

LMR SYSTEMS



Critical Communications



Request More Info Here

Tel: +1 (913) 495.2600

Selex ES Inc, a Leonardo Company.

**Communications are
critical when working
with energized lines.**





Leonardo is the market innovator for flexible and scalable next generation critical communications systems. We focus on meeting customer needs through highly configurable, reliable, redundant, and maintainable solutions. We proudly offer one of the industry's truly open platforms allowing customers to interface with a multitude of vendors with traditional or cloud-based configurations. Located in the heartland of America, Leonardo has designed, engineered, installed, and supports over 220 proven systems in over 50 countries. Our global experience, with local presence and support, allows us to deliver solutions designed to meet customers' unique needs.



**10-Year
Non-Obsolescence
Guarantee**

**5-Year Parts
and Labor
Warranty**

**Committed to
Interoperability and
Open Standards**





TARGET MARKETS:

Utilities, transportation, oil & gas, fire services, emergency responders, law enforcement, and large enterprise sectors.



EXPERIENCE:

Leading global supplier of LMR solutions for critical communications applications.



TECHNOLOGY:

Designs & manufactures solutions conforming to widely accepted international standards including Digital Mobile Radio (DMR), APCO Project 25 (P25) and TETRA.



SUPPORT:

North American sales, service, system integration, and after market support in Overland Park, KS.

**Reliable Communications
are critical when protecting
life and property.**

DMR AND P25

DMR is the ETSI standard for professional digital radio communications. It introduces a 2-slot TDMA channel access feature, doubling the communication capability and making simultaneous voice and data applications possible.

P25 is the TIA standard for mission critical digital radio communications. P25 offers two Phases: Phase 1 includes digital conventional and digital trunking in a single time slot. Phase 2 offers TDMA digital trunking with a doubling of capacity.

Leonardo innovates by combining these two very popular open standards in one solution, the Extended Communications System – Digital, or ECOS-D. Leonardo “dynamic dual-mode” ECOS-D (P25 or DMR II) network uniquely works in analog and digital modes, allowing the use of existing analog terminals and the ability to gradually substitute them with new digital terminals as required.

DMR networks have a 2-slot TDMA air interface structure, supporting SCADA applications, as well as operational communications over large areas using the same physical channel.

Leonardo ECOS-D solutions encompass the following operating modes: Analog FM, DMR II Digital Conventional, DMR III Digital Trunking, P25 Phase 1 Digital Conventional, and DMR II/ P25 Dynamic Dual Mode.

Leonardo ECOS-D solutions operate on VHF, UHF, 800, and 900 frequency bands, feature full-IP system architecture and are IOP and PCAP certified for primary vendor terminals. Leonardo ECOS-D multi-site solutions allow versatility in network architectures supporting several configurations and different intersite links (IP, E1, 4W-E&M, and RF).

Leonardo ECOS-D architectures include repeaters for standalone sites, simulcast, multi-cast and a hybrid of the two. Leonardo offers DMR trunking topologies as traditional centralized, fully distributed, or a hybrid of the two.

Leonardo ECOS-D solutions include industry standard interfaces for:

- › Dispatchers and control room terminals
- › Network management applications

Simulcast

Simulcast (Simultaneous Broadcasting) networks are the best solution for professional mobile radio applications for the coverage of large territories with low to medium-low traffic density and only a small number of frequencies available.

Leonardo designs and manufactures conventional, P25, DMR Tier II and Tier III simulcast solutions that are used by mission critical and critical infrastructure organizations in both the public and private sector, worldwide.

In a simulcast network, repeaters deployed over a territory operate as a virtual repeater, covering the served area and offering an inherent and transparent communications handover, as users roam from site to site.

The main challenge when designing a simulcast DMR system is to manage the delay spread that characterizes overlapping areas. Leonardo has vast experience designing networks using radio coverage and delay spread analysis, critical for providing optimized system performance.

Trunking

DMR Tier II solutions are complemented by DMR Tier III “trunking” solutions designed to cope with higher traffic volumes given the capability to manage multiple frequency pairs. Using a dedicated control channel, the system dynamically allocates payload channels to handle traffic peaks and enables user-roaming from site to site.

Leonardo Trunking solutions include:

- › Single site
- › Simulcast multi-site (frequencies and number of channels is the same in each site)
- › Multi-cast or cellular (frequencies and number of channels vary by site)

TETRA

TETRA is the communications standard of choice for organizations that require immediate access to reliable, secure communications. Engineered for public safety, its versatility makes it an ideal solution for:

- › Police and security departments
- › Emergency services
- › Government agencies
- › Defense forces
- › Utilities
- › Transportation
- › Airports and marine ports

The Leonardo TETRA product portfolio is comprised of the ElettraSuite ADAPTANET IP, featuring full IP, switchless architecture. ADAPTANET provides the complete line of TETRA services, which includes:

- › Individual communications
- › Group communications
- › Broadcast communications
- › Mobile data communications including Short Data Services (SDS) file transfer and internet access
- › Mobile data services taking advantage of multi-slot packet data for narrowband communications and TEDS for wideband data-intensive communications

The TETRA infrastructure is comprised of:

- › Radio base stations supporting both TETRA1 and TETRA2/TEDS carriers
- › SwMi (TETRA Switching and Management Infrastructure) supporting hierarchical, distributed or centralized architectures; Full-IP SwMi is intrinsically ready for multi-technology integration
- › Control room equipment including recorders and dispatchers
- › Gateways for interconnection with external networks (PSTN, ISDN, and packet data)
- › Terminals including fixed, mobile, avionics (Helicopter) and handhelds
- › Applications including Automatic Vehicle Location (AVL) and management

PUMA T4-LE (LTE Enhanced)

The Leonardo ES PUMA T4 introduces a new concept for handheld devices combining modular design with new value-added services. The PUMA T4 is a flexible tool combining the power and performance of LTE with the ruggedness and reliability of traditional LMR devices. The PUMA T4 is a multi-mode portable capable of TETRA and LTE.

Versatile Mobile Solutions

Vehicle solutions take advantage of the flexibility of the VS4000 TETRA/TEDS radio and the FPG3-E front panel that allow different configurations (single front panel controlling multiple radios or vice versa). The FC 4000 supports desktop applications for small or district offices.

VS/FC4000 supports TETRA DMO (Direct Mode Operations), allowing communication services even in the absence of a conventional infrastructure. With the combination of Wi-Fi and TEDS within a vehicle, it is possible for smartphones and tablets to become a secure entry point into the professional network.

Leonardo TETRA solutions are part of the PERSEUS (Professional Emergency Resilient System Enabling Ubiquitous Services) multi-technology infrastructure that is a key component of the professional network evolution.





JUDAH
OCEAN BEACH

MOTORISTS
MUST STOP FOR
PEDESTRIANS

**Dependable communications
ensure mass transit systems
operate safely and efficiently.**

**Critical communications
solutions save lives.**



LEONARDO NEXT GENERATION NETWORK INTEGRATION AND MANAGEMENT

Critical communications organizations often require the functionality to integrate multiple systems. Historically this has been accomplished using external gateways or console patches. Leonardo provides critical communications operators and users with multiple solutions.

Leonardo's ECOS-D System-of-Systems (SoS) provides the ability to integrate systems together. The Leonardo Communications Services Platform (CSP) combines the ability to integrate and manage multiple networks using a single management application.

This functionality is designed for the critical communications sector, including LMR system users such as utilities, transportation, first responders, police and defense. These environments tend to be characterized by performance and reliability issues that are often experienced in spite of feature availability requiring 24x7x365 operations.

By contrast, commercial best-effort environments (enterprise and public networks) offer versatile and feature-rich solutions that are built around COTS technologies. As such they can lack the quick response, fault tolerance and system reliability characteristics that are essential in mission-critical communications systems.

Leonardo's SoS at the system level and CSP at the network level both integrate the best of both solutions (public and private), by delivering the features enjoyed by the commercial environment with the adaptability, scalability and performance of the professional environment. This will bring increased effectiveness without compromising performance or reliability. In addition, both SoS and CSP can integrate with existing equipment and infrastructures.

ECOS-D System-Of-Systems (SoS) Functionality Included

Leonardo's ECOS-D system has this functionality included within the RBS4000. ECOS-D SoS provides the ability to integrate conventional analog, DMR II, DMR III, P25 Phase I, PTT over Cellular and proprietary

systems using the software defined ECOS-D Embedded Proxy Server (EPS).

The ECOS-D SoS integrates the features enjoyed by the commercial environment with the reliability, adaptability, scalability and performance required of traditional land mobile radio systems. This brings increased effectiveness without compromising critical communications performance, fault tolerance or reliability.

In addition, ECOS-D SoS provides critical communications operators with the flexibility to connect their existing LMR equipment and infrastructures to provide a smooth migration to the new critical communications ECOS-D platform with interface options to commercial/public systems.

ECOS-D SoS also provides integrated voice and data applications independently of the technology access using industry open standards. SoS provides the opportunity to integrate wireless narrowband mission-critical data systems with broadband non-mission-critical systems such as 4G / LTE.

SoS benefits:

- › Embedded proxy server within RBS 4000 base station
- › Integrated voice and data application system
- › Ability to interoperate analog, DMR II/III and P25 Phase I
- › Integrated LMR and PTT over Cellular
- › Scalability - urban, suburban and rural applications
- › DMR standards-based - Incorporation of new features and functionality as soon as they are available.



LEONARDO CSP

Leonardo's Communications Service Platform (CSP) is an implementation of the Next Generation Network integration and management. CSP is a server-based application that can be hosted at an existing central site, a local data center or can be implemented as a cloud-based solution.

CSP provides LMR/Mil multimedia services independent of the technology access and is open to integrate and manage legacy LMR networks with new generation access networks such as 4G /LTE. In a CSP network, multimedia services such as video-conferencing, conference call and high speed data transfer (via LTE) are available together with conventional LMR services.

The CSP not only integrates and manages multiple LMR/Mil and TLC networks, but also provides the ability to manage end-user terminal devices. This provides network operators the ability manage a single, unified and homogeneous physical and logical network.

The CSP reference model aims to surpass the traditional stovepipe organization where each application has to deal with specific control plane and access plane for each communication technology used, embracing the Next Generation Convergent Network approach.

There is a single control that interacts with access technologies on the lower side and offers a unified virtual network model to upper side applications. In the unified control plane, professional services are implemented and "adapted" to underlying technologies according to technology features and possibilities. The control plane contains interfaces for access to other communication services.

CSP offers communication services applicable to a number of communication technologies for a number of high level applications. A common call manager (modeled on the TETRA call manager) deals with communication control and service implementation.

The Leonardo CSP can be used in several operational contexts ranging from multi-agency coordination centers for big events to day-by-day activities where operators need to integrate narrowband with broadband technologies.

This model can be scaled up to a large region or wide network and can be scaled down to a small site or even a single vehicle that can act as an emergency control room for unplanned events of disaster conditions. It can also be used to integrate different TETRA implementations or even different vendor TETRA networks.

CSP benefits:

- › Multimedia communication services
- › Professional communication services
- › Technology interworking that allows the same services in a multi technology domain
- › Unified command and control support that eases multi-agency operations
- › Unified network management and unified subscriber management that translates into operation efficiency
- › Scalability - in terms of size and time
- › Tetra Standards based - incorporation of new features and functionality as soon as they are available



**System-wide communications
are not optional for mission-
critical organizations.**



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For more information please email:
LMRsales@leonardocompany-us.com

LEONARDO\US\081321

11300 West 89th Street,
Overland Park, KS 66214
Tel: 1 (913) 495.2600

leonardocompany-us.com

