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# Vocality RoIP and Alea PTT

*White Paper*

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## Abstract

This white paper is a general overview of Vocality interoperability with Alea, a Leonardo company, XPTT for commercial markets. Together they enable direct connection between Push-to-Talk (PTT) radios, also known as Land Mobile Radios (LMRs), smartphones, and desktop communication applications.

## Introduction

As broadband technology matures and budgets are increasingly constrained, the demand for greater capabilities with lower capital outlay has become a common requirement. Establishing connectivity between legacy voice communication systems and emerging technologies means organizations seek to maximize existing investment while benefiting from newer technologies, such as Push-to-Talk over Cellular (PTToC), video sharing, and live mapping.

Reliable, high-quality communications are critical to daily operations. Organizations often include a range of users who communicate through various devices. The challenge is to create a unified communication system across devices, users, and network types.

That is where Cubic and Alea come in. Our combined technologies help organizations build an effective communications capability that leverages existing PTT capabilities, mobile apps, and easy-to-use desktop applications to enhance and streamline communications. The solution comprises Cubic's innovation and leadership in Radio over IP (RoIP) combined with Alea's innovative XPTT mobile apps and desktop applications.

## The Need for a Unified Solution

Bridging the gap between different voice systems and technologies requires a tried, tested, and trusted solution capable of delivering enhancements and new features while employing existing equipment to help reduce new capital expenditure and maximize savings. The system must connect disparate PTT radios, smartphones, and desktop applications without needing specialized software development.

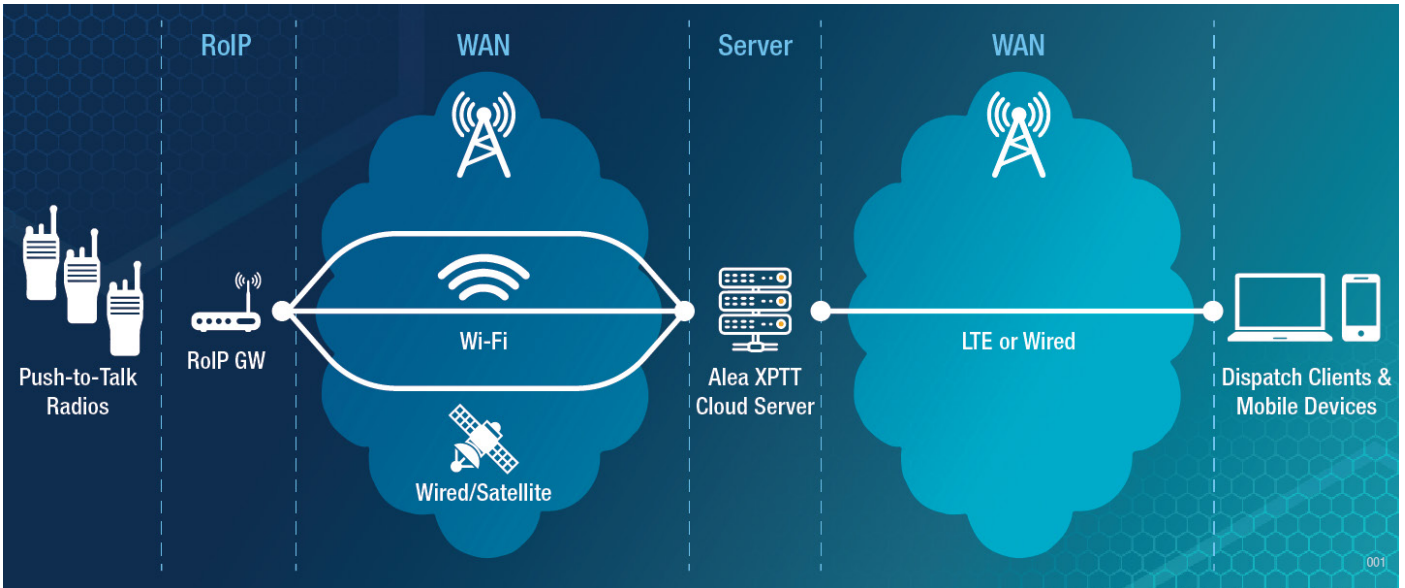


Figure 1: End-to-End Key Components for Unified Voice

## Underlying Technologies

When we look at how to enhance existing voice communications between traditional PTT radios and network-based services, four key components are required for these systems' end-to-end connectivity: the communications network (backhaul infrastructure), existing PTT radio equipment, a software application such as Alea XPTT, and a RoIP gateway.

### 1. Communications Networks

#### Cellular Networks

Modern cellular networks enable reliable broadband connectivity across large areas and often cover up to 99% of populated countries\* for a monthly fee per handset or device user. These high-speed networks are ideal for voice and video communication connectivity; however, some factors can reduce the available bandwidth and availability of a good signal. These include the user's distance from the cell tower, geographic locations (for example, dense woodlands, hills, and mountains) and certain building materials (e.g., metal building frames, tinted and low-emissivity glass).



A significant benefit of cellular connectivity is that both voice and video data are encrypted at a network level, and it is possible to add further levels of security between the Cubic RoIP units and Alea XPTT users.

*\*A common practice of commercial cellular providers is to quote the percentage of the population covered by their network, not the portion of the land mass, meaning that in more rural areas, coverage may be patchy or unavailable.*

## UHF and VHF Networks

Ultra-High Frequency (UHF) and Very-High Frequency (VHF) radios are ideal for voice communication but do not offer the bandwidth to transmit large amounts of data, such as video. UHF and VHF networks can be set up quickly, are cost-effective, often do not require a service fee\*, and coverage can be improved with a UHF or VHF signal repeater. Such networks usually are much smaller than cellular networks and operate from as small as a handset-to-handset communication to citywide or statewide coverage; users cannot access national coverage like the cellular networks.



*Push-to-Talk (PTT) Radios*

UHF is a short-range communication frequency band with a strong signal penetration that enables UHF to communicate through obstacles (e.g., walls and concrete), making it better suited to urban areas and indoor applications.

VHF is a radio frequency that provides a larger broadcast range and is more commonly used in outdoor applications, because it has a lower signal penetration than UHF.

*\*Depending on your location and frequency, a license may be required in certain circumstances.*



*GATR Inflatable Satellite Antenna*

## Other Networks

Other radio network types are available, including fixed-line, satellite, and Mobile Ad Hoc Networks (MANET). The Cubic Vocality RoIP is compatible with a wide range of radio networks, including satellite and MANET. Alea XPTT can be used on networks where a link to the internet is available. We recommend contacting our support team for further information about supported networks.

## 2. Existing PTT Radio Equipment and Mobile Devices

It is critical to understand the existing PTT radio equipment manufacturer, the supported frequencies, and how they are currently used. When multiple organizations come together, each organization may use a different manufacturer and frequency, and each may have separate network coverage.

It is also important to understand which cellular devices are used or will be used. Many are available, manufactured by different companies, and often run different operating systems, such as Android and Apple iOS.

## 3. Radio Over IP Gateway

Designed to connect teams with two-way PTT radios to voice services, including PTTToC, dispatch, and Voice over IP (VoIP) systems, the Cubic Vocality RoIP allows users to maximize their existing two-way radio investment while benefiting from the latest innovations in voice communications.

Radios from an extensive range of radio manufacturers and frequencies can be connected to the Cubic Vocality RoIP by a “donor” radio, and manufacturer-specific audio cables are available to connect the radios to the Cubic Vocality RoIP. With an integrated cellular modem and connectivity to Wi-Fi and other Wide Area Networks (WANs), users can choose which provider best suits their organizations or use case. Users needing added resiliency can connect the Cubic Vocality RoIP to multiple WANs and enable the automatic failover features that switch between WANs if one of the networks should fail.

## 4. Dispatch Software and Mobile App

The Alea XPTT mobile app allows users to turn their smartphone into a PTT device and use it as an enhanced PTT radio with various innovative features, including location tracking; text messaging; file, video, and photo sharing; and man-down sensing.

If users prefer a desktop dispatch solution, the XPTT Web Portal requires no software download. It can be accessed through Google Chrome on an internet connection or dedicated network to connect with your mobile workforce.

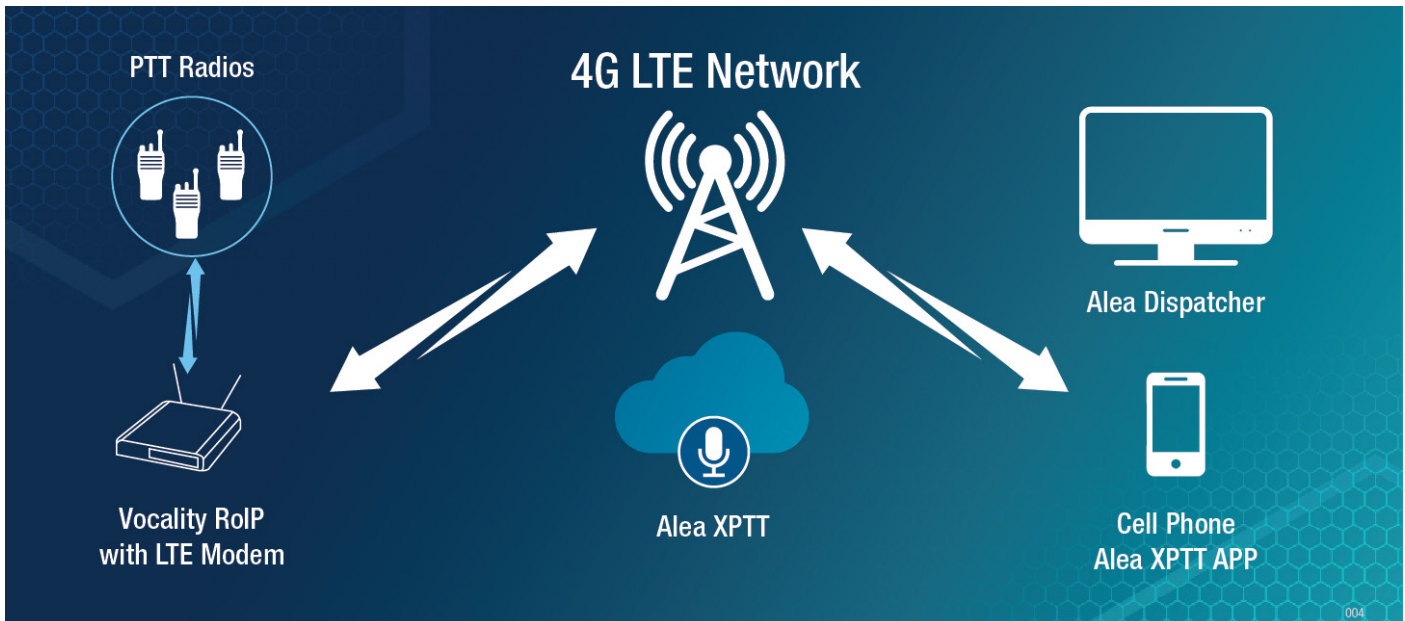


Figure 2: Alea XPTT over Cellular

## Unifying Voice Communications

Several technologies may independently offer a partial solution to the unification challenge. However, a unified solution is successful when interoperability is achieved between different voice communication systems.

To help meet user demands, the Cubic-and-Alea solution observes these four design principles:

- Connectivity for versatile and standardized equipment that can provide interoperability between any PTT radio available.
- Scalable and easy to deploy and allows gradual expansion based on user needs.
- Increased return on investment and low cost of ownership because it supports existing infrastructure and device reuse, and removes the need for specialized software development.
- Assures reliable connectivity and voice quality, even over less-reliable interconnections, such as internet and low-bandwidth satellite links.

## Radio Cross-Banding (Bridging)

An everyday use case for the Cubic Vocality RoIP is cross-banding, a feature through which the RoIP acts as a bridge between disparate radio manufacturers and frequencies. Suppose multiple teams on different radio systems need to communicate—the Cubic RoIP can connect two or more radio groups and allow users of various radio manufacturers and frequencies to communicate with each other and with Alea XPTT users.

### Radio Cross-Banding Locally on RoIP

In the following illustration, Team A is using one type of radio vendor and Team B is using a different radio vendor. Connecting a “donor radio” from each radio vendor to the Cubic RoIP facilitates communication between the two teams. The strategic advantage of this setup is that each team can continue to use the radios they have.

Suppose users plan to migrate away from a PTT radio technology or a particular radio manufacturer? Cross-banding enables them to continue to use their existing radios, which extends the life of the radio equipment while migrating to a different model or technology.

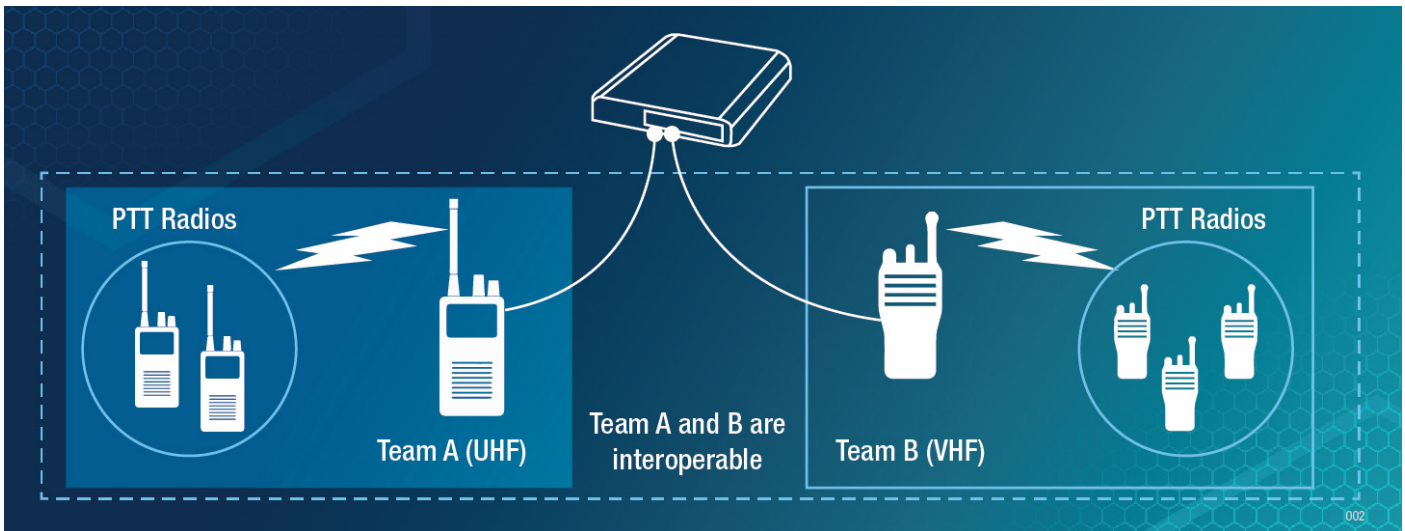


Figure 3: Cross-Banding

### Radio Cross-Banding Over an IP Network

In this use case, the Cubic RoIP digitizes the voice from local PTT radios and securely sends it over a network connection, wired or wireless, to a remote location. At the remote location, a Cubic RoIP converts the digital voice traffic back to analog and sends it to remote PTT radios.

Support for a diverse range of digital voice codecs is integrated into the Cubic RoIP such that voice communications can still occur in locations where network connectivity may be limited.

*Note – It is possible to simultaneously bridge local networks and stream audio to remote locations.*

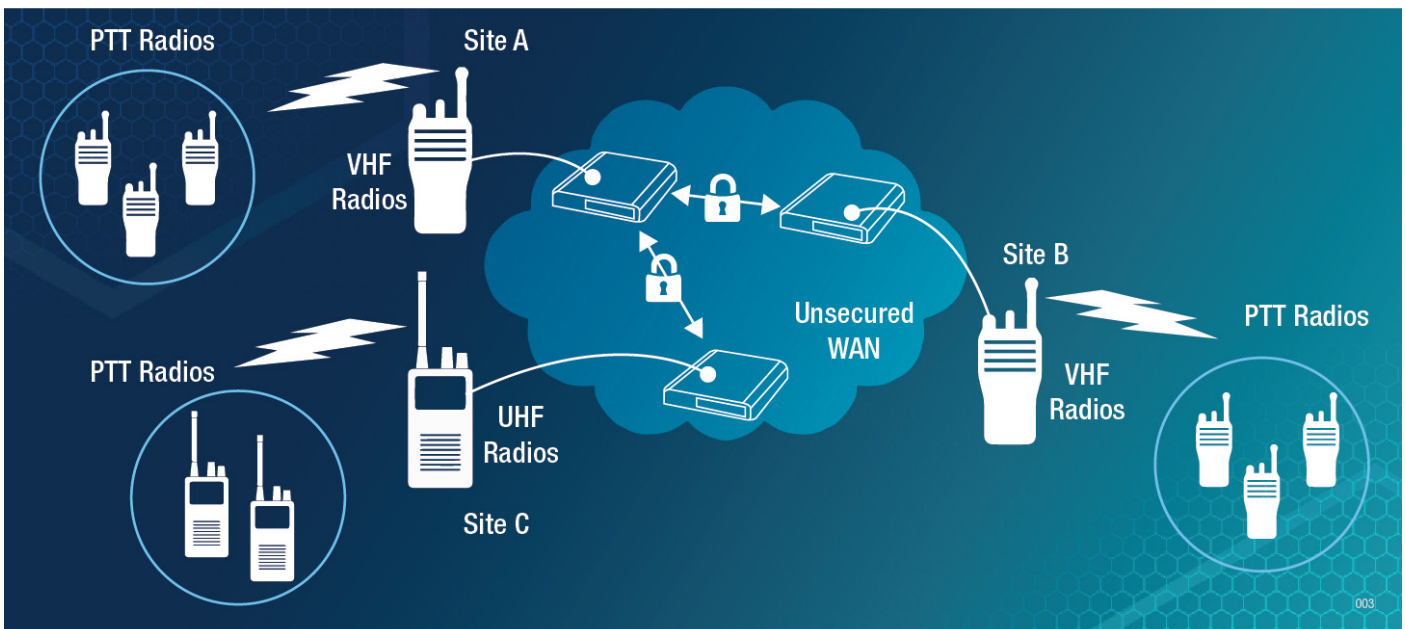


Figure 4: Radio over IP

### Push-to-Talk Over Cellular and Desktop Applications

Cubic's Vocality RoIP has powerful capabilities for cross-banding between radio manufacturers and locally across network connections. This begs the question: what happens when existing legacy PTT radio users need interoperability with PTT mobile applications to emulate a traditional radio on a mobile device or for desktop users?

Integration between legacy UHF or VHF radios and new mobile apps and desktop software, such as Alea XPTT, delivers the benefits of newer technologies while maximizing existing PTT investment.

Mobile and desktop XPTT users and UHF or VHF users can communicate as if they are on the same network. This powerful solution delivers unified, robust communications across teams and the organization—whenever and wherever needed. New users can be added quickly and use existing mobile cellular devices or Bring Your Own Device (BYOD) if radio hardware is in short supply.

Connecting UHF and VHF radios is quick and easy with Cubic RoIP. Existing PTT radios can be connected to the Cubic Vocality RoIP, and the RoIP digitizes the voice from the local radios and securely sends it across a network connection, wired or wireless, to a remote location and Alea XPTT users.

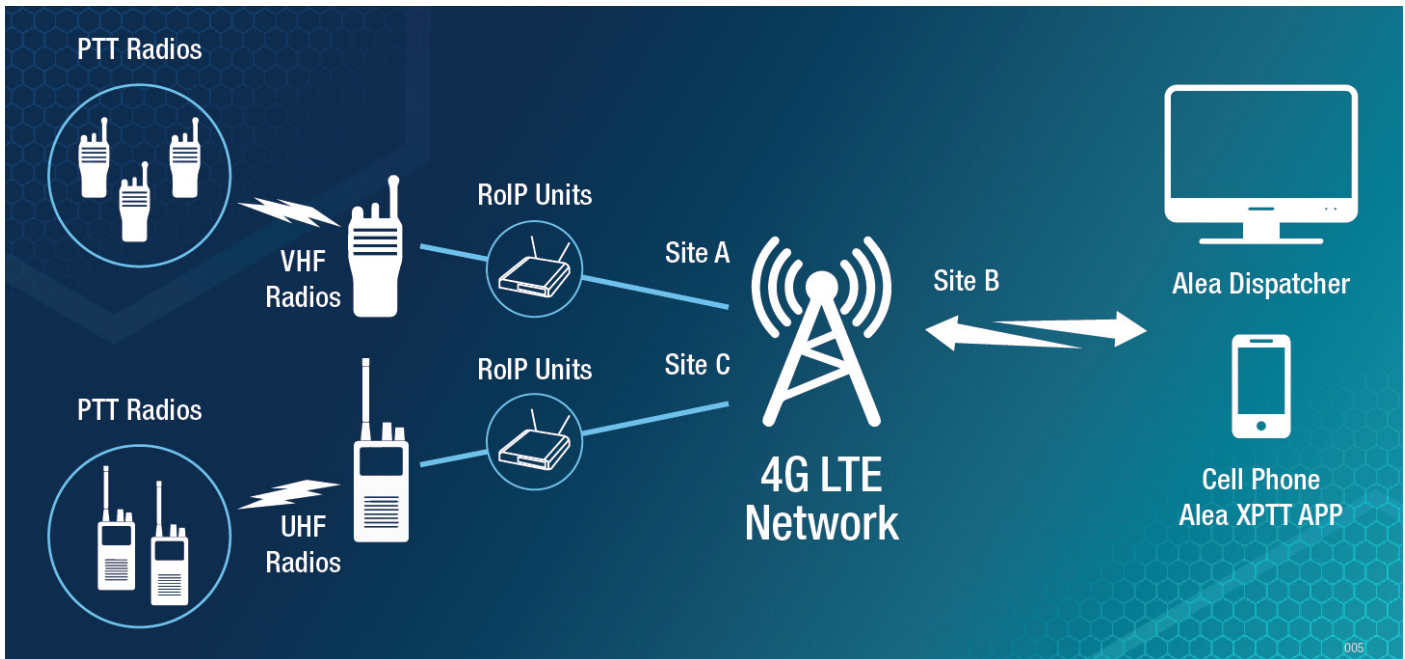


Figure 5: Push-to-Talk over Cellular

## Alea XPTT

Alea XPTT is a carrier-independent broadband PTT service that instantly connects teams across different devices, networks, and locations, and brings everyone together.

### Alea XPTT is made up of the following components:

#### XPTT Web Portal

The web portal requires no software, is accessible through Google Chrome on a Windows or Apple Mac OS computer on an internet connection or dedicated network, and connects with mobile and other web portal users. The web portal enables voice communication with users or groups of users using PTT radios connected to the Cubic Vocality RoIP, XPTT app users, and other web portal users.

Communication is further enhanced by live video streaming from XPTT app users, and they can send and receive files, including documents, videos, and photos, to users in the web portal or users in the field through the XPTT app.

The safety and well-being of mobile XPTT user health can be monitored as part of a man-down feature, and a user's location can be tracked in real time through an interactive map interface.



## Alea XPTT Mobile APP

The XPTT mobile application allows a smartphone to serve as a PTT handset and combine the power of Push-to-Talk with the ability to share location, images, videos, and data files with individuals or groups at the touch of a button.

XPTT users can communicate with mobile app users, desktop users, and UHF or VHF radio users connected to the Vocality RoIP.

## Deployment Scenarios

Unified voice communications have a broad range of use cases across multiple vertical markets. Examples of the Cubic Vocality and Alea XPTT deployments include the following public safety and enterprise customers:

- Broadcasters
- Aid Agencies
- Oil and Gas
- Mining
- Construction
- Marine
- Security
- Road and Rail
- Education/Campus

## Example of Supported PTT Radios

Vocality RoIP supports a wide range of radio manufacturers and technologies. The following radios can be connected to the Cubic Vocality RoIP. Support for new radio manufacturers is being added all the time. Contact the Cubic support team for the latest list of supported radios.

- Motorola Solutions
- Kenwood
- Icom
- Hytera
- Tait
- Thales
- Sepura
- Harris
- Codan
- Barrett
- Military radios
- Ritron

## Conclusion

By combining Vocality RoIP and Alea XPTT, users in various vertical markets can improve communication methods across teams, devices, and networks. The solution helps to maximize savings between legacy and new mobile-based devices and enables flexibility when adopting advanced broadband-based features, such as live video, location tracking, and man-down monitoring.

The result—a new, unified solution with greater capabilities, easier scalability, and faster deployment times. Users can implement the best network type and devices to meet their organizational and geographical needs.

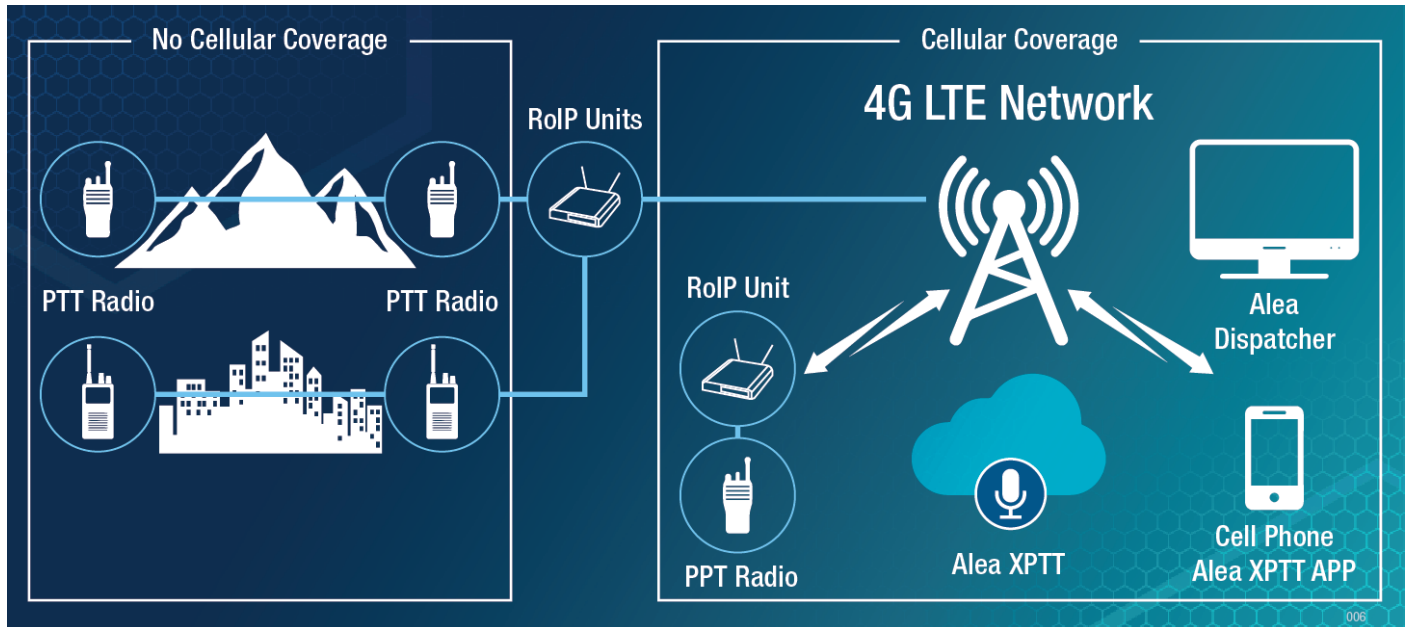


Figure 6: Unified PTT and Cellular Solution

## Additional Information

For Cubic Radio-over-IP products:

[cubic.com](http://cubic.com)

For Alea, a Leonardo company:

[aleasrl.com](http://aleasrl.com)



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