Selex ES S.p.A.

Via Tiburtina Km. 12,400
00131 Roma RM
Tel. +39 06 41501
Fax +39 06 413143

Selex ES Ltd

Sigma House
Christopher Martin Road
Basildon, Essex
SS14 3EL
Tel. +44 (0) 1268 522822
Fax +44 (0) 1268 883140

infomarketing@selex-es.com
www.selex-es.com

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Critical communications

Selex ES
A Finmeccanica Company


POLIZIA

Selex ES is a world leader in the supply of communications systems for the protection of communities and infrastructures. With over 100 years of experience, Selex ES develops integrated and interoperable cutting-edge telecommunication solutions for military, civil and institutional customers.

Selex ES is acting both as a technology provider and system integrator to provide turnkey, mission-critical infrastructures to professional customers. Selex ES develops in-house technologies including TETRA, DMR, LTE and network integration infrastructures.

- Over 50 countries rely on our integrated mobile communications
- We support public safety and emergency services, civil protection agencies, transportation bodies, utilities and homeland security authorities
- Secure, integrated, reliable and interoperable multi-technology communications solutions
- We were the first to release an ATEX TETRA terminal in environments containing potentially explosive gas and dust.

TETRA

TETRA is the communications standard of choice for organisations or groups that require immediate access to reliable, secure communications. Engineered for the emergency services, it is ideally suited to a number of other requirements.

The versatility of TETRA technology makes it an ideal solution for sectors such as:

- Police and security departments
- Emergency Services
- Government Agencies
- Defence Forces
- Utilities
- Transportation
- Airports and marine ports.

TETRA is perfectly suited to the support of scenarios where the security and reliability of communications is priority.

The Selex ES TETRA product portfolio is comprised of two product families - ElettraSuite and ElettraSuite ADAPTANET:

- ElettraSuite exploits legacy TDM interconnections between network elements
- ElettraSuite ADAPTANET featuring a full IP switchless architecture.

Both families supply 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 centralised architectures. Our 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 systems.

Elettrasuite PUMA T3 Plus2 Ex
The Selex ES PUMA T3 Plus2 Ex is a multi-mode handheld terminal designed to operate with both legacy and TETRA networks. It has been engineered to be "Intrinsically Safe" according to European ATEX standards "Directive 94/9/EC (ATEX Directive)" and II 2 G Ex ib IIC T1/T2/T3/T4 and II 3 D Ex Td A22 T85°C IP54 coding compliant for operations in potentially explosive environments. Conformity with the ATEX standard is a legal requirement in all European countries, and is a recognised reference all over the world.

Vehicle 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 radio or vice versa) and feature Wi-Fi and CAN bus interfaces for extended connectivity options.

VS4000 supports TETRA DMO (Direct Mode Operations) thus 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.

Selex ES 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.

DMR

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

Selex ES "dual-mode" ECOS-D (conventional Tier II) network is able to work in analogue and digital modes. This unique feature allows the use of existing analogue terminals and the ability to gradually substitute them with new digital terminals as required. DMR networks can be used to support SCADA applications as well as operational communications over large areas using the same physical channel, due to the 2-slot TDMA air interface structure.

Selex ES DMR solutions encompass both Tier II conventional Simulcast and Tier III trunking networks.

Selex ES DMR solutions operate on VHF and UHF frequency bands, features a full-IP system architecture and are IOP certified for primary vendors DMR terminals. Selex ES DMR multi-site solutions allow versatility in network architectures supporting several configurations and different inter-site links (IP, E1, 4W-EWM and RF).

Selex ES DMR solution includes:
- Repeaters for standalone, conventional, simulcast and "trunking" configurations
- 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.

Selex ES designs and manufactures conventional DMR Tier II Simulcast solutions that are used by Italian and world PMR organisations in both the public and private sector.

In a Simulcast network, repeaters spread over the territory to make a sort of virtual repeater covering the whole served area and offering a transparent communications handover.

The main challenge when designing a Simulcast DMR system is to manage the delay spread that characterises overlapping areas. Selex ES has vast experience designing networks using radio coverage and delay spread analysis – this provides optimised system performance.

Trunking

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 and instructing terminals in automatic tuning operations by means of a control channel.

Selex ES Trunking solutions include:

- Single site
- Simulcast multi-site (number of frequencies and channels is the same in each site)
- Cellular multi-site.

LTE

LTE is the preferred technology for the provision of broadband to the Professional Market. LTE provides data communication services in combination with existing narrowband PMR voice services. At a later stage (depending on international standardisation activities) LTE technology could include PMR class voice capability and become the dominant technology for professional application. Selex ES is developing a scalable version of the LTE core network specifically focussed towards the requirements of the professional user.

Selex ES LTE is a complete LTE-based solution specifically designed to satisfy the demanding requirements of PMR users. Selex ES is able to provide customers with a full set of LTE-based components ranging from the Core and eNodeBs at one end and terminals and applications at the other.

The Selex ES LTE solution includes:

- Base stations
  - Integration of 3rd party equipment
  - Agreements with major manufactures
- Core network and professional services
  - Selex ES core network, tailored for professional users
  - Enhanced security with end to end encryption and national customisable encryption algorithm
- Terminals
  - Off-the-shelf 3rd party terminals (COTS).

Characteristics

The main characteristics are:

- Overlay and Integration
  - This guarantees PMR users high-speed data integrated with classic TETRA or DMR voice services. The wideband TEDS standard can be integrated and enhanced with the use of the Selex ES LTE.
- Scalability
  - Public Safety Agencies, Utilities and Industries will be able to scale the system as appropriate for their broadband network. The Selex ES LTE - Core is scalable from very small networks to huge networks, matching the various requirements of mission critical networks in a similar way to a commercial network.
- Leveraging the know how in TETRA networks
  - Selex ES has developed the LTE to assure PMR-like performance in its Broadband Data Services.
- Flexibility
  - The Selex ES LTE solution allows the use of different business models depending on the context. This can range from the integration of self-managed wideband TEDS to the deployment of LTE (where allowed) on public infrastructures under the control of a private PMR core.
- Network management
  - Network traffic management is essential in many mission critical scenarios in order to maintain an acceptable level of network quality and resilience. Selex ES LTE allows Public Safety Agencies to control critical features of the network even if integrated with other TETRA or DMR networks.

SELEX ES CSP

CSP (Communications Service Platform) is an implementation of the Next Generation Network designed for the professional sector, including PMR/LMR users such as first responders, Police and defense. These environments tend to be characterised by performance and reliability issues that are often experienced in spite of feature availability.

By contrast, commercial 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 and reliability characteristics that are essential in mission critical environments.

CSP aims to combine the best of both solutions, 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, CSP will integrate with existing equipment and infrastructures in the new critical communication solution.

CSP provides PMR/Mil multimedia services independently of the technology access and is open to integrate legacy 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 PMR services.

The CSP integrates not only with PMR/Mil and TLC networks, but also their subscribers in order to obtain a single, unified and homogeneous physical and logical network. The CSP reference model aims to surpass the traditional stovepipe organisation where each application had 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 a communication services applicable to a number of communication technologies for a number of high level applications.

From an architectural point of view, each single technology is interfaced by means of a gateway that translates the specific legacy signaling into the common extended IP/SIP languages and also deals with the codec negotiation as appropriate.

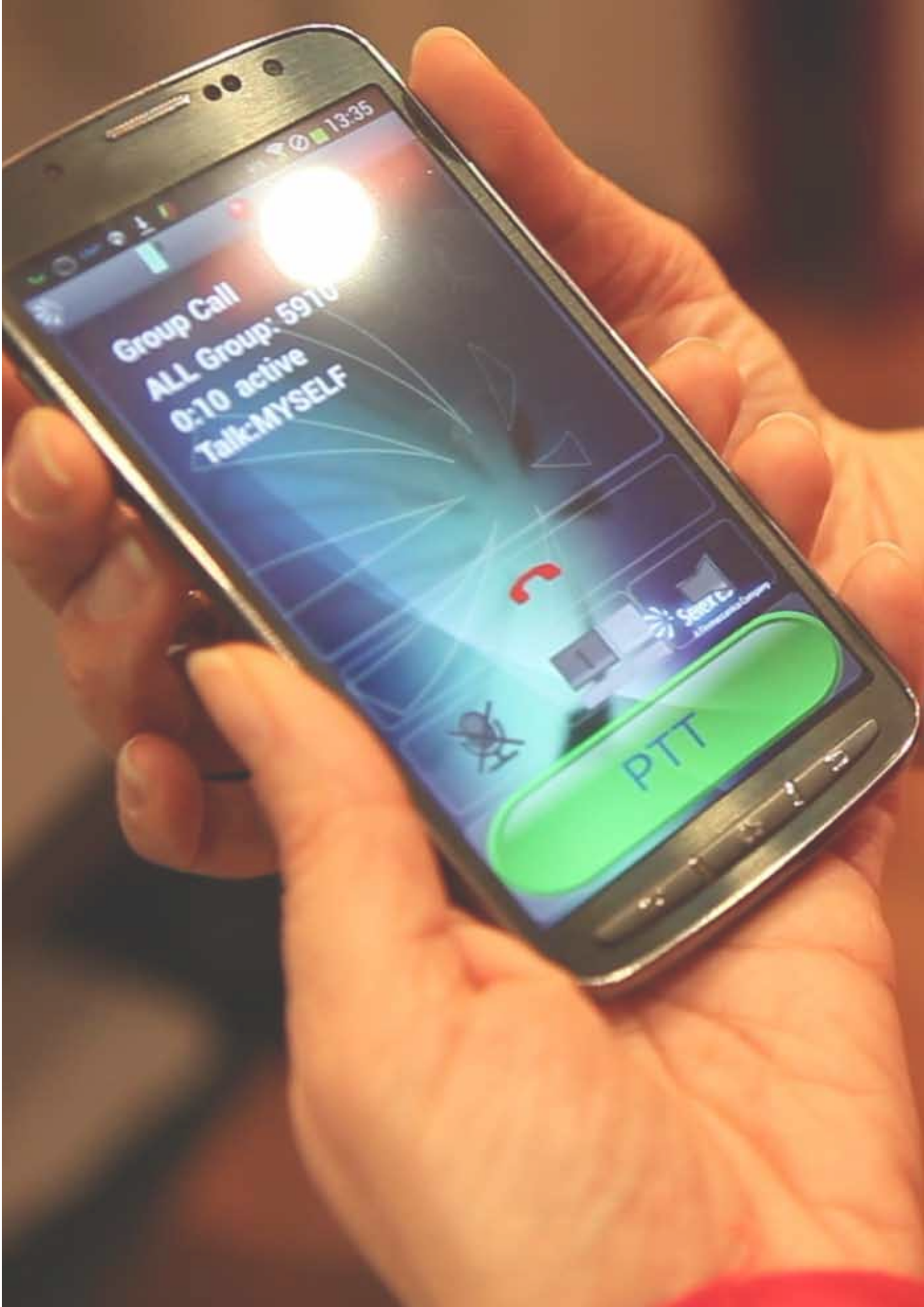
A common call manager (modelled on the TETRA call manager) deals with communication control and service implementation.

The Selex ES 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 allow 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 sense of size and time
- Incorporation of new standards as soon as they are available.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