 LEONARDO

Oil & Gas Infrastructures Protection

Leonardo's Critical Infrastructure capabilities deliver surveillance and security systems to the Oil & Gas upstream, midstream and downstream companies to provide 24/7 protection to the workforce and infrastructures involved in mission-critical & safety activities helping to preserve the efficiency of operations. Surveillance and monitoring technologies deliver physical and cyber protection, contributing to a safer working environment and enhanced business continuity.

Leveraging a breadth of expertise across both defense and civil domains, we have developed a range of capabilities to offer modular complex solutions ensuring effectiveness, reliability, security and control of Oil & Gas operations throughout all stages of the lifecycle.

As a systems integrator and world leader in sensor development and production, we offer multi-functional integrated solutions to engineering procurement construction companies and end users.

Our solutions are based on proprietary technology and third-party state-of-the-art products, able to meet the increasing operational demands of critical infrastructure safety, security and reliability.

Our solutions encompass protection of assets and people through the integration of high performance sensors, physical & cyber security, mission critical communications and process automation systems, in order to provide:

› Long range threat detection
› Early threat assessment and comprehensive situational awareness.
› Increased situation awareness - and coordination through data and communication management.
› Generation of "Standard" and "Emergency Operating Procedures".

Our company is ideally positioned to deliver these user-benefits, given its:

› Deep understanding of security control centers and safety and security procedures in O&G plants and pipelines.
› Strong system integration expertise.
› Experience as Original Equipment Manufacturer of high performance sensors.
› Scalable, flexible security solutions with embedded operator alert systems for both off-shore and on-shore sites, vessels and pipelines.
› Integrated communications solutions employing operation-specific technologies.
› In-house Research & Development capability for operational communications technologies, sensors design and command and control implementation.
› Long-standing experience in automation and process control for the Oil & Gas sector.

PHYSICAL AND CYBER SECURITY WHERE PROTECTION MATTERS

Our security solutions address the requirements of Oil & Gas infrastructures in a scalable and flexible way, adapting to different geographic conditions, size, scale, scope requirements and the various threats.

PHYSICAL THREATS PROTECTION

From long-range radar and video based protection to perimeter protection and access control, we can design, integrate, install and deliver a complete range of protection systems to guarantee quicker and more effective threat prevention, detection and response. Subsystem integration at command and control level increases situational awareness and solution effectiveness.

Physical security solutions

Long/ medium range	**Radar**	Our company designs and produces coherent, pulsed-doppler, solid state radars, operating in different bands. These radars feature different characteristics and sizes for using in both maritime and ground scenarios.
	Electro-Optical (EO)	We design and produce high performance thermal and electro-optic camera solutions providing medium to long-range surveillance in optical and infrared domains.
	UAV	We provide advanced Unmanned Aerial Systems (UAS) to enhance situational awareness and prevent threats alongside both pipelines and on-shore plants.
Perimeter protection	**Fences and Barriers**	Perimeter protection solutions are based on third-party multi-technology products (microwave barriers, infrared sensors, fencing, taut wires, micro-phonic cables, anti-intrusion) closely integrated with our video surveillance management system and the Integrated Safety and Security Control Center.
	Sensors	M-UGS is designed to detect movement and activity. Built around a cluster of unattended ground sensors, the system dynamically creates and maintains a wireless 'mesh' network able to transfer information and data to remote operation centres.
Video surveillance	**VMS and NVR**	Our Video Management System and Network (VMS) Video Recorder (NVR) have been designed to manage highly integrated, geographically dispersed video surveillance and alarm systems. The VMS and NVR Systems can be fully integrated into our Integrated Safety and Security Control Center.
Access control	**Auto-Detector**	Access control systems simultaneously manage the movement of vehicles and people through automated identification and superior security performances, thanks to specialised hardware and smart algorithms. The Auto-Detector is a robust, reliable, smart IP Fixed ANPR (Automatic Number Plate Recognition) system that uses advanced technologies to perform embedded OCR processing to read vehicle number plates without additional (or external) hardware or software.

CYBER PROTECTION

Today's Oil and Gas industry is a technically sophisticated and complex operating environment with an increasing reliance on digitization, data analysis and sensors. While this offers greater operating efficiencies, it can also expose systems to increasing risks and vulnerabilities to cyber attacks.

Threats and attacks on SCADA and Information Systems have nearly doubled in the last year for 77% of stakeholders (source: Tripwire 2016 Energy Survey). The majority of attacks are never even detected.

Leonardo can support customers in the design, deployment and management of cyber security and data protection networks, in order to defend and secure customers' ICT infrastructures and create new sources of value that reduce costs, improve efficiency and enable growth by enhancing the scalability of the production chain.

Cyber Security solutions

Total Cyber Protection	We offer protection for both traditional ICT and Industrial Control Systems (ICS)/SCADA by leveraging a comprehensive approach: › Infrastructure assessment, design and review › Data, system and network protection › Deep protocol behavior inspection › ICS and SCADA protection › Security management
ICS and SCADA Cyber Protection	We provide Customers with off-the-shelf protection from the Dragonfly threat and out-of-the box protection from similar unknown threats. The solution relies on behavioral analysis to threat-recognition and promptly activates remediation actions. The protection algorithms learn the "normal" behavior of the industrial network and warn for anomalies and deviances from the normal state. In particular for HAVEX & Karagany, the monitoring technologies recognize system behavioral anomalies at different levels.
OSINT (Open Source INTelligence)	Actionable intelligence based on real time analysis of large amounts of web information (open, deep, dark), obtained through data mining, machine learning algorithms and a high performance computing framework. › Analysis of massive social networks › Network analysis for intelligence and surveillance › Security prevention & early warning › Brand protection - reputation analysis › Fraud & anti phishing.

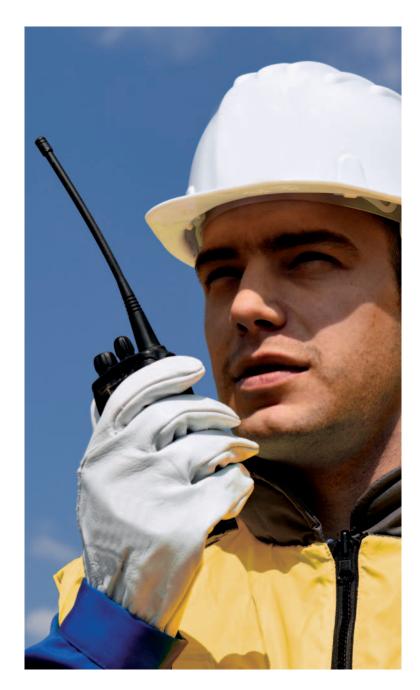# COMMUNICATIONS: WHERE RELIABILITY MATTERS

Oil & Gas operators require fully integrated information and communications solutions that are both reliable and robust, designed to operate in extreme hazardous environments and during critical emergency situations.

Leonardo develops turnkey multi-technology network solutions that integrate a range of wired and wireless communication technologies (TETRA, DMR and next generation wireless broadband radios) and guarantee transparent user connectivity in all circumstances, for safe and efficient operations.

Typically we deliver such solutions to first responders, fire brigades, police forces and to all user communities who need to communicate during mission critical operations where life matters.

Complete communications packages are available to EPC and End Customers, addressing:
› Transport networks (both wired and wireless)
› Access to wired (LAN) and wireless networks
› PAGA/PABX
› Clock distribution
› Operational communications.

Mission Critical Communications

TETRA	The **ElettraSuite Adaptanet**® is a complete modular, scalable and flexible family of TETRA products, satisfying requirements ranging from single-site to national networks. The system supports technology enhancements with full IP communications, and is complemented by terminals dispatching solutions and service applications.
DMR	**ECOS-D DMR solutions** are characterized by a high degree of scalability and flexibility that allows selecting the most suitable configuration for Customer's requirements. The same radio base station can operate in DMR Tier II, with simulcast option and dynamic analogue FM, or DMR Tier III in simulcast or cellular configuration.
LTE	**LTE infrastructures** can support data intensive applications and video monitoring for safety and security purposes. Our LTE Core Service can guarantee standard enforcement and openness to professional applications for private networks.
Netwok integration	The **CSP ecosystem** infrastructure facilitates the integration of multi-technology networks with unified users and application management, supporting the progressive evolution from narrowband to broadband professional communications networks.

AUTOMATION AND PROCESS CONTROL: WHERE EFFECTIVENESS MATTERS

By combining process, system integration and project management capabilities with proven experience designing hardware and software applications, we are one of the main industrial companies able to manage the entire life cycle of automation and process control systems, from consulting and needs analysis with the customer, to guaranteeing service levels and personalized after sales assistance.

The best systems engineering solutions in the field of automation today are the result of synergy between multiple competences in specific areas.
Our approach therefore involves the integration of its hardware and software products with the best referenced market technologies, appropriately customized through joint initiatives with world leading producers of automation components.

OFFSHORE/VESSEL AUTOMATION SOLUTIONS

ICSS Integrated Control and Safety System including (but not limited to):
› Auxiliary automation system
› Data acquisition system
› Propulsion automation system
› Power management system
› Safety information system and load & stability calculation
› Boiler control system
› Emergency shutdown system
› Fire & Gas system.

ONSHORE AUTOMATION SOLUTIONS

› Gas network distribution - SCADA system
› Gas Compression - Control system
› VMS Vibration Monitoring System.

INTEGRATED SECURITY AND SAFETY CONTROL CENTER: WHERE CONTROL MATTERS

Taking advantage of the integration of in-house developed dual-use and military grade systems (Radars, EOs, UAVs, ANPRs) with "best-of-breed" technologies, our Integrated Control Center has been designed specifically to address high grade requirements of security and safety in Critical Infrastructure and specifically in Oil and Gas assets. It enhances situational awareness and improves the ability to prevent and deter criminal acts.

Features can be scaled from smaller and less demanding cases to higher and more complex scenarios depending on the customer needs.

Our Integrated Control Center is able to:
› Integrate a large number of different sensors and subsystems to collect events and alarms
› Filter and correlate alarms through the intelligent rule based engine
› Geographically represent the on-field scenario thanks to an effective and flexible GUI integrated with a powerful GIS
› Automate operations and guide operators in the analysis of the situation by following standard and emergency operating procedures
› Boost on-field squad coordination through the integration of Mission Critical Communication
› Track and record all events to enhance post event analysis, investigation and debriefing activities.

The Integrated Safety and Security Control Center is based on the interaction between different modules/layers powered by an Enterprise Service Bus architecture.

The system architecture is based on SOA (Service Oriented Architecture) allowing internal and third party modules to be integrated through standard interfaces with signature verification, data encryption and guaranteed delivery of information.

This open architecture allows to easily connect, different vendor devices and systems to have a unique presentation and business logic.

It supports a wide range of on-field equipment and sensors, including:

› **Video Surveillance System (CCTV)**
   – Wide range of real-time video technologies including ONVIF equipment, thermal and EO cameras

› **Video Analytics**
   – Automatic detection of temporal, spatial or more complex events (e.g. virtual fences, object tracking, people counting, etc.), designed to expand with new features and to integrate third party algorithms

› **Electronic Access Control Systems**
   – Control of physical access of vehicles (ANPR System) and people, integrating gates, face recognition and scanners

› **Long Range threat detection**
   – Medium and Long Range Identification Radars

› **Perimeter Intrusion Detection System**
   – Barriers and intrusion detection sensors

› **SCADA**
   – Processing of alarms coming from Supervision Control and Data Acquisition subsystems

› **PAGA, EVAC and Safety Related Sensors**
   – Personnel safety management such as fire and smoke sensors or PA speakers

› **AIS**
   – Information coming from vessels surrounding the off-shore plant or the LNG vessel.

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