover the ACU-M, ACU-T, ACU-1000, ACU-2000IP and ACU-5000 products

2015
February 10-11
March 10-11
April 14-15
May 12-13
June 9-10
July 14-15
August 11-12
September 15-16
October 6-7
November 3-4
December 15-16

WAIS Training Classes Cover all Versions of WAIS: Classic, Enhanced, and Enterprise

ACU Technology Training above is a prerequisite

2015
March 12
June 11
September 17
December 17
Software/Firmware Updates Are Available Online

Software and firmware updates are available for many of our products and modules to ensure you are benefitting from the latest technology.

The following software and firmware updates are available online at no charge:

- ACU Simulator (used with the ACU-2000 IP, ACU-1000, ACU-M, ACU-T)
- ACU Controller Software (ACU-2000 IP, ACU-1000, ACU-M, ACU-T)
- ACU-M Software Upgrade (ACU-M)
- ARA-1 Software Upgrade (ARA-1)
- CPM-3 Module (SNV-12)
- CPM-4 Module (ACU-1000, ACU-T)
- CPM-6 Module (ACU-2000 IP)
- DSP-2 Module (ACU-1000, ACU-T)
- DSP-2 IP Module (ACU-2000 IP, ACU-T)
- NXU Setup Utility (NXU-2A, NXU-2)
- NXU-2 Software Upgrade (NXU-2)
- NXU-2A Software Upgrade (NXU-2A)
- PCNXU (ACU-2000 IP, ACU-1000, ACU-M, ACU-T, NXU-2A, NXU-2)
- SCM-1 Module (ACU-2000 IP)
- SCM-2 Module (ACU-2000 IP)

Software and Firmware Request Form

The Software/Firmware request form is found online; included are pulldown menus to make the process easy. A portion of that form appears below.

To access the form and make a request, click on this link: firmware request form.

You can request up to four software or firmware updates at a time. The procedure involves filling out the online form and agreeing to some export-related statements at the bottom of the form.

Agree by checking the box, then hit “Submit.” After submittal, you will be contacted by our customer service department (typically within a few hours if during a business day). You will be given a link to download the encrypted software and a security key to decrypt the software provided.

This procedure is necessary to make sure that we fully comply with all export regulations.

If you have questions, please e-mail us at civcomms.firmware@raytheon.com or call our Customer Service department at 1.888.627.1088 for technical support.

24-hour Customer Support Hotline 800.498.3137

Our 24-hour customer support hotline, available to U.S. and Canadian customers only, provides our customers an outstanding level of service.

Customers can call 800.498.3137 for immediate assistance with any technical problems, day or night.

The 24-hour customer support hotline is available to JPS customers needing assistance with our voter equipment, ACU products, NXU-2A, VoIP/RoIP products and, for systems issues rather than product-specific support, to the customers who have purchased the 24-hour support option with their system installations.

Repair Service

All equipment returned for repair must be accompanied by an RMA number (Returned Material Authorization).

Email jpsrmasubmit@raytheon.com to request a repair RMA number.

Please include the following in the body of your email: failure symptoms, product name, serial number, contact name and shipping information.
Customer Corner

A Frequently Asked Question

From Benny Hillman, Customer Service/Support Engineer: One of the most frequent calls I receive goes something like this...

"I can't get my radio to work with the NXU-2A. I bought the interface cable from JPS. Why won't it work?"

My response “You didn't install the Audio Crossover Adapter.”

JPS Interface cables are designed for connection to the ACU-1000. The ACU-1000 and the NXU-2A have similar, but different, pinouts. The inputs and outputs, COR and PTT are reversed. The Audio Crossover Adapter is included with the NXU-2A, in the accessory kit. Connect it between the cable and J7.

It will adapt an ACU cable for use with an NXU.

DSP Module Optimization Procedure

Another important question: What us the best way to optimize an ACU radio interface?

The ACU DSP Modules have a wide variety of configuration options, available to deal with the many problems that can occur when radio systems are patched together. But what is the best way to set up a typical interface? The procedure below explains the proper steps and the best order to perform them.

1. Verify that the DSP module is in Standard Mode (DSP-2 and DSP-3 only)
2. Verify that the host radio or device to be connected to the ACU is functional and can communicate with other like devices
3. Determine manufacture and model number of host radio or device to be connected to DSP
4. Select host Radio Interface Cable based upon Step 3. Cable must be manufactured by Raytheon, or if built by end-user, must be constructed using Raytheon Radio Interface Cable Application Notes. Also, the host radio must have all applicable physical and programming modification based upon Radio Interface Cable Application Note
5. Attach applicable Radio Interface Cable between the ACU DB15 connector or CPC connector (ACU-T), and host radio interface
6. Turn host radio ON
7. Set the applicable volume level of host radio based upon Radio Interface Cable Application Note
8. Launch the Module Setup screen from within the ACU Controller or WAIS Controller application by double-clicking on the module icon of the DSP to be aligned
9. In the Module Setup screen click on TEMPLATE [Load…] button, then [OK]. Next select host radio model from the list, and then click [Open]. Template will load, and configure the DSP module
10. If the host radio is a trunked radio increase the DSP TX AUDIO DELAY to compensate for the voice channel acquisition time of the radio system
11. Create an isolated cross-connection between only the HSP module and the DSP module to be aligned (no other modules should be cross-connected to this group during the alignment)
12. Using a complementary field radio transmit a test count to the receiving host radio, and then listen for the received audio from the HSP handset or speaker
13. Observe the SIGNAL LED on the DSP module:
   - SIGNAL LED does not light during test count - Increase DSP RX AUDIO LEVEL
   - SIGNAL LED constantly ON during test count - Reduce DSP RX AUDIO LEVEL
   - SIGNAL LED flashes during test count - DSP RX Audio Level is properly set
14. Listen to receive audio from ACU HSP handset or ACU speaker. If the first syllable is missing, increase DSP RX AUDIO DELAY
15. Using the HSP handset transmit a test count from the host radio, and then listen to the received audio from the complimentary field radio
16. With the volume control of the complimentary field radio set to a nominal position listen to the audio quality:
   - Field Radio audio sounds too weak – Increase DSP TX Audio Level
   - Field Radio audio sounds too loud – Reduce DSP TX Audio Level
   - Field Radio audio sounds fine – DSP TX Audio Level is properly set
17. Listen to the transmitted audio received by the complimentary field radio. If the first syllable is missing, increase the DSP TX AUDIO DELAY until all audio can be heard
Raytheon JPS Communications personnel will be presenting our interoperability solutions as well as new product offerings to customers in the Richmond and Hampton Roads, Va. area. For more information contact Marty Ingram via e-mail: publicsafetysales@raytheon.com

Jan 27, 2015 – Richmond, VA.  
Jan. 28, 2015 – Hampton, VA.

Raytheon JPS Communications personnel will be exhibiting at the International Wireless Communications Expo (IWCE)

Las Vegas Convention Center  
Las Vegas, NV  
Booth 1827  
March 18 and 19

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Product Information: 
Raytheon JPS Products

Do you have a question about how our technologies can help your agency, business or mission?

Roman Kaluta is the customer advocate and public safety liaison for Raytheon JPS Communications.

As director of Interoperability Solutions he is available and eager to discuss your needs. He can be contacted directly at jpsadvocate@raytheon.com