Extending Life-Saving Communications

The intrepid Alaska Department of Transportation & Public Facilities connects people, process, data and equipment along the state's most remote roads.

"At its worst, I was going through fast-running water up to three feet deep in temperatures of −7°. With solutions from Cisco and the Internet of Everything, we could quickly dispatch vital equipment and people and communicate no matter where I was. The impact of this system has been amazing."

– Jeff Russell, Dalton Area Superintendent

Challenges

- Implement telephone, radio, and Internet communication capabilities along one of the harshest stretches of highway in the United States
- Achieve absolute reliability in spite of extreme conditions
- Improve safety for staff and the public traveling the Dalton and Elliott Highways

The Alaska Department of Transportation & Public Facilities (ADOT&PF) is responsible for the state's highways, airports, bridges, community transit, ports, marine highway system, and harbors. Even when they are hundreds of miles from a town. Only accessible by aircraft. And buried under ice and snow.

In the case of remote northern Alaska, that means the Elliott and Dalton highways. The 150-mile Elliott Highway is paved until it meets the Dalton Highway at mile 73. The Dalton Highway runs for 414 miles from Livengood and ends at Deadhorse in Prudhoe Bay, which is the third-largest oil field in the United States. Ensuring safe transportation of goods and services across this vast wilderness can be difficult, especially when there was no communication infrastructure. Until recently, traveling to a remote facility required an airplane or helicopter. Satellite connected staff to the Internet, telephone service, and basic radio communication.

"Life safety is everything," says Jeff Russell, Dalton area superintendent. "We wanted to be able to get on a radio and call for help, whether it's to provide basic safety for our staff on the road or to the public that travels it."

Initially, ADOT&PF considered deploying multiple substation repeaters for the radio system. But there were numerous obstacles. There is no electricity along the road. Running power to each station would be cost-prohibitive. Solar power works

Size: 3,400 employees across the state | Location: State of Alaska, USA | Industry: Government and Transportation

only if there is sun—which is not present for a significant portion of the year. The only other option was to deliver fuel to generators by helicopter. However, the weather is unforgiving, and temperatures often drop well below zero and stay there.

As the team investigated its options with assistance from the Alaska Division of Enterprise Technology Services, they also looked for ways to upgrade their phone system. With an existing Cisco® network, the state looked to Cisco and solutions from the Internet of Everything. This resulted in deploying Cisco Connected Roadways solutions, Cisco Unified Communications solutions, and Cisco Instant Connect (formerly Cisco IP Interoperability and Collaboration System). By connecting people, processes, data, and things, the state would significantly improve communication, safety, and emergency response in the field.

All of these moving parts result in my ability to have that radio on my computer screen, desk phone, or iPhone—that's pretty amazing.

Solutions

- Seamlessly support fixed and mobile communications across telephone, radio, Internet, and other devices with push-button simplicity
- Network connectivity for roadways with highly secure data, voice, video, and application services back to the office
- Compete IP-based dispatch and incident response system

Embedding a network within a network

The State of Alaska already had Cisco switching and routing solutions. With Cisco Connected Roadways solutions, ADOT&PF could extend networking capabilities to connect people, process, data, and equipment in the Dalton area—whether stationary or mobile. Cisco solutions provide reliable, highly secure operation in the most harsh environments and extreme temperatures to meet the most demanding needs.

Cisco Services worked closely with AT&T, New Horizons Telecom, and the Enterprise Technology Services Division within the Alaska Department of Administration to deploy the new solution. Microwave communication transport is delivered by 19 AT&T-owned towers. Cisco Instant Connect provides the ability to manage secure radio, channel, and media resources; coordinate dispatching; and provide push-to-talk features for group communications.

"We now have the all-call channel," says Russell. "If anyone needs help, they can get on that channel and instantly communicate. All of these moving parts result in my ability to have that radio on my computer screen, desk phone, or iPhone—that's pretty amazing."

Responding faster than ever before

Before, there was no way to quickly determine local conditions along the Dalton Highway. So plow drivers had no way of knowing what they would be driving into. Responding to weather conditions or washouts meant numerous calls, and delays, to find someone in the vicinity that could report on an incident.

“The Cisco solution has been a tremendous help,” says Russell. “Before, when an air ambulance had to fly in to the town of Manley and needed a runway condition report, the only way to do that was to call the closest station and have someone find the airport manager. It could take all day to get the condition report. Right after we turned on the new system, the ambulance service called and we were able to respond and groom the runway within an hour and a half.”

The new Cisco Connected Roadways system helps save lives. Recently, a plow driver found a head-on collision and a truck on fire approximately 40 miles from Deadhorse. The plow driver radioed Russell in Manley—600 miles away—and he dispatched an ambulance from Deadhorse to respond and provide assistance.

Communicate from anywhere with anything

Providing reliable communications for vehicles, truckers, and all types of highway operations across harsh and remote conditions is difficult at best. Early in 2015, the Sag River accumulated ice, which forced moving water to the surface. Combined with a heavy snowfall, wind, and sub-zero temperatures, the overflow created a massive sheet of ice that covered miles of the Dalton Highway and shut it down.

“At its worst, I was going through fast-running water up to three feet deep in temperatures of -7°,” says Russell. “With solutions from Cisco and the Internet of Everything, we could quickly dispatch vital equipment and people and communicate no matter where I was. The impact of this system has been amazing.”

Connected systems for big savings

“With Cisco Instant Connect the ADOT&PF was able to deploy a truly unified and connected land mobile radio, telephonic, and administrative network with a system capable of programed expansion by simply modifying the end points to meet mission requirements as needed, without forklifting the entire network,” said Russell.

Results

- Fast response to emergency situations with vital manpower and equipment
- Expandability to broaden reach, improve safety and responsiveness
- Achieve significant equipment management and maintenance efficiency

Expanding its usefulness

“This solution is designed to expand,” says Russell. “And we’re looking at a number of ways to do just that.”

One possibility is sharing radio channels with the Alaska Trucking Association. At least 40 tankers per day navigate the highway, and in case of an accident, Russell’s team can notify the proper people and accelerate response. State troopers’ ability to share the system will also help improve safety. The Bureau of Land Management, Fish and Wildlife Service, and Department of Natural Resources also have expressed interest in the system’s ability to connect them in this remote area.

Logistics, equipment, and maintenance tracking

"We have up to 100 people, 294 pieces of equipment, and stockpiles of material," says Russell. "This system can simplify our administrative burden by integrating and automating monitoring and tracking applications."

Russell plans to take advantage of electronic maintenance features that are built into many of the heavy equipment vehicles. The sensors are there, the applications are readily available, but until now, there had not been a way to capture and deliver that data. With solutions from Cisco and the Internet of Everything, ADOT&PF can now connect sensors to the network and capture monitoring data for automating maintenance alerts, logistics planning, and numerous other potential applications.

"We have Cat graders with Cat Connect technology that will let us monitor location, fuel burn, and maintenance issues," says Russell. "We just didn't have the ability to use them until the Cisco network solution became available to us."

Next steps

Russell also sees the value of integrating GIS systems with the state's massive stores of database information for improving daily operational effectiveness. GIS integration will accelerate planning and simplify the logistics of routine maintenance tasks.

"All of these capabilities can save us time, reduce costs, and improve process efficiency," says Russell. "Now that we can connect our roadways with a Cisco solution, it's just a matter of deploying and testing them. The sky's the limit."

Products & Services

Data Center
- Cisco Nexus 5000 Series Switch
- Cisco Nexus 7000 Series Switch
- Cisco UCS Servers

Routing and Switching
- Cisco 3945 G2 Integrated Services Router
- Cisco 2911 Integrated Services Router

Fabric Interconnects

Network Management

Virtualization

Applications

Voice and IP Communications
- Cisco Instant Connect (formerly Cisco IP Interoperability and Collaboration System)
- Cisco Instant Connect Dispatch Console
- Cisco Instant Connect Mobile Client
- Cisco Unified Communications Manager
- Cisco Unified IP Phones 7965, in road stations
- Cisco Services for Unified Communications (Plan and Build)

OS

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at **www.cisco.com/go/offices**.

DRMKT-19412 06/15