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Responding to calls for emergency air medical service from more than 635,000 members and more than 1,300 hospitals and EMS agencies, Air Evac Lifeteam provides a critical service to rural citizens across a 12 State region. Coordinating more than 100 helicopters at more than 75 bases, the organization has been suffering from the physical limitations of its radio network, operating with multiple consoles – and multiple dispatchers – at each station with no inter-service interoperability and limited system survivability. The bottom line: critical patient care and the organization's financial well-being are at risk. Leveraging the capabilities of Radio-Over-IP software, Air Evac Lifeteam will be able to affordably achieve almost unlimited scalability, greater efficiency, extensive communications interoperability and system redundancy.

Extending Emergency Care

How National Interop and Radio-over-IP Systems Will Help Air Evac Lifeteam Deliver Fast and Reliable Critical Care in Rural America

The Challenge

In rural areas, death rates from life-threatening conditions average twice as high as those of urban locations, primarily because of the extensive delay in the delivery of proper care. Air Evac Lifeteam offers its patients a fighting chance, providing life-saving helicopter ambulances across the largely rural landscape of 12 Midwestern States.

As the largest independently owned and operated membership-supported air medical service in the U.S., Air Evac Lifeteam has flown more than 140,000 people who were in critical need of care. To provide this vital service, the organization maintains a fleet of more than 100 helicopters stationed at more than 75 mutually-supporting air medical bases. This massive operation is coordinated by 25 dispatchers from a single emergency dispatch center, with calls coming in from over 600 hospitals, 700 EMS agencies and more than half a million members.

Unfortunately their existing radio network is no longer up to the task. Based on bulky and expensive proprietary hardware consoles, the system is inefficient, confusing and operating past capacity. There is no survivability to speak of and no functional interoperability. Furthermore, physically accommodating future growth is out of the question. Even if it were, expanding operations with the current configuration would actually lead to diseconomies of scale, with per-channel and per-seat costs rising with each addition and draining any return on investment.

With each console capable of handling a mere 48 channels, dispatchers have to operate two separate consoles – and two separate microphones – to account for the 76 channels corresponding to the individual bases. With every second vital to patient survival, dispatchers must remember which

console a particular channel is on, and then which microphone is connected to that console. The limited number of channels also means that telephone lines cannot easily be patched into radio channels. Dispatchers, therefore, are forced to pass critical information back and forth between flight crews and the requesting parties or receiving facilities when direct communication would clearly be faster, less prone to error and in the best interest of patients in critical condition. Complicating matters even further, the expense and size of the hardware means that Air Evac Lifeteam cannot easily afford additional equipment, nor physically fit it in the limited desktop space already populated by 3 monitors. As a result, 3-4 individual dispatchers are forced to ineffectively share each set of consoles instead of operating their own.

Finally, recognizing its vital role in the emergency response chain for a growing number of communities, the organization knows that absolute network survivability is crucial. Like most of the 9-1-1 dispatch centers in the U.S., AEL's single dispatch center has no redundant facility that can instantly assume control in the event of a major natural disaster or system failure. The entire communications system is based on a point-to-point architecture in which each radio tower is connected to a single corresponding circuit at the dispatch center. This infrastructure makes it completely unfeasible to install a backup dispatch center. It also means substantial maintenance costs and potentially fatal repair delays in the event of a system disruption. During Hurricane Katrina, similar radio systems operated by other organizations were down for relatively minor reasons, but the difficulties of getting specially trained technicians on location delayed recovery, often for days.

Customer Pain Points

- **Inability to Grow.** Channel limits and size requirements of existing proprietary radio equipment has the dispatch center past capacity.
- **Lack of Interoperability.** Flight crews have difficulty communicating directly with call initiators and emergency services, increasing delays in the transfer of critical information and hindering patient care.
- **Reliability Concerns.** Legacy point-to-point radio communications architecture makes implementing a backup facility completely unfeasible.



Solution Features

- **System-of-Systems Architecture.** Uses standards-based software to avoid the unnecessary complexity, limitations and expense of proprietary hardware solutions.
- **Easy Scalability.** Can support 250+ channels with ability to scale to a virtually unlimited number of users, all from a single console.
- **Extensive Interoperability.** Creates a tightly integrated communications environment, supporting interoperability with almost any communications device.
- **Cost-Effectiveness.** Leverages software to achieve economies of scale while delivering highly affordable scalability, reliability and interoperability.

The Solution

To begin its search for a solution, Air Evac Lifeteam identified four primary objectives: provide every dispatcher instant access to any helicopter from a single console, establish a 1:1 ratio of dispatchers to consoles, ensure effective interoperability between radio channels and telephone lines, and employ a network architecture that would allow the implementation of a redundant dispatch center.

After hearing about new software-based solutions for radio integration with an IP network, Air Evac Lifeteam's research led them to National Interop, an expert radio systems integrator with personnel experienced in the EMS community and air medical transport – and a Certified WAVE™ Integrator.

“Capitalizing on our familiarity with emergency response, we conducted a thorough assessment of the objectives, technical constraints and budget of Air Evac Lifeteam,” said David Billstrom, CEO and Chairman of National Interop. “After evaluating all possible solutions in the marketplace, it was wholly apparent that a solution based on Twisted Pair’s WAVE was not only the best choice of all the Radio-over-IP technology we use for our clients, but the only solution given the project’s scale.”

To earn this selection, WAVE presented a manifold unified communications solution that no other technology could match. In a revolutionary approach proven at numerous installations worldwide, WAVE uses standards-based software to allow disparate devices to communicate seamlessly without requiring any expensive proprietary hardware. In this manner, WAVE builds a system-of-systems to create communications interoperability with unparalleled scalability, flexibility and affordability.

WAVE's economical capitalization of software instead of proprietary hardware means that every dispatcher will have their own PC-based console from which they can communicate on any radio channel with only two clicks of a mouse. Taking advantage of the WAVE Software Development Kit (SDK), National Interop will also customize several features of the user interface to facilitate optimal dispatcher performance. Additionally, these WAVE-enabled consoles will have the power to easily expand to more than 250 separate communications channels.

With WAVE at its core, the solution for Air Evac Lifeteam will also establish a higher standard of reliability. Capitalizing on a new IP telephony system, flight crews will be able to use their radios to communicate directly with the initiators of emergency calls and receiving hospitals, ensuring the clear, effective transfer of information. And once all communications are managed across an IP network, Air Evac Lifeteam will be able to establish the back-up dispatch center mandated by senior management in the organization's far-reaching continuity of operations plan.

According to Communications Systems Manager Don Looper, the exceptional capabilities of WAVE software will revitalize their communications capabilities and enable Air Evac Lifeteam to continue putting the patient first. “Our 23-years of operations have shown that a patient's chances of survival from a life-threatening injury are greatest if they receive definitive care without delay. Our upgraded dispatch capabilities will ensure the fastest responses possible when patient lives hang in the balance, plus we'll have a state-of-the-art backup center that will be ready at a moment's notice should it be required.”

Update: Towers across many states (Texas, Missouri, Arkansas, and Oklahoma) are up and running on the new system, already reducing costs of tower maintenance. 35 operator positions in the dispatch center and emergency backup dispatch center are also operational as the rest of the 79 towers are converted to the new system.

About National Interop, Inc.

We provide consulting, design, installation, training, and written operating procedures for communications systems nationwide. We're happiest when we are involved from the initial design, through system installation and customization, all the way to end-user training – but we'll help you at any stage along the way. We are a team of passionate public safety and technology professionals with a deep commitment to true communications interoperability.



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