



4RF Application Note

Military LOS tactical radio relay



Image: US Army

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1 Introduction

The Aprisa XE digital microwave link offers a commercial off the shelf (COTS) solution to tactical radio relay requirements from rear echelons down to company command posts or other forward locations. The Aprisa XE is used worldwide by military and paramilitary forces, international peacekeeping agencies, public safety and homeland security, disaster relief, and international aid agencies.

With an enviable deployment record the Aprisa XE can be found in commercial use in over 130 countries, with more than 40 countries using Aprisa XE equipment for peacekeeping, military, and emergency service applications.



Image: US Navy



Aprisa XE point-to-point radio

2 About the Aprisa XE

2.1 Point-to-point linking solution

The Aprisa XE digital radio is a compact, powerful, medium capacity terrestrial point-to-point linking solution. A wide range of interface options are integrated within the radio platform for the transmission of Internet, voice, and data traffic between two fixed points with proven performance over line of sight (LOS) distances of more than 200 kilometres. The Aprisa XE is readily deployed with in-service antennas and transportable telescopic antenna masts used for tactical radio relay communications support.

2.2 Why use the Aprisa XE?

The Aprisa XE is chosen for mission-critical communications applications in the field for a variety of reasons, including:

- Ease of deployment, with simple grid or Yagi antennas
- Independence from satellite and terrestrial service providers, for complete network ownership and control
- Unbeatable reliability, even in challenging deployment conditions and over long distances

2.3 Aprisa XE specifications

Specification	Aprisa XE
Frequency bands	300 MHz to 2700 MHz
Modulation	QPSK to 64QAM
Capacity	56 kbit/s to 65.4 Mbit/s
Channel sizes	25 kHz to 14 MHz
Interfaces	E1 / T1 framed & unframed
	2-Wire FXO / FXS
	4-Wire E&M
	V.24 asynchronous, synchronous and over sampling mode
	X.21 / V.35 / RS-449 / RS-530 high speed synchronous
	10 / 100Base-T

Aprisa XE deployment scenarios:

- Sea to land
- Land to land
- Base to base

3 Military applications

Mission-critical communications are rapidly established between command posts or forward locations for a wide variety of both permanent and deployable tactical radio relay applications.

New developments in tactical data networking are offering vastly improved situational awareness to commanders using a wide variety of IP enabled sensors and communications means. The Aprisa XE is a multi service platform delivering traditional applications such as combat net radio links and command post telephone services, through to IP enabled video conferencing and other remote image transmission systems.



The Aprisa XE is at home in either fixed or mobile applications. Mobile applications include tracked, wheeled, or even aboard maritime assets. As with most COTS equipments vibration attenuating mountings are required but Aprisa XE can operate without air conditioning in most environments.

With guaranteed communications in even the toughest conditions, the Aprisa XE is reliable, easy to install, and has a high MTBF and low MTTR. The design sacrifices costly anti-jamming and frequency hopping capabilities unnecessary in low intensity conflict situations while delivering excellent technical performance with proven deployments worldwide.

The Aprisa XE features a range of user selectable signal waveforms, from robust QPSK to complex 64 QAM, enabling capacity to be traded for system gain to benefit links between nomadic elements with different paths lengths.

4RF has delivered customised versions of the Aprisa XE, supporting maritime ship-to-ship and ship-to-shore digital IP connectivity.

Aprisa XE applications include:

- Covert and overt operations
- Forward observation posts
- Backhaul of data relating to video, voice/face, number plate ID etc.



Image: US Navy

4 NATO frequency bands

The NATO Theatre Frequency Management recommendations for tactical radio relay in NATO Band IIIA include 1375-1400 MHz, 1400-1420 MHz, and 1530-1544 MHz. For NATO Band IIIB recommendations are 2020-2110 MHz and 2200-2290 MHz. The Aprisa XE covers these bands and also complies with civil EU ETSI, FCC, and IC certification requirements allowing peacetime deployments in permanent applications, replacing public networks.

The Aprisa XE is available with either fixed or tuneable duplexers. For fixed or semi-permanent deployment wideband band pass duplexers support multiple channels to simplify spares logistics and frequency plans.



Image: US Army

NATO band	Spectrum	Aprisa XE
NATO Band I	225 - 400 MHz	330 - 400 MHz
NATO Band II	610 - 960 MHz	620 - 715 MHz
		698 - 806 MHz
		805 - 890 MHz
		850 - 960 MHz
NATO Band IIIA	1350 - 2000 MHz	1350 - 1550 MHz
		1700 - 2000 MHz
NATO BAND IIIB	2000 - 2700 MHz	1900 - 2300 MHz
		2300 - 2700 MHz

5 Aprisa XE deployments around the world

The Aprisa XE has been deployed in more than 130 countries around the world. Many mission-critical deployments are confidential, and so only some of the peacekeeping, military and emergency services users can be listed.



Aprisa XE deployments

Peacekeeping	Military	Emergency orgs
Afghanistan	Australia	Australia
Burundi	Colombia	Bahrain
Cote d'Ivoire	Italy	Bangladesh
Democratic Republic of Congo	India	Canada
Ethiopia	Kazakhstan	Costa Rica
Georgia	Namibia	France
Guinea-Bissau	Panama	India
Haiti	South Africa	Lebanon
Iraq	Sri Lanka	New Zealand
Ivory Coast	Sweden	Nicaragua
Liberia	UAE	South Africa
Nepal	United Kingdom	Spain
Sierra Leone		Sweden
Sudan		United Kingdom
Timor-Leste		
Western Sahara		

6 Conclusion



Image: US Navy

The Aprisa XE is used for mission-critical wireless communications by military operations throughout the world, chosen because it provides a robust, reliable, easily deployed flexible solution for a range of voice and data applications.

For a commercial off the shelf solution providing high performance in challenging environments, the Aprisa XE is the only option.

About 4RF



Operating in more than 130 countries, 4RF solutions are deployed by oil and gas companies, international aid organisations, public safety, military and security organisations, transport companies and utilities, broadcasters, enterprises and telecommunications operators. All 4RF products are optimised for performance in harsh climates and difficult terrain, and support legacy analogue, serial data, PDH and IP applications.



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