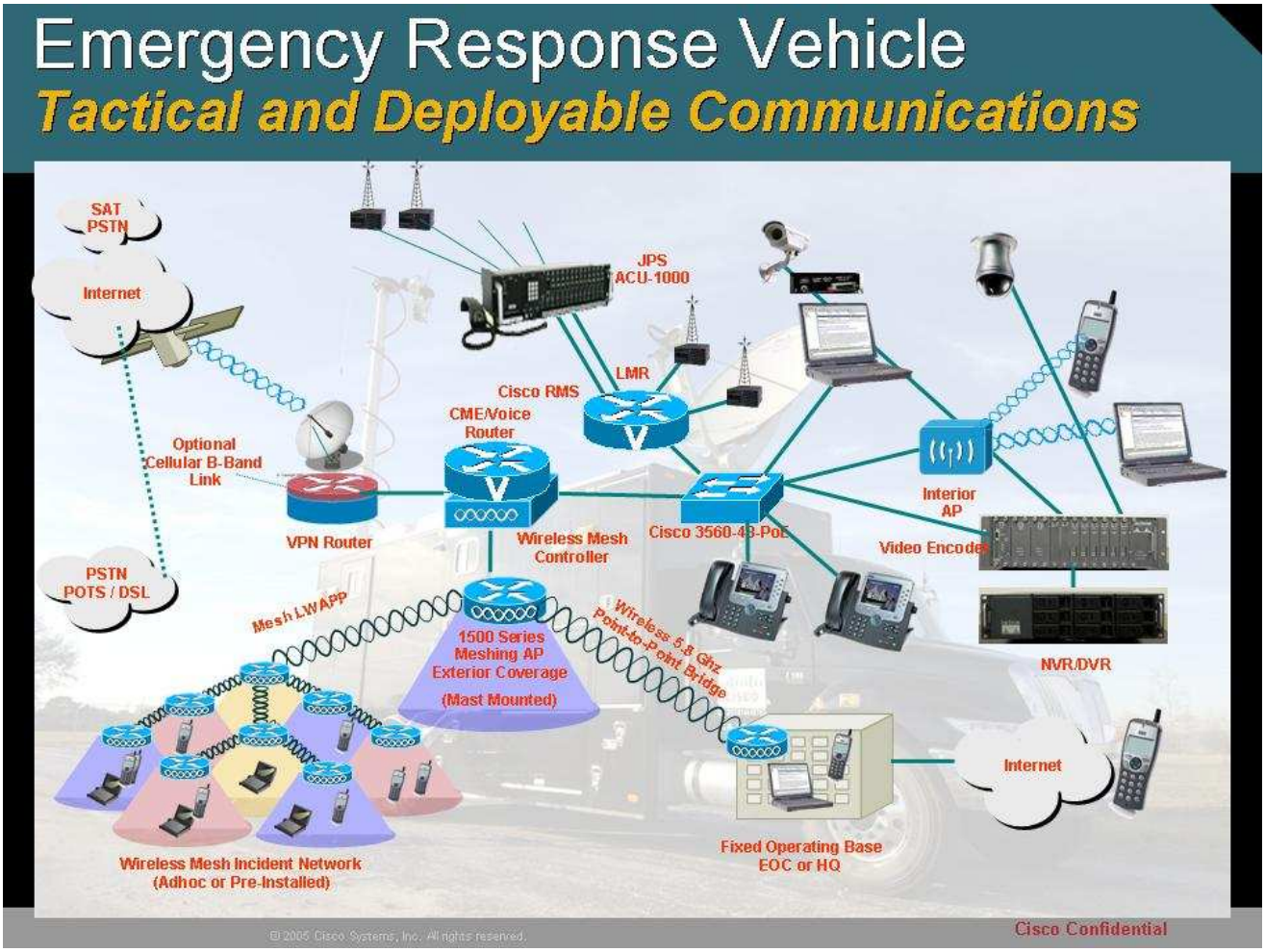
Cisco's Network Emergency Response Vehicle – "NERV"

In situations that require emergency response, or for mobile communications during special events, every second counts. First responders must rapidly establish essential command presence, resource control, and communication interoperability for incident command and control. To support these objects, a tactical mobile solution must include:

- Command, control, communication, computers, and intelligence (C4I)
- Scalable, reliable, and secure interoperable data, voice, and video
- Redundant communication options for reliability in any environment

Whether incidents require a single responder or a large command staff to manage a team of hundreds, Cisco® is helping mobile command and control centers meet the need for high-performance, mobile IP-enabled solutions. Working with industry leaders, first responders and incident commanders Cisco has learned how much is possible when mobile command and control is enhanced with commercial off-the-shelf (COTS) products based on IP technology and communications.



General

The NERV can rapidly establish essential communications in order to enable command presence, resource control, and communication interoperability. The technology enables rapid deployment of secure, reliable IP capabilities into a user friendly mobile command center environment. The electronic and technology layout of the vehicle is carefully planned and configured to embody the crucial ergonomic considerations that optimize information flow, foot traffic flow, intra-team communication, equipment access and usability, safety and comfort.

The communications area of the NERV vehicle is configured with five racks of state-of-the-art radio, telecommunication, computer, video, and IP technology. Outbound and inbound communications facilitate fast and efficient decision-making and communications. A separate command suite with seating for six individuals provides decision support tools and meeting space for making real-time command and control decisions. The command suite is outfitted with a large plasma display, computer network connections, video teleconference, and radio and IP phone service for timely analysis and display of situational data.

The entire system is self-contained and can be operational in less then 20 minutes after arriving at an incident. The NERV utilizes a diesel generator and a system of batteries and UPSs to run all the communications equipment and is designed to provide untethered communications during an incident or event. It has several different reach back mechanisms including satellite and cellular broadband. In addition, it has the ability to connect to most "landline" connections if they are available. The NERV solution encompasses a wide variety of technologies including **VoIP**, **LMR interoperability and LMRoIP**, **IP video surveillance**, **audio and web conferencing**, **Wireless Connectivity (WiFi and MESH)** and **video teleconferencing**.

VoIP

The NERV vehicle includes a Cisco IP Telephony solution featuring Cisco CallManager Express, which enables voice communication over both fixed and wireless Cisco IP phones. By using voice over IP (VoIP) and secure virtual private networks (VPNs), dial tone can be extended beyond an effected region - a critical capability when cellular infrastructure and radio networks are nonresponsive or become saturated. This "out-of-region dialtone" can be achieved using ITSPs or by connecting into your own back office voice system. Using VoIP also allows the system to scale very rapidly and to have local voice mail and auto-attendant capabilities.

LMR Interoperability

The Cisco IP Interoperability and Collaboration System (IPICS), in conjunction with the Cisco 2800 Series Integrated Services Router and the Cisco Gateway for land mobile radio (LMR) feature, allow for cross-band LMR interoperability. In addition to that, the limits of traditional LMR systems are extended to include interoperability and extensibility over IP. Using IPICS, the IP LMR functions allow for dispatch from COTS-based PC platforms as well as the ability to control on-demand conferencing between LMR, IP telephones, cellular, and push-to-talk networks. This multi-band multi-technology is essential especially when circumstances are not "normal" – a commander is on vacation and out of cellular or radio coverage but still has the ability to VPN into their home network, executives at HQ want to obtain real-time situational awareness so that they can properly release factual information to the press or advise on how to proceed, or if you want to interoperate and communicate with other constituents in the area.

IP Video Surveillance

Video surveillance always increases the situational awareness of field personnel and commanders. Cisco takes this a step further with the employment of the Cisco Infrastructure Video Surveilence solution. This solution has the ability to connect to legacy analog CCTV cameras and encode that video into IP. This IP stream can then be viewed from anywhere on the network (a commander back at HQ or a first responder in charge of security) and can also be recorded onto a Cisco network video recorder (NVR). This video feed can also be sent to a monitoring station where a Cisco video decoder would provide the IP-to-analog video translation. This solution can also manage the video streams from IP cameras so that a network user can view both the analog and IP cameras on a single PC using the client software.

Audio and Web Conferencing

The NERV's audio and web conferencing system is provided through Cisco MeetingPlace Express. MeetingPlace Express allows for users to create and attend audio and/or web conferences with minimal configuration. This particularly useful in the event that several parties want to attend an audio conference but also be able to see what the speaker is talking about (this is done through application sharing over a web interface).

Wireless Connectivity

The NERV uses multiple wireless technologies including WiFi for local PC and phone connectivity, and MESH to extend that WiFi coverage to the surrounding areas. An integrated wireless access point (WAP) provides a WiFi hot spot in and around the vehicle, while a mast-mounted MESH access point provides the root for the MESH wireless network. The MESH technology uses zero-touch configuration on the APs, and provides WiFi coverage and wireless backhaul (at different frequencies). The use of MESH wireless networking allows us to extend the WiFi coverage area much farther then the local WAP without running any additional wired network connections. It also gives us the ability to use wireless bridging over the MESH, which can be used to connect to other facilities (buildings) or groups.

Video Teleconferencing (VTC)

The vehicle VTC solution is actually a combination of two product sets – Cisco VT Advantage and 3rd party H.323 endpoints.

Summary

An IP-enabled tactical data, voice, and video communications solution provides critical communications to the extended community of assets that enable an effective response to any incident.