JPS Interoperability Solutions

Product

Executive Summary

Prepared by:

JPS Interoperability Solutions, Inc.
5800 Departure Drive
Raleigh, NC 27616
(919) 790-1011
February 13, 2018

support@jpsinterop.com
sales@jpsinterop.com
http://www.jpsinterop.com

Products Link: http://www.jpsinterop.com/tradeshow/
JPS Interoperability Solutions Experience

JPS has a long history and experience in the design and manufacture of equipment that interconnects disparate radios systems to each other or to analog and digital telephones, using Digital Signal Processing (DSP) algorithms to resolve the various problems that can occur when different communications systems link. The heart of all JPS interoperability products and capabilities is our ACU Intelligent Interconnect Technology, first introduced in 1997. ACU Intelligent Interconnect Technology design offers transparent and reliable communications interoperability between disparate radio systems, analog and digital telephony systems, cellular and satellite phones, dispatch consoles and other audio communication systems.

Public safety, government, military and commercial environments around the world deploy over 8,800 ACU radio interoperability gateways, in standalone and large region-wide system. JPS Interoperability Solutions equipment is well proven and our specific experience in Wide Area Interoperability systems such as the State of Maryland Department of Natural Resources, State of Alabama, State of California Emergency Management Agency, and the United States National Guard is well documented. The Turkish General Directorate of Forestry, the Indonesian Search and Rescue, and the Alberta Health Systems are examples of our larger international wide-area deployments.

Vendor Neutral Interfaces

The JPS ACU Intelligent Interconnect Technology product and system designs eliminate the proprietary nature of some systems by offering agnostic radio interfaces that allow integration to hundreds of different radio systems and radio types, regardless of frequency, modulation technique, protocol, or encryption. This vendor neutral approach towards disparate radio interfaces allows customers to use existing radios that can be transparently integrated into any Intelligent Interconnect Technology system. JPS interoperability can simply be “inserted” into any existing radio system without the need for extensive system reconfiguration or build-out.
Flexible Architecture – Cost Efficient

JPS interoperability systems can begin as small standalone local domains, and multiple local domains can connect to create large region-wide, state-wide, or nation-wide systems. The ACU Intelligent Interconnect Technology employs a flexible architecture so that with system expansion, there is no decommissioning, or replacement of already deployed equipment. The latest ACU Intelligent Interconnect Technology design is with backwards compatibility in mind, and able to collaborate with older existing equipment. This translates into simple and reliable integration processes, as well as lower system upgrade costs.

Standards-Based Protocol Approach

JPS ACU Intelligent Interconnect Technology can deploy in small standalone interoperable domains that are not dependent upon networks, servers, or computers, and thereby give reliable and continuous communications interoperability. When communications need to manage interoperability over a vast area, ACU systems can use remote control with common local or wide area networks, or even the Internet by engaging standards-based TCP/IP network protocols. Usually these networks are already in place and in operations when ACU systems deploy in a region.

The SIP Digital Telephony Protocol exists in many of the JPS Intelligent Interconnect Technology products and systems. SIP, or Session Initiation Protocol, is a prevalent worldwide telephony protocol in use within many communication platforms, such as dispatch consoles, telephony enterprises, and even in many communication interoperability devices produced by other manufactures. The use of the SIP standards-based protocol in JPS Communication products strengthens our vendor neutrality philosophy towards system integration.

Additionally, all the JPS Intelligent Interconnect interoperability SIP interfaces follow the Department of Homeland Security Public Safety VoIP Working Group, BSI Core Profile standard. The “Bridging System Interface” (BSI) standard ensures that JPS Communication interoperability gateways can share interoperable voice communications with other vendor’s interoperability gateways, bridging devices, and end user units (such as VoIP phones) in an expedient and reliable manner.
Radio-over-Internet Protocol (RoIP)

JPS Intelligent Interconnect Technology incorporates Radio-over-Internet Protocol in many of its product and system offerings. This protocol allows voice communications over non-proprietary TCP/IP networks from one JPS interoperability device to another, over long distances, or over challenging environments. RoIP communication links settings can give a “relentless” mode that permanently connects with its peer device, and is self-healing. RoIP communications links can be malleable, and dynamically influenced by non-technical operators responsible for managing communication interoperability by using the JPS WAIS Controller software applications.

JPS Intelligent Interconnect Technology RoIP not only strives for reliability, but also employs customer-configurable VOCODERs that allow the link to fine-tune to fit requirements of bandwidth conservation (as low as 16kbps in one direction) or preservation of audio fidelity.

Distributed Architecture – Reliable Interoperability

From the very beginning, JPS Intelligent Interconnect Technology interoperability gateways design is fully self-contained with their own integral processors that do not need outside influence from ancillary computers, servers, or networks. As customers demanded larger region-wide systems and remote control, our systems began relying on networks to share and distribute voice communications. Additionally, operators came to need real-time situational awareness and system wide command and control over these same networks. This needed the use of PC applications that allow operators to monitor and control systems as well as communicate with the disparate communications systems connected via the Intelligent Interconnect technology.

Even with these PC-based control applications, JPS Interoperability Solutions has avoided embracing pure server-based architecture to control and manage hardware, avoiding the single point of failure which is far from ideal when dealing with mission-critical interoperable communications. The mantra of our Distributed Architecture is ensuring that local domain interoperable communications continue even if a disaster or another event takes down network infrastructure. Additionally, if one or more local systems are out of service or otherwise inaccessible, the rest of the wide area system can continue operation. The Distributed Architecture allows the JPS Interoperability Solutions gateways to live on less than reliable networks without the fear of losing interoperable communications within the local domain.

All JPS Interoperability products have an 18-month warranty period. Our products are proven to be reliable for many years offering trusted and dependable service to our customers. JPS has one of the lowest life-cycle costs and product repair-and-return percentages on the market today.
The SNV-12 Voter can now operate in environments with packet-based IP backhaul for some sites, operating alongside sites that employ traditional analog voter backhaul methods. The new SVM-3 digital backhaul Site Voter Modules can coexist in a standard SNV-12 chassis along with the current SVM-2 modules. The result is backwards compatibility, an opportunity for a phased-in transition of existing systems to all digital backhaul where desired, and maximum flexibility overall.
The industry-leading SNV-12 modular receiver voting system uses individual Digital Signal Processors to measure receiver audio quality for fast and accurate determination of the best signal. Our new SVM-3 modules, along with the QMT-1 modem at the receiver sites, allows transport of receiver audio via customer’s IP network, reliably handling the challenges that network delays and jitter add to the voting process. The SVM-3 modules can be plugged into existing SNV-12 chassis alongside current SVM-2 modules for flexible, low cost upgrades.

JPS Interoperability Solutions builds on its industry leading SNV-12 analog receiver voter, now allowing a customer’s IP network to transport receiver and transmitter audio between the SNV-12 voter chassis and remote RX/TX sites. This made possible by our new QMT-1 remote units and SVM-3 three-channel IP backhaul Site Voter Modules.

Network delays and jitter create challenges to traditional analog voting which requires time-synchronized signals from multiple voting receivers. These challenges are capably handled by the combination of the QMT-1 and the SVM-3, in conjunction with updated software in the SNV-12’s CPM-3 Control Processor Module.

The QMT-1 single-channel voting receiver modem interfaces remote receivers and transmitters to the SNV-12, performing these functions:

- Audio signal time stamps
- Accurate Signal Quality Analysis performed on analog RX audio
- Analog to digital translation of RX audio and COR as well as digital to analog translation for TX audio and PTT
- Full duplex audio with superior sound quality

When an Unsquelch condition occurs, signaling that receiver audio should be sent to the voter, the QMT-1 measures signal quality and converts the analog audio to IP for transfer to the SVM-3. Each SVM-3 module can service three receivers, and works in conjunction with the CPM-3 to monitor the arrival timing of incoming audio. This allows the voted signals to be resynchronized for accurate voting and switching between sites during a voting sequence.

The remote RX audio, whether interfaced by analog means to an SVM-2 or by an IP network to an SVM-3, is buffered up by the site voter modules until the CPM-3 determines that all unsquelched sites have reported in. The CPM-3 then coordinates re-alignment of the various signals.

Initial Network Requirements (may be relaxed upon successful testing):

- Bandwidth 100k min per channel per direction (RX/TX))
- Packet loss less than 0.1%
- Overall latency less than 30ms
- Differential latency between Rx sites less than 10 ms
- Jitter less than 5 ms
Benefits

- Bring voter audio to/from your remote sites using your network or IP microwave
- Allows use of existing private network infrastructure, thereby eliminating the need for leased lines
- Multiplexes voice audio and data over a standard Ethernet network
- IP backhaul sites do not require idle tones • IP Backhaul sites use loss of multiple consecutive audio packets as the trigger for faulting an RX site, removing it from voting consideration until the next Unsquelch event
- SNV-12 interfaces easily with standard dispatch consoles
- Detects and generates EIA key-tones in addition to hard PTT
- Can repeat voted audio
- Controllable locally, or remotely via IP
- Wide range of automatic and manual transmit steering features
- Digital audio delay ensures no loss of initial syllables

Advantages

- System expansion to 36 sites
- 5.25” high by 19” wide rackmount modular cardcage
- System statistics and ability to monitor voted
- audio available via IP
- Dispatcher’s audio takes precedence over voted retransmissions, or may be set to mix with the repeat audio
- Front panel LEDs assist easy setup and ongoing system diagnostics
- Enables the formulation of low cost, extremely flexible radio communications

Overview

The SNV-12 uses Digital Signal Processors to continuously monitor multiple remote receiver sites and select the receiver with the best signal quality. A typical application is an LMR system in which mobiles and portables can hear a repeater, but the repeater cannot hear them, due to their lower transmit power and/or the antenna size or placement.

Remote receivers can be positioned in the communications dead spots, with audio from each receiver linked to the voter via IP or T1 microwave, IP Fiber, landline, twisted pair, RF link, or fiber optics. The voter will select the best quality signal from all unsquelched remote receivers and forward this signal to the repeater for rebroadcast or monitor by a dispatcher, thus providing greater talk back range for the radios.

Past Performance

- Dominates the market with over 7,500 voters sold worldwide
The SNV-12 chassis will select from up to 12 individual receiver sites (or 36 in an expanded, 3 chassis system), the input with the best signal quality. This voted signal is sent to a dispatcher and can also be retransmitted. Above is a two channel, 2 remote receive site system using SVM-2 modules and non-IP legacy backhaul (RT line or phone line, RF link, T1 telco or T1 microwave).

New SNV-12 IP Backhaul Capability

The new SNV-12 IP Backhaul capability is a major advancement, and is backwards compatible with SNV-12 analog voters already deployed. The new SVM-3 module, along with a new QMT-1 unit (for Quality Measurement & Transport) allow the use of IP networks for transport of receive and transmit audio. The SVM-3 modules can coexist in an SNV-12 chassis along with the current SVM-2 modules. The SVM-3 allows front panel force vote and force disable, just like the SVM-2. The chassis must also have a CPM-3 with latest firmware.

DSP Voting

The SNV-12 uses a spectral approach to continuously monitor the audio signals from each receiver site, using proprietary speech detection and measurement algorithms. These algorithms continuously calculate a 31-discrete step Signal Quality Number for each voting receiver. The SNV-12 monitors all SVMs and votes the site with the best Signal Quality Number. This thorough voting process ensures the best site is voted even if the received signal is transmitted by a vehicle currently moving behind buildings or between remote voting receiver sites. The QMT-1 performs these detection and measurement operations, sending the results digitally to the SVM-3.

The SNV-12 voting criteria may be easily optimized to suit individual systems. DSP voice detection capability allows automatic faulting of receivers with inappropriately open squelches. The voting process is initiated whenever any receiver is unsquelched, signaled either by loss of pilot tone or by a hardwired COR output or multiplexer E-lead; individually configurable on each SVM-2. The SVM-2 accepts pilot tones of either 1950 or 2175 Hz. The QMT-1 uses only the hardwired COR approach for unsquelch detection.
Benefits

- Do you need a device that acts like a Remote Radio Relay; the RSP-Z2 is your product
- Do you need a device that acts like a Remote PSTN to Radio Patch; the RSP-Z2 is your product
- Do you need a device that acts like a controller and remotely interfaces radios, PSTN, or other devices to other RSP-Z2 units and JPS gateways, including the new ACU-Z1; the Z2 is it
- Is your need driven by the capability to run an Encrypted Browser-Based Control and Configuration through PCs and Tablets, connect, and disconnect modules in a Wide Area Solution from anywhere there is an IP connection; you should look at the ACU-Z1 and RSP-Z2. Operators can use this highly scalable GUI to control wide area interoperability systems that include multiple ACU-Z1s as well as new RSP-Z2 Dual Channel Radio/PSTN Internet Gateway
- Do you need a Wide Area Network where the embedded browser can handle from (60-80) Z1 or Z2 connections; then the ACU-Z1 and/or RSP-Z2 is the solution
- Do you need interoperability that connects Smart Devices, both phones and tablets to your present and future ACU interoperability products; the Z1 and Z2 are your devices
- Want a cell phone PTT interface that connects to the JPS interoperability product line; use the new JPS VIA Smartphone App (powered by ESChat) which offers a PoC interface to the Z1, Z2, 2000, 5000, T, M and NXU systems, as well as optional connection to ISSI, AIS, and FirstNet
- Do you need selectable VoIP protocols: SIP, RTP; or JPS RoIP; then the Z1 or Z2 are the way to go
Overview

- Intuitive web-based GUI with SSH encryption
- Single RJ-45 connector & IP address for both channels
- USB port supports software upgrades and monitor/dispatch with specified USB headsets/DECT 6.0 Headsets
- 2-Channel Network Centric Gateway
- Featuring ACU Technology found in all ACU Interoperability gateways
- PSTN users can dial in and use DTMF to create a connection to either of two radios which interface to the unit (guided by voice prompts)
- Includes JPS radio interface algorithms developed over several decades as the leader in radio interoperability
- Uses standard JPS radio interface cables

Network Centricity allows distribution of large interoperability domains to establish bridging channels. Above: The RSP-Z2 can function as a remote radio interface for an ACU-Z1 interoperability system, controlled by the ACU-Z1’s web based GUI. Note that in this capacity, the RSP-Z2-linked radios do not tie to any of the ACU-Z1 plug-in modules, keeping these resources free, thereby creating an extremely scalable system. These units, under control of the ACU-Z1, can patch their analog ports and send a single combined audio stream.

Interfaces:
- Radio
- Analog PSTN
- Digital SIP / RTP
- RoIP
- Bluetooth
Remote Extension Mode

When used in the Remote Extension Mode, the RSP-Z2 acts as a pair of independent “cable extenders,” able to transfer audio plus PTT & COR signals, via IP, from local radio or PSTN sources to other devices. In this mode, the unit behaves similarly to a one or two channel version of the popular JPS NXU-2A and ARA-1 units, but with many added features such as RTP along with RoIP & SIP, and if desired, a PSTN interface.

Above: The RSP-Z2 functioning as a pair of independent Radio to IP interfaces. Optionally, one of the two analog ports can be a PSTN interface. There is a single RJ45 Ethernet Port and IP address, but in the Remote Extension Mode, each path is independent of the other. The transport protocol for each path (SIP/RTP/JPS RoIP) is user-configurable, depending on system requirements.

Stand Alone Mode

In Stand-Alone Mode, the RSP-Z2 can create a local patch between its two analog interfaces (radio-to-radio or radio-to-PSTN). This dynamic patching capability can be controlled and its audio monitored via the unit web-based graphical user interface. Audio from this local patch can also connect to other radios or other devices, and can work with other RSP-Z2 units or by a JPS radio interoperability gateway.

Above: In Standalone Mode, the RSP-Z2 can patch together its two analog ports. If desired, this joint audio can travel via IP in a single stream, using the desired transport protocol.
Controller Mode

Multiple RSP-Z2 units can also function as a wide-area interoperability system. With one RSP-Z2 set to Controller Mode, it can cross-connect any of the radios, PSTN lines, or other devices that interface to the other RSP-Z2s. System operators browse to the Controller unit, which hosts a Graphical User Interface like that of the ACU-Z1 gateway and use this GUI to create interoperability nets.

Above: Multiple RSP-Z2 devices can create a wide area interoperability system, with a similar GUI on one RSP-Z2 unit that is functioning in Controller Mode.
Above: The RSP-Z2 can function as a remote radio interface for an ACU-Z1 interoperability system, controlled by the ACU-Z1’s web based GUI. Note that in this capacity, the RSP-Z2-linked radios are not tied to any of the ACU-Z1 plug-in modules, keeping these resources free, thereby creating an extremely scalable system. These units, under control of the ACU-Z1, can patch their analog ports and send a single combined audio stream.
Capabilities – Network Based Voice Transport

All JPS Products Offer Both Localized and Wide Area Interoperability

Voice Transport over Networks

- SIP (Session Initiation Protocol – ARA-1, ACU-2000, ACU-5000, ACU-T, ACU-Z1, RSP-Z2)
- RTP (Real-Time Transport Protocol, ACU-Z1, RSP-Z2, JPS VIA)

JPS RoIP streams voice communications using bandwidth conserving vocoders:

- GSM (13 kbps)
- ADPCM (16 kbps)
- ADPCM (24 kbps)
- ADPCM (32 kbps)
- PCM (64 kbps)
JPS VIA

Benefit

Want a cell phone PTT interface that connects to the JPS interoperability product line;

- Use the new JPS VIA Smartphone App (powered by ESChat) which offers a PoC interface to the Z1, Z2, 2000, 5000, T, M and NXU systems, as well as optional connection to ISSI, AIS, and FirstNet

http://www.jpsinterop.com/products/jps-via/

Overview

JPS Interoperability Solutions, Inc., the industry leader in communications interoperability, offers the integration of SLA’s Enterprise Secure Chat (ESChat) with its ACU technology. Called JPS VIA, the service offers secure voice and data links between mobile devices and JPS gateways. This brings many new features to the gateway operators, interoperability system members, and Smart Device users.

- Fast Call Setup, Excellent Voice Quality
- Instant Secure PTT Voice and Group Text Communications
- In-Call Preemption and Priority-Based Call Override
- Late Join and Re-Join on Group Calls
- Complete User Account Management by Administrators using a Handset or by Web-based GUI
- SIPREC Interface for Professional Third Party Recording Systems
- Future Improvements include Path to Mission Critical PTT (MCPTT), and Integration With & Visibility into JPS Gateways

Advantages

- Connection to JPS equipment with RoIP
- Wireless Carrier Independent and Cross Carrier Capable
- Live and Historical (Bread Crumb) Location Tracking
- ISSI Integration for P25 Networks
- Presence for Groups and Individual Contacts
Above: 3G/4G/LTE/Wi-Fi networks. Customers simply buy the service through JPS and download the application to their Smartphones from the JPS Android or JPS Apple App Store. A monthly service fee charge is per mobile device used. JPS VIA offers ESChat’s full and very extensive feature set, and JPS will also be rolling out new features that more tightly integrate the JPS VIA application with ACU gateways, bringing increased awareness and control to all users of the combined system.
Benefits for JPS Products ACU-2000, ACU-5000, ACU-T, ACU-M

- **Suffering from typical interoperability issues between radios such as Ping Ponging, and missing syllables:**
  - Sophisticated DSP algorithms in the JPS interoperability products will help
- **Are repeater long squelch tails causing problems with your interoperability system interface:**
  - The JPS COR Inhibit and VMR (VMR-Voice Modulation Recognition) will help (COR indicates you are receiving a valid signal)
- **Need a reliable COR for AM/HF/Single sideband radios:**
  - The leading JPS VMR and noise reduction algorithms are your solution
- **Want a cell phone PTT interface that connects to the JPS interoperability product line:**
  - Use the new JPS VIA Smartphone App (powered by ESChat) which gives a PoC interface to the Z1, Z2, 2000, 5000, T, M and NXU systems, as well as optional connection to ISSI, AIS, and FirstNet
- **Is your radio phone patch working reliably with clean/clear audio:**
  - Our Adaptive hybrid in our PSTN modules will offer the solution
- **Wishing you had a reliable COR for VHF, UHF, 800mHz, and trunking radio systems:**
  - The true and time tested JPS VOX or VMR will solve this problem
- **Need Bridging System Interface (BSI) compliant protocols for your gateway interoperability:**
  - Our products meet this specification
- **Missing radio interface cables for your interoperability system:**
  - The JPS library of over 300 radio-specific interface cables and templates covering most radio makes & models is your answer
- **The JPS Radio over Internet Protocol (RoIP) is reliable and for years, customers recognize the JPS RoIP as the best in the public safety market**
- **JPS WAIS System capable (WAIS - Wide Area Interoperability System)**
- **Proper for Public Safety, DOD, commercial, education, international, and Private Sector**
ACU-2000 / Communication Interoperability with SIP

The ACU-2000 IP offers a full suite of network capabilities including linking of radios over an IP network, control of large interoperability systems via IP, remote channel change over IP, and the ability to interface radios via SIP.

Overview

- Intelligent Audio Communication Gateway
- Up to 24 channels (dual chassis)
- The ACU-2000 IP gives true convergence of Local Interoperability, IP communications and control, with the advantages of the open-standards SIP protocol to your radio systems and adds radio functionality to your network.
- Modular interoperability system employing proven JPS DSP Technology, Radio over IP (RoIP), and SIP technologies
- Builds on the industry standard ACU-1000’s ability to link disparate communications systems

• Offers unsurpassed local and wide area interoperability by directly connecting or networking UHF, VHF, 700/800, HF, P25, military radios and PTT devices, Cellular, Digital SIP, and Land Line telephone endpoints

• Systems can link, be monitored, and controlled over an IP network

• SIP capabilities allow SIP-based systems or individual SIP endpoints (such as SIP phones or softphones) to be included in the conferences

• Flexible Distributed or Server-Based configuration allows compatibility with different architectural environments and philosophies

• TX & RX Audio delay

• Noise reduction

Advantages

• Digital Signal Processing, multiple RoIP, GUI interface, radio templates, SIP capability

Past Performance

• Thousands of operationally fielded units
ACU-5000 / Communication Interoperability with SIP

Overview

- The ACU-5000 keeps the great features that made JPS’s ACU product line the industry leader – with a technology refresh in a smaller, One Rack Unit high form factor plus many new capabilities
- The ACU-5000 IP gives true convergence of Local Interoperability, IP communications and control, giving your radio system the advantages of the open-standards SIP protocol while adding radio functionality to your SIP network
- Incredibly versatile; 12 communications channels that can configure as user-defined combinations of radio, phone, or VoIP (SIP) or RoIP channels
- Offers unsurpassed local and wide area interoperability by directly connecting or networking UHF, VHF, 700/800, HF, P25 radios and PTT devices, Cellular, SIP and Land line telephones / end points
- Integrated Web Browser-Based configuration and control prevents the need to have hardware specific software applications preloaded on controlling computers
- Optimized cables and preloaded settings ensure quick interface of radios, phones, satellite (Sat) phones, etc.
- TX & RX Audio delay

http://www.jpsinterop.com/products/acu-5000/
Advantages

- High port density – 1 Rack Unit high
- Digital Signal Processing

Past Performance

- Operationally fielded, public safety and NG
ACU-T / “Tactical” Communication Interoperability

Overview

- Intelligent Audio Communication Gateway in a tactical form factor
- Modular interoperability system employing proven JPS DSP and Radio over IP (RoIP) technologies
- Offers unsurpassed local and wide area interoperability by directly connecting or networking UHF, VHF, 700/800, HF, P25 radios, iDEN and PTT devices, Cellular and Land line telephones
- Control and status monitoring options make the ACU-T truly flexible and versatile. Interconnections between any of the system radios and telephones (and a local operator) can start and end using:
  - Integral keypad and LED display
  - Remote DTMF signaling from radios and consoles
  - ACU Controller software via IP networks or serial RS-232 links

http://www.jpsinterop.com/products/acu-t/
Advantages

- Digital Signal Processing, multiple RoIP vocoders, GUI software interface, radio templates, network remote interface

Past Performance

- Proven ACU technologies with 1000 + deployments

ACU-T Tactical Package
ACU-M / “Mini” Communication Interoperability

Overview

- Intelligent Audio Communication Gateway in a small form factor designed to maximize ease of setup and use
- Self-Contained interoperability system employing proven JPS DSP and Radio over IP (RoIP) technologies
- Offers unsurpassed local and wide area interoperability by directly connecting or networking UHF, VHF, 700/800, HF, P25 radios and PTT devices
- Control and status monitoring options make the ACU-M truly flexible and versatile. Interconnections between any of the system radios and RoIP links (and a local operator) can start and end using:
  - Integral front control panel buttons and LCD display
  - Remote DTMF signaling from radios and consoles
- ACU Controller software via IP networks or serial RS-232 links
- 4 radio channels + 2 RoIP channels

http://www.jpsinterop.com/products/acu-m/
• Weighing less than 3 pounds, the ACU-M can deploy anywhere and its affordable price makes it ideal for any agency

Advantages
• Digital Signal Processing, multiple RoIP vocoders, GUI software interface, radio templates, network remote interface
• Self-contained, computer-less integrated front panel button and LCD operations
• Onboard radio templates

Past Performance
• Proven ACU technologies with 1000 + deployments
Benefits

- Do you need to join two radio channels or talk groups together as one:
  - The NXU-2A is your answer, it multiplexes voice audio and data (COR/PTT) over a standard Ethernet network, at a low cost to you
- Do you want to end the need for pilot tones and in-band signaling:
  - The NXU-2A does this easily by using COR and PTT between the two radio channels/talkgroups
- Do you need to setup or check the status of your radio link:
  - The NXU-2A Web Browser-based configuration does the job
- Do you need to have a remote link for one radio connected to your ACU-2000/5000/T or M:
  - The NXU-2A does this by connecting directly to the IP port of our interoperability products or PC NXU RoIP technology
- Suffering from typical interoperability issues between radios such as Ping Ponging, and missing syllables:
  - Sophisticated DSP algorithms in the JPS interoperability products will solve this problem with adjustable transmit and receive audio delay, VMR COR type, multicast mode, and QoS
- Bridging System Interface (BSI) compliant protocols for gateway interoperability
- Do you need higher quality audio than a standard vocoder offers in most products:
  - JPS products have five built-in VOCODERs to balance audio quality vs bandwidth – our lowest vocoder consumes as little as 13 kbps in each direction with good audio quality
- Missing radio interface cables for your interoperability system:
  - The JPS library of over 300 radio-specific interface cables and templates covering most radio makes & models is your answer
- JPS WAIS System capable (WAIS - Wide Area Interoperability System)
- Proper for Public Safety, DOD, education, commercial, international, and Private Sector

http://www.jpsinterop.com/products/nxu-2a/
Overview

- Network Extension Unit
- Extends radio coverage over networks by implementing RoIP

- Leverages RoIP and networks to overcome physical obstacles or distances beyond typical radio systems

Advantages

- Digital Signal Processing, multiple RoIP vocoders
- Low cost
- Using existing network infrastructure ends the need for leased lines and microwave sites

Past Performance

- 11,000 + deployments
ARA-1 / Analog Radio Adapter

http://www.jpsinterop.com/products/ara-1/

Benefits

- Do you need a SIP-to-Radio interface which brings radio advantages to SIP networks and SIP capabilities to radio networks:
  - Then the ARA-1 is for you

- Do you want a radio channel/talk group connection from a SIP PBX extension number:
  - Interoperability is as simple as dialing an extension number with an ARA-1

- Do you need to extend SIP based communication to areas where cell phone carriers do not offer coverage (but LMR offers coverage):
  - The ARA-1 is the answer

- Do you need to monitor or control your SIP interoperability link from anywhere on a laptop:
  - Our Web Browser-based control and configuration capability is the solution

- Suffering from typical interoperability issues between radios such as Ping Ponging, and missing syllables:
  - Sophisticated DSP algorithms in the JPS interoperability ARA-1 will solve this problem with adjustable transmit and receive audio delay, and VOX and VMR COR types

- Easy to associate to peer end-point with IP address in SIP proxy server-less environment

- Bridging System Interface (BSI) compliant protocols for gateway interoperability

- Missing radio interface cables for your interoperability system:
  - The JPS library of over 300 radio-specific interface cables and templates covering most radio makes & models is your answer

- Constrained by bandwidth:
  - Multiple codec and compression level options allow system optimization in relation to available bandwidth.

- Appropriate for Public Safety, DOD, education, commercial, international, and Private Sector
Overview

- Simply defined, the ARA-1 offers a seamless interface between a radio and an IP-based network using SIP
- Implements standards-based SIP Protocol
- Leverages SIP network environments to extend voice communications to areas outside of the radio system’s coverage area
- Brings SIP PBX features into the radio arena – can include call logging, forwarding, and recording
- Radio-centric interface can support 4- or 2-wire, balanced or unbalanced full-duplex radio systems

Advantages

- Suited for standards-based environments implementing SIP digital telephony
- Radio systems can harness digital telephony features and functions available to SIP devices

Past Performance

- 1,700 + deployments
WAIS / Wide Area Interoperability System

Benefits

- Do you need the ability to see multiple JPS “Local Interoperability Sites” (“LIS” defined are ACU-2000 / 5000 / T / M / and NXU sites) at the same time, with connect/disconnect ability and control; then the JPS WAIS is your answer.

- Do you need the capability to have multiple dispatchers using IP from anywhere to be able to visually see your LIS, dispatch and listen, connect, and disconnect modules, check groups or individual sites, dispatch to groups or individual sites; our WAIS system is the solution. The Operator Graphical User Interface allows management of interoperability between multiple sites, by multiple operators.

- Do you need constant feedback and real time Situational Awareness; then our well recognized WAIS will help.

- Do you need experience in your LIS design; then use the field proven ACU, NXU and RoIP technologies by JPS, 28 years of radio experience, 20 years of interoperability capabilities.

- Direct Dispatch two-way communications capabilities with any radio channel or talk group within the system.

http://www.jpsinterop.com/products/wais/
Multiple operator remote command and control from anywhere on the network

Easily scalable and adaptable to existing communication equipment

Overview

Wide Area Interoperability System

Scalable interoperability solution that links multiple communication devices through any IP network: LAN, WAN, or the Internet

Existing ACU, NXU, and RoIP technologies share communications and collaborate control functions using WAIS software and architecture

WAIS operators and dispatchers can control and configure interoperability from multiple locations from anywhere in the network environment

Distributed architecture ensures local interoperability will work in the presence of network failure

3 WAIS System Versions

WAIS Classic

Operators use WAIS Controller operator software interface to manage interoperability with dispersed communications assets via networks, such as a LAN, WAN, or the Internet

WAIS Enhanced

Includes all capabilities of WAIS Classic, plus direct dispatch operator two-way communications from directly within the WAIS Controller operator software interface

WAIS Enterprise

Includes the capabilities of both WAIS Classic and WAIS Enhanced, plus extends the dispatch capabilities by allowing multiple dispatch operators to simultaneously dispatch two-way communications with the same radio channels or talk groups

Advantages

Use existing ACU hardware and customer’s radio systems. No forklift upgrades are necessary

Distributed architecture ensures local interoperability will work despite network failure

Past Performance

Regional, Statewide, DOD & International
Benefits

- Do you need a Wide Area Network where the embedded browser of a product can handle from (60-80) Z1 or Z2 connections;
  - Then the ACU-Z1 and/or RSP-Z2 is the solution. Operators can use this highly scalable GUI to control wide area interoperability systems that include multiple ACU-Z1s as well as RSP-Z2 Dual Channel Radio/PSTN Internet Gateways
- Is your need driven by the necessity to run an Encrypted Browser-Based Control and Configuration through PCs and Tablets, connect, and disconnect modules in a Wide Area Solution from anywhere there is an IP connection;
  - You should look at the ACU-Z1 and RSP-Z2
- Do you need interoperability that works with Smart Devices, both phones and tablets to your present and future ACU interoperability products;
  - The Z1 and Z2 are your products
- Want a cell phone PTT interface that connects to the JPS interoperability product line;
  - Use the new JPS VIA Smartphone App (powered by ESChat) which offers a PoC interface to the Z1, Z2, 2000, 5000, T, M and NXU systems, as well as optional connection to ISSI, AIS, and FirstNet
- Do you need selectable VoIP protocols:
  - SIP, RTP, or JPS RoIP; then the Z1 or Z2 are the products to choose

http://www.jpsinterop.com/products/acu-z1/
Overview

- Builds on the ACU-2000 feature set, using up-to-date hardware and advanced processors
- SIP PBX and Stun Support (Decides IP Address for NAT Clients)
- Operators can use this highly scalable GUI to control wide area interoperability systems that include multiple ACU-Z1s as well as new RSP-Z2 Dual Channel Radio/PSTN Internet Gateway
- Modular, only 2U high, lower power - does not need extra rack space for ventilation
- Local connection through standard handset or with specified DECT 6.0/USB Headsets
- Modern, intuitive, and user-friendly Graphical User Interface

Interfaces:
- Radio
- Analog PSTN
- Digital SIP / RTP
- RoIP
- Bluetooth

Above: The ACU-Z1 functions as a Local Interoperability Site, with the capability to interconnect radios, SIP phones, cell phones, PSTN phones, tablets, and all in any combination of nets.
ACU SIP – LMR Channel Bank

Benefits

- Do you need the capability of multiple ARA-1’s at a single site:
  - The ACU-SIP LMR Channel Bank is your solution
- Do you require trusted standards based SIP connectivity:
  - The ACU-SIP conforms to the standards-based SIP Protocol services
- Easy to associate to peer end-point with IP address in SIP proxy server-less environment
- Bridging System Interface (BSI) compliant protocols for gateway interoperability
- Missing radio interface cables for your interoperability system:
  - The JPS library of over 300 radio-specific interface cables and templates covering most radio makes & models is your answer
- Proper for Public Safety, DOD, education, commercial, international, and Private Sector
- Do you need interfacing into the Cisco Unified Communications Manager / Call Manager Express; the ACU-SIP is fully compatible

Overview

- Seamless interfaces up to 12 radios to an IP based network using BSI-Compliant SIP
- Enables communications between radios and network communications devices such as SIP phones and softphones
- Offers radio networks all the features available with SIP
- Enables interoperable communications among disparate radio systems via PBX conference call

Advantages

- High port density – up to 12 channels in single Rack Unit high aluminum rackmount case
- Local handset can connect to any channel – which aids setup and maintenance
- Industry leading DSP technology

Past Performance

- Built on proven ACU-2000 technology
ACU ROIP – LMR Channel Bank

Benefits

- Do you need the capability of multiple NXU-2A’s at a single site:
  - The ACU-RoIP LMR Channel Bank is your solution

- Do you need higher quality audio than a standard vocoder provides in most products:
  - JPS products have five built-in VOCODERS to balance audio quality vs bandwidth – our lowest vocoder consumes as little as 13 kbps in each direction with good audio quality

- Do you need to save money on costly leased lines or microwaves:
  - Then the ACU-RoIP allows communication links that do not rely on these costly methods

- Missing radio interface cables for your interoperability system:
  - The JPS library of over 300 radio-specific interface cables and templates covering most radio makes & models is your answer

- Suffering from typical interoperability issues between radios such as Ping Ponging, and missing syllables:
  - Sophisticated DSP algorithms in the JPS interoperability products will solve this problem with adjustable transmit and receive audio delay, VOX/VMR COR type, and multicast mode

- Want a cell phone PTT interface that connects to the JPS interoperability product line:
  - Use the new JPS VIA Smartphone App (powered by ESChat) which offers a PoC interface to the Z1, Z2, 2000, 5000, T, M and NXU systems, as well as optional connection to ISSI, AIS, and FirstNet

- Do you need to extend and connect communications systems via existing network infrastructure:
The ACU-RoIP is your solution
• Bridging System Interface (BSI) compliant protocols for gateway interoperability
• JPS WAIS System capable (WAIS - Wide Area Interoperability System)
• Proper for Public Safety, DOD, education, commercial, international, and Private Sector

Overview
• Seamless Radio over IP interfaces for as many as 12 radios
• Uses RoIP to extend radio infrastructure over IP networks for connectivity to:
  o Dispatch Centers
  o Console Resources
  o Emergency Operation Centers
  o Disparate Radio Systems

Advantages
• High port density – up to 12 channels in single Rack Unit (1U) high aluminum rackmount case
• Local handset can connect to any channel – which aids setup and maintenance
• Industry leading DSP technology

Past Performance
• Built on proven ACU-5000 technology
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