US Department of State and JPS Help Advance Police Communications in Paraguay

In the Northern Zone of Paraguay, the lack of communications infrastructure had been a major impediment to the Paraguayan National Police (PNP) in their efforts to combat marijuana cultivation and violent criminal groups. In an effort to address communication deficiencies, the State Department’s Bureau of International Narcotics and Law Enforcement Affairs (INL) initiated a multi-year $200,000 project to improve communications for the Paraguayan police. With the assistance of Raytheon JPS Systems Engineering, the project was successfully completed this spring.

The new communications system provides basic radio capability to the PNP in locations around the country, as well as interoperability among the various systems. The INL-donated radio equipment is compatible with the prior police communication system and was installed in strategic locations to maximize coverage.

The JPS ACU-T was selected to provide an additional tactical interoperability capability, including with remote devices via the PNP IP network. Most vital to the INL initiative are links between the PNP’s VHF handheld and vehicular radios and the AM aircraft radios in the police helicopters.

Michael Beck, PE, of the Raytheon JPS Systems and Applications Engineering Department, supported INL communications expert Herman Rivera with a visit to Asuncion, Paraguay in April. He updated and commissioned the JPS equipment purchased as part of the INL-funded communication upgrades. Mike also provided training to PNP communications technicians, allowing them to take ownership of future needs for changes in configuration or interfacing of additional communication assets to the system.

An important aspect of any communications system with this type of mission is effective command and control. Three Panasonic Toughbook Laptops were supplied by the Department of State; each uses ACU Controller software for easy monitoring and control of connections between radio systems, as well as PCNXU software that allows the operators to hear radio traffic and transmit to selected systems. Alternatively, the cellular modem capability can be employed for remote system access.

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With the ACU-T supplying on-the-fly linking capability between all of the different communications devices and formats, a complete communications infrastructure is possible. Officers patrolling in vehicles or using their portables while on patrol with drug sniffing dogs can communicate with remote leaders who are out of radio coverage range, via PCNXU or cellular phone. They can also call for backup via helicopter, directly to the pilots, or assist a helicopter pilot from the ground.

The ACU-T Tactical Radio Interface Gateway was chosen as having the proper combination of ruggedness, portability, and feature set for the Paraguayan mission.

From the viewpoint of incident command, the interoperability provided by the ACU-T allows leaders to travel outside of LMR coverage range, but remain able to remotely monitor all aspects of an ongoing operation via PCNXU or cellphone and join as needed in the communications occurring between officers in the ground or in the air.

Besides configuring, optimizing, and proving the VHF-to-AM radio patches and the Command and Control capability, the system was also configured to provide connectivity with cellular phones via the ACU-T’s PSTN-2 Module and a Globesurfer III cellular modem.

Final system testing was successful, with an extra benefit of some local color. According to Mike Beck:

“We took only a laptop with ACU Controller and PCNXU installed and travelled to a police station. This police station was on the Policía Nacional intranet and we were able to connect remotely to the ACU-T and demonstrate cellular and radio patches to PCNXU and between all system resources.

Torrential rains poured down all day and we had to wade in ankle deep water.”

Sometimes There REALLY IS a Free Lunch - Make Sure You Have the Features Included in these No-Cost Software Upgrades for Licensed WAIS Systems

Previous issues of ACULink have discussed some very successful WAIS implementations and documented the different versions now available that provide WAIS Controller operators the ability to dispatch directly to system radios using the sound cards of their PCs. For more information about these versions, or about discounted pricing to upgrade to a version with improved dispatch features (from WAIS Classic to Enhanced or Enterprise; or from Enhanced to Enterprise), please contact us at: publicsafetysales@raytheon.com

Raytheon JPS Communications provides many system software upgrades free of charge. If you haven’t upgraded your system software recently, it may not be taking advantage of some very worthwhile improvements. This section explains recent improvements in the various versions of the WAIS Controller software. Keep your eye on upcoming issues of ACULink for details of software upgrades to other system components.

Client Port Agility

The latest version of the WAIS Controller (includes all versions: WAIS Classic, WAIS Enhanced, and WAIS Enterprise) contains improvements that make the system more network efficient and also allow the system to respond to problems in the IP network in a more robust and graceful manner.

John Van, aka John Van Valkenburgh, has primary responsibility for maintaining the WAIS Controller Software and adding new features.
The WAIS Controller now also provides various indicators when lost data streams are encountered, and performs various measures to re-establish lost connections for WAIS Enhanced and Enterprise. The capability of existing indicators (such as the Link Active LED on the DSP-3 module) has also been made more forgiving of minor network outages that are not having a major negative effect on communications. Most of the changes function in the background and will not be apparent to system operators.

One major change is an improvement in the system's ability to adapt if a router decides to change port numbers during ongoing sessions. This is an undesirable router behavior that has cropped up with some routers/router software versions recently commercially available, and JPS decided that the surest way to prevent customer problems is to give the WAIS Controller software the ability to detect the unrequested port number change and adapt to it. To accomplish this, the WAIS Controller now includes a new function called CPA (for Client Port Agility). Again, this function is completely transparent to system users.

To gain full benefit of these improvements, including CPA, the latest firmware should be installed in all system CPM-4/CPM-6, DSP-2, and DSP-3 modules. Backwards compatibility exists with previous versions of firmware as well as the WAIS Controller; the new features just won't be available to modules that haven't been updated. See the end of this article for more information about updating your firmware.

**Dispatch View Diagnostics**

The figure below shows some of the added status indication capability available in the DISPATCH view. To the right of each DSP-3 module icon there is now Dispatch Status Indicator.

[Diagram showing Dispatch Status Indicators]

Status indicators in Dispatch Mode

This new indicator serves two purposes. First, it displays at a glance the status of each DSP-3 IP communications link:

In WAIS Enhanced systems, the Green Circle indicator verifies that the data communications with the associated DSP-3 are operating normally.

In WAIS Enterprise systems, all DSP-3 communications run through a MultiTap server whose purpose is to allow multiple WAIS operators to simultaneously listen to streaming audio from the DSP-3. Therefore, Enterprise systems have both a main IP address and a Failover IP address and the system will “fail over,” switching communications to the main IP address and providing Enhanced mode capability if the MultiTap server, or the IP link to it, are experiencing problems. A yellow diamond-shaped “warning” icon is used to indicate that communications to the DSP-3 are functioning, but there is a problem with the primary IP address.

The screen shot excerpt that follows shows the Dispatch Status Indicator's second function. Simply click on the Dispatch Status Indicator to bring up the Dispatch Module Status dialog box. The status information is useful for diagnostic purposes if any system or network problems are encountered.

[Diagram showing Dispatch Module Status dialog box]

Dispatch Mode Status Dialog Box

The screen shot section below shows the "Lost Stream" icon. The WAIS Controller will display this icon whenever it determines that it is no longer receiving VoIP traffic (whether actual audio or "keep alive" packets) from the DSP-3. Whenever this icon is being displayed, the WAIS Controller has already begun sending requests to the DSP-3, attempting to get the audio stream re-started.

[Diagram showing Lost Stream Indication]

Lost Stream Indication

The WAIS Controller will keep trying to re-establish the stream indefinitely as long as the DSP-3 is still responding on its Command port (keep in mind that there are ongoing communications between both a Command Port and a VoIP Port). If the DSP-3 stops responding altogether (no response from either port), the module will eventually be dropped from the Dispatch Screen and will be displayed colored red on the Overview (this is standard operation following a data communications failure). An operator can also command the WAIS Controller to drop the stream by clicking on the "Lost Stream" icon.
How to Update Your Software

Regarding WAIS Controller Software Upgrades:

- Some upgrades to the WAIS Controller application work in concert with upgrades to ACU gateway firmware (CPM-4/6, DSP-2 and 3 interface modules and NXU-2A units). Be sure to upgrade all to latest revision, prior to upgrading the WAIS Controllers. See the section "Software/Firmware Requests are Available" that follows this article. The actual firmware upgrade process for ACU Modules is quite simple. Instructions will be provided, and JPS Customer service is standing by to assist as needed (rarely required)
- All WAIS Controllers in a system should be upgraded.
- A Wide Area Interoperability System may include multiple agencies covering a range of jurisdictions, so system changes should be coordinated through a System Administrator. Therefore, updates to WAIS Controller Software will be issued only to the System Administrator, who will have responsibility for distributing the upgrade.
- Existing Unlock Code and Site Init files must be retained and copied into the directory that houses the new WAIS Controller software.
- If desired, Raytheon JPS can provide a quote to have certified systems engineers perform on-site upgrades as well as any desired system configuration tune-ups.
- WAIS software upgrades require interaction with our System Engineering group and it is essential that the WAIS system administrator coordinate any upgrade requests, individual users should not request WAIS software upgrades.

In order to know if your equipment needs an upgrade, you will need to know whether it has the latest code already installed. Current revisions are listed below.

The SW revisions of your modules can be found by browsing to them. Follow the standard MS Windows "Help" tab to learn the WAIS Controller's current revision, as well as that of the MultiTap server used with WAIS Enterprise.

Current Revisions

- The current revision of WAIS Controller is 2.3.1. This is the same for all versions – Classis, Enhanced, or Enterprise
- MultiTap server (used with WAIS Enterprise is 1.0.1
- CPM-4 Module (ACU-1000, ACU-T) Version 3.08
- CPM-6 Module (ACU-2000 IP) Version 3.08
- DSP-2 Module (ACU-1000, ACU-T) Version 3.07
- DSP-2 IP Module (ACU-2000 IP, ACU-T) Version 3.07
- DSP-3 Module (WAIS Enhanced or Enterprise) Version 1.02
- SCM-2 Module (ACU-2000 IP) Version 3.01

E-mail us at the address below to begin the process:
WAIS.upgrade@raytheon.com

Please have copies of original sales order or other documentation handy to verify that you have purchased a license.

Software/Firmware Updates Are Available

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

Software and firmware updates are available for the following products free of at no charge:

- ACU Simulator (used with the ACU-2000 IP, ACU-1000, ACU-T products)
- 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)

Contact us regarding WAIS Controller SW upgrades

Software and Firmware Update Request

To request updates, please send an e-mail to us at JPS.firmware@raytheon.com

The Software/Firmware request form will be emailed to you.

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

Next, save the form and email it back. This request form will be reviewed by the Raytheon JPS Customer Service Department, who will contact you and provide an encrypted link for downloading the software upgrades (response typically occurs within a few hours if during a business day).

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

If you have questions at any time during the process, e-mail us at JPS.firmware@raytheon.com or call our Customer Service Department at 1.888.627.1088 (business hours, Eastern Time Zone) for technical support.
Training Schedule Remainder of 2015

We offer classes at our facility in Raleigh, North Carolina. These classes are free-of-charge and include lectures and hands-on training. The schedules for these 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-1000, ACU-2000IP, ACU-M, ACU-T and ACU-5000 products

2015
October 6-7
November 3-4
December 15-16

2016
January 12-13
February 9-10
March 8-9
April 12-13
May 10-11
June 14-15
July 12-13
August 9-10
September 13-14
October 4-5
November 15-16
December 13-14

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

ACU Technology Training above is a prerequisite

2015
December 17

2016
March 10
June 16
September 15
December 15

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.

If you have called in to JPS Customer Service, chances are good that you’ve been assisted by Benny Hillmann. 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, and VoIP/RoIP products.

Note: For systems issues rather than product-specific support, the hotline is available only 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 phone number, and full shipping information.
Customer Corner

Radio Interface Troubleshooting and Optimization Tips

Note 1: As shown in the figure above, the “Donor Radio” is the radio associated to a DSP module via a Radio Interface Cable. Not shown here, but part of most systems, is a repeater between the Donor Radio and the Field Radio.

Note 2: Always use the audio from or to the ACU’s handset as the "gold standard" when setting levels, rather than the audio between a pair of other systems connected via the ACU. This will prevent propagating an errant level throughout the system. What needs to be avoided is setting, for example, input level of Radio A too low while compensating for a too high output on Radio B.

Refer to ACU Installation manual for further optimization and troubleshooting tips.

Symptom: User in Field Complains of Missed First Syllables
Cause: Donor radio is trunked, cannot accept incoming TX audio until a trunked channel is acquired
Cause: Slow-to-key transmitter on donor radio
Cause: Secure donor radio, so the system needs to compensate for encryption or scrambling time
Solution: Increase TX AUDIO DELAY of the DSP module supporting the donor radio

Symptom: User in Field Complains of Missed Syllables Mid-Conversation
Cause: VOX or VMR Squelch Type Dropout
Solution: Increase HANGTIME of the DSP module supporting the donor radio
Cause: COR Sampling configured ON (enabled)
Solution: Determine whether COR SAMPLING is turned on for the DSP module supporting donor radio; if so, consider turning it off or adjusting its settings
Solution: Raise sensitivity level of VOX or VMR function

Symptom: Continuous Ping-Pong of COR / PTT between Cross Connected DSPs
Cause: Linked donor radios momentarily unsquelch after a TX session, causing cross-connected systems to momentarily key
Solution: Increase COR INHIBIT TIME AFTER PTT of the DSP module supporting affected donor radio(s)

Solution: Try changing COR Squelch Type to VMR if the inappropriate Unsquelch condition following a transmission is longer than the maximum COR Inhibit duration.

Symptom: False Keying of DSP Module
Cause: Possible extraneous RFI emissions present
Solution: Eliminate RFI emission source
Solution: Transit power of other donor radios maybe too excessive; reduce enough to link to repeater
Solution: Modify antenna placement
Solution: Change COR Squelch Type to VMR
Solution: Reduce COR or VMR sensitivity

Symptom: DSP Experiencing Continuous COR State
Cause: Donor radio is introducing continuous noise to DSP module
Cause: Donor radio is a non-squelching Amplitude Modulated receiver (i.e. HF, aircraft radio, etc.)
Solution: Change COR Squelch Type to VMR

Symptom: Audio Sounds Too Weak
Cause: Received audio level from donor radio is too low as heard in ACU handset
Solution: Increase RX AUDIO LEVEL of receiving DSP until SIGNAL LED just flashes with incoming speech syllables
Cause: Audio from HSP Handset is heard as too low in field radio
Solution: Increase TX AUDIO LEVEL of transmitting DSP until donor radio is properly modulated. Use the ACU’s handset microphone as a common audio source for all modules.

Symptom: Audio Sounds Too Loud
Cause: Transmit audio level delivered to donor radio too high
Solution: Lower the RX AUDIO LEVEL of receiving DSP until SIGNAL LED just flashes with incoming speech syllables
Cause: Transmit audio level delivered to donor radio too high
Solution: Lower the TX AUDIO LEVEL of transmitting DSP until donor radio is properly modulated. Use the ACU’s handset microphone as a common audio source.
Recent and Upcoming Events

Kentucky NG COMEX – US NORTHCOM Vital Connection Exercises, Denver CO and Minneapolis MN

During June, July and August JPS personnel participated in three communication exercises providing on-site technical support, training and technology demonstrations. These events brought together representatives from various DOD, federal, state and local agencies as well as the private sector responder communities. Numerous training sessions, communications exercises and practice sessions were held. We extend our thanks to the host agencies and participants of all three venues for their help and their commitment to ensure their readiness for emergency response and communications interoperability.

APCO 2015

Raytheon JPS Communications exhibited at the APCO 2015 in cooperation with Cisco in their combined solutions booth. Interoperability technologies were demonstrated to the many visitors. This included our new ACU SIP-LMR Channel Bank seamlessly connected by IP to the Cisco “Any Connect” allowing interoperability between various IP devices and LMR. Also demonstrated were ACU technologies, SIP, ROIP and WAIS.

Technology Roadshows

We would like to extend our thanks to Alpha Communications for hosting representatives from Raytheon JPS Communications for several dealer and customer visits in Connecticut, Rhode Island and Massachusetts in July. The technology briefings were well received and exposed our dealers and customers to the full capabilities of our interoperability product lines, including enhanced features that were recently added to our Wide Area Interoperability System solution (WAIS).

For more information contact Marty Ingram via e-mail: publicsafetysales@raytheon.com

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

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