

DEFENCE



CAPABILITY APPROACH

MULTI ROLE ARMORED VEHICULE

FRENCH EXCELLENCE
IN DEFENCE AND SECURITY

GICAT

The French land defence and security
industry association



GICAT.COM

INTRODUCTION

TRENDS FOR A FUTURE MULTI ROLE ARMORED VEHICLE

ATTACKING THE ENEMY'S COMBAT POWER, UNDERSTANDING, WILL, AND COHESION.

The operational feedback learnt provided by the land forces deployed on the field of operations abroad show a new technical, technological and operational breakthrough in the sector of armored vehicles.

2 The nineties, following the end of the Cold War, brought the issues of the volume and natures of the armored or motorized forces and were dominated by the quest for compromise between versatility, projection capacity and control of ownership costs. The studies on the next generation of combat armored platforms, meant to succeed the heavy tracked « Legacy Forces », are leaning towards median, mobile and wheeled platforms. The American Brigade Combat Team program, equipped with the Stryker (medium armored vehicle 8x8, 16 to 18 tons), also inspired by the French projection forces equipped with VABs and 10RC, symbolizes this trend. The first Strykers were deployed in Iraq in 2005. But the following years these « medium forces » vulnerabilities were revealed as unfit to resist IEDs and individual anti-tanks weapons.

The allied engagement in Afghanistan and the American engagement in Iraq's human cost thus generated a doctrinal shift making protection the new primordial setting. The « MRAP », vehicle in which protection has been highly increased at the expense of its carrying capacity (and consequently its versatility) and mobility, massively appears on Iraqi and Afghan battlefields through the American and British urgent operation program, while France was equipping its forces with a new multirole wheeled armored vehicle, highly protected and versatile: the « VBCI », the French mechanized infantry's latest vehicle used in Afghanistan, Sahel or Central Africa.

On the field of operations, the firepower, the stake of ground control, the elongations, the potential lethality of asymmetric combat as well as the combat in urban areas are reminders of the key settings required of any armored vehicles to accomplish its mission in a XXIst century battle.

1 THREE MAIN FEATURES ARE STRUCTURING A PLATFORMS' ABILITY TO FULFILL ITS MISSIONS

Mobility

Ability to manoeuvre in harsh environments (sand, rock, damaged or obstructed roads), as well as to maintain an operative and strategic mobility matching the stakes of projection and theater control. The new propulsion and hybrid technologies contribute to enrich the motorizations options in a context characterized by the drive line choice (cinematic chain, transmission, tracks, drive wheels) which reflect the imperatives of use, projection, deployment and cost of maintenance.

Fire power

The combat armored vehicle has to be able to carry systems suited to its missions (recce, support or destruction), precise (in urban environments particularly), multi-purpose and coordinated. Nowadays, it is not one but many weapon systems that are carried on armored vehicles: heavy machine-guns, automatic 40mm caliber grenade launcher, heavy gun and remotely operated light armament, medium caliber gun and anti-tank systems, as well as means of observation, acquisition and designation, including for the use of precision or programmable ammunitions.

Protection

The versatility of the threat, whether it is conventional (direct shot of any caliber, hollow-charge ammunitions, core generating charge, guided effects weapons) or improvised (IED) is calling for new responses in terms of conceptions and material. Preventing detection, interfering with acquisition, jamming the enemy's sensors, deceiving, intercepting or neutralizing the ammunitions, blocking or limiting their effects, are the main improvements of the protection mission. The ability to handle the blast effect, the additional protection kits and the embarked detection systems are contributing to optimize the armored platforms' survivability in hostile environment.

2 FOUR TRANSVERSAL FUNCTIONS ARE PLAYING A KEY ROLE IN THESE VEHICLES' CONCEPTION, DEVELOPMENT, IMPLEMENTATION AND OPERATIONAL READINESS MAINTENANCE

Systems engineering

The compromise which needs to be found between those transversal functions require the development of an « Architecture » function in order to define the « armored systems » and engineering required to integrate those modules. It is thus about designing effective systems to match the mission's requirements on the one hand, as well as anticipating technical and operational evolutions which could occur throughout the platform's life cycle (which can reach 20 to 30 years for a multi-purpose armored vehicle). This function also determines the payload capability's settings (troops, equipment, subsystems), and as such, the modularity of the vehicle.

The CIS

The modern combat, imbricated, fluid, versatile, requires information control through C2 systems (command & control), communication, localization/navigation and integration of Battle management systems (IFF, « blue force tracking » and platforms cooperation). The stakes implied by the issues of coordination and management of embarked subsystems (vetronic) are determining in terms of structure dimension as their number is constantly increasing, calling for a new remote management as well as an optimization on the crew and commanding level, for each platform. The electronic and cyber war aspects are, for their part, imperatives as the threats on embarked software and communication networks expand.

Logistic

The system's ability to last, in operation as well as all throughout its life cycle, lays with its level of consumption of parts and energy in operation, but also with its modularity. Modularity allows quick replacement of damaged parts and the optimization of

the operational readiness maintenance, modernization and evolution processes. It is thus about developing a « system logic » based on an optimized logistic engineering, in order to decrease the system's footprint and maintenance cost, in a lasting manner, including coordination between companies and state decision makers.

Training

Training and simulation allow the acquisition of technical and tactical know-hows, in static as well as dynamic situations (simulators or « real » conditions). Embarked simulation must be a tool to optimize exercises with the equipment and real mission preparation. Training also includes support teams training and their upgrade all throughout the life cycle.

The key challenges for the platforms in the years 2020 are related to the ability to integrate digitalization technologies: commanding systems computing, external network interfacing, internal networks vetronic, embarked simulation.

The other differential will be the ability to evolve, in a sustainable manner: integrating protection kits, innovative solutions for intelligence and fire control, new weapon systems, in a coherent logic with regards to systems, functional ergonomy to benefit the crew, operational readiness maintenance and operational relevance.



MULTI ROLE ARMORED VEHICLE

COMPONENT BREAKDOWN

Six operational categories have been identified in order to showcase the products and skills of armored and non-armored vehicles' equipment and system suppliers. This operational division also reveals 21 technological and know-how subsections.



VEHICLE ARCHITECTURE

- Vehicle Architect & System Integrator.
- Engineering, Design, Technical master, Modernising.
- Technical Simulator & E-documentation (Driver, shooting and maintenance assistance systems).



MOBILITY

- Engine (electrical/thermal/hybrid).
- Drive Line (Gearbox, automatic transmission tracks).
- Running Gear (tires, suspension, brakes,...).
- Outside Lights (road Lights, Black out,...).

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WEAPONRY

- Armament (turrets, weapons, support).
- Ammunition (Shells, Fuses, Missiles).
- Optical/Optronic Devices for Day & Night vision.



PROTECTION

- Interior installation (seats, inside lights , instrument panel).
- Ballistic Protection (Armor, Liners, auto protection devices).
- Stealth (visible, thermal, sounds).
- C-IED and jammers.
- Fire Protection & CBRN devices.



COMMUNICATION INFORMATION SYSTEMS







- Communication (radio set, helmets, antennas).
- Battle management System (computer, screen, software).
- Navigation (GPS-Inertial).
- Vetriconic (connectors, wires, inboard electronic and energy).



LOGISTICS

- Repair equipment (winches, cable, tools, cleaning) - MRO.
- Ventilation and Cooling systems.
- Oil and Lubricants (Refuelling, Stocking, tanks).
- Electrical Energy: generator, battery.

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APRRES INDUSTRIES



Vehicle Architecture



Mobility



Protection



Logistics

APRRES Industries is a company of the Metal Energy Group, by its expertise capacity, ensures the maintenance in operational condition « MCO » of vehicles and equipments.

APRRES Industries has participated in the Maintenance of military and civil vehicles with 3 objectives: Increase vehicle availability, Extend the life of vehicle, and Give a second life to the materials...

MAINTENANCE IN OPERATIONAL CONDITION (MCO) OF VEHICLES FOR 20 YEARS

APRRES INDUSTRIES' EXPERTISE IN MECHANICS, ELECTRICITY, HYDRAULICS IS RECOGNIZED FOR MCO SERVICES FOR CIVIL AND MILITARY VEHICLES:

- Maintenance;
- Repair;
- Refurbishing and Modernization;
- Treatment of obsolescence;
- Supply of spare parts.

Its engineering team is equipped with SOLIDWORKS 3D Mechanic & Electrical 2D, and taking advantage of its integration into the Metal Energy Group, it relies on the specific technical skills of Group Companies (SOTIAG, JET CUT) and is therefore able to:

- Carry out design and development studies;
- Make and assemble prototypes in his workshop;
- Reproduce identical articles in small series with reverse engineering;
- Resolve problems with obsolete components or define appropriate substitutes.

Thanks to close historical relationships with a network of original parts suppliers, APRRES Industries is able to respond effectively to the needs of military purchasing centers, provide original or adaptable spare parts in a timely manner and at competitive prices.

APRRES Industries positions itself mainly alongside manufacturers, as a robust alternative for supporting aging vehicles or mobile equipment to extend or give another life.

Particularly recognized on any intervention in the power transmission chain, APRRES Industries has specific experience in reassembling or upgrading the engine and gearbox for the vehicle repowering.

Its multidisciplinary team can implement solutions adapted to the trades and techniques taking into account both logistical and budgetary constraints.

OUR DEFENSE OFFER AND OUR TECHNICAL SKILLS

Metal Energy Group companies:

- **#1** APRRES Industries: MRO Civil & Military « Maintenance, Repair & Operations vehicles »;
- **#2** JET CUT: Waterjet 2D & 3D Milling soft materials;
- **#3** SOTIAG: Sheet metal working.

Our defense offer:

- MRO: Maintenance, Repair, Modernization and Retrofit, Treatment of obsolescence. Management and supply of spare parts;
- Cutting and supply of metallic and composite materials. *Application: Mechanical parts, Shielding;*
- Manufacturing of mechanically welded assembly, Prototyping, Reverse Engineering. *Application: Chassis sub-assembly, delivery for assembly line.*



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Protection

INDUSTEEL

ARCELORMITTAL GROUP

EUROPE'S LEADING SUPPLIER OF CARBON-ALLOYED AND STAINLESS STEEL PLATES

SPECIAL STEELS CREATOR

Industeel is a subsidiary of ArcelorMittal group, producing special steels hot-rolled plates, ingots and formed pieces.

We offer a complete range of high-quality grades designed to meet the most stringent specifications in various domains like energy, transportation, mines and quarries, mechanical constructions, military land vehicles and naval application.

Industeel offers the world's widest dimensional range: from 2.5 to more than 1000mm thick and up to 4300mm wide to satisfy our customers' requirements thank to our 3 mills located in France and in Belgium.

Our solutions are tailor-made to your projects thank to a rich metallurgical know-how and a very long experience.

ARMOR SOLUTIONS PROVIDER

Producing steel armor plates since more than 150 years and pioneer on Ultra-High-Hardness steel market from 1980's, Industeel took part in the most prestigious military programs and has developed a complete of grades with hardness from 280 to 650 HBW, marketed under brand Mars®. Their properties are specially adapted to the production of protected platforms, including blast resistant floors, but also of add-on armor panels.

- Mars® 280 - Rolled Homogeneous Armor with maximum resistance to shock.
- Mars® 380 - Rolled Homogeneous Armor for ballistic protection and evaluation of armor-piercing ammunitions.
- Mars® 440 - Medium Hardness Armor.
- Mars® 500 - High-Hardness Armor.
- Mars® 600 - Ultra-High-Hardness Armor with increased workability.
- Mars® 650 - Ultra-High-Hardness Armor with maximum resistance to penetration.
- Perforated Mars® 650 - Ultra-High-Hardness perforated armor.

Thanks to a very good homogeneity, tight thickness tolerances, very-low internal residual stress and an excellent flatness, our products are globally recognized and highly valued.

A complete range of steel plates for protection against ballistic impacts as well as Landmines & IEDs effects.

- 6 high quality grades, with typical hardness 280 to 650 HBW.
 - Quarto plates, up to 400mm thick and 3300mm wide.
 - Cut-to-length sheets (from coils): 2.5 to 10mm thick and up to 2000mm wide.
- Unequalled flatness, performances and workability.**



Industeel



ArcelorMittal

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ARQUUS



Weaponry



Protection

Communication
Information
Systems

Logistics

ARQUUS, a French century-old company and European leader of protected land mobility, offers a complete range of tactical vehicles, remote-controlled weapon stations and tailored services. The success of ARQUUS' vehicles and systems is mainly due to their ergonomic architecture and robustness, their excellence regarding mobility and protection, and their reliability proven in theatres of operations throughout the world.

ARQUUS, A KEY PARTNER FOR ARMIES

A COMPLETE RANGE OF VEHICLES AND SERVICES

As the historical partner of armies since its very beginning, ARQUUS designs tailored solutions to meet its customers' specific needs with a complete range of tactical vehicles from 3.5 to 26 tonnes.

- As part of the French Scorpion program, ARQUUS is putting its mobility solutions expertise at the service of the temporary consortium for Griffon, along with its new remote-controlled weapon stations range (Hornet).
- In the 20-tonne (GVW) category, ARQUUS offers the VAB MK3, the heritage of 40 years of experience.
- The light tactical and armoured vehicles from 3.5 to 15 tonnes (GVW) including the Fortress, Bastion, Sherpa Light, VLRA, Trapper and Dagger are based on 4x4 chassis and available in many variants providing all kinds of missions: patrol, weapon systems or homeland security. The Fortress Mk2 completes ARQUUS' range with a new armoured hull and the latest technologies providing very high levels of protection.

INNOVATION AT THE CORE OF OUR DNA

Technological innovation is part of ARQUUS' DNA and R&D covers first its core business: vehicle architecture.

Driven by the ambition to serve the operational needs, ARQUUS explores four technological fields focusing on a real strategic and operational advantage: robotisation, energy, protection and platform digitisation.

The new HORNET remote-controlled weapon stations range or the new light armoured vehicle Scarabee make this R&D approach a reality.

Crammed with technologies, the Scarabee benefits from ARQUUS' expertise regarding mobility with its 2-ground clearance levels or minimal steering radius enabling the crab motion. The Scarabee is designed to be compact and stealthy for air transport. It is capable of performing air landed assault missions, with personnel on board and weapons ready, allowing the securing of strategic points. It can thus ensure the capture of advanced positions, and the securing of airstrips, ahead of the airborne or air transported units.



ARQUUS

DEFENSE · MOBILITY · SYSTEMS

ARQUUS

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BREN-TRONICS

(INTERNATIONAL SOLUTIONS SARL)

POWER & ENERGY SOLUTIONS DESIGNER & MANUFACTURER

DESIGN, ENERGY STORAGE, SMART CHARGE

Bren-Tronics focuses on bringing armed forces around the world the latest and most efficient expeditionary power solutions for uninterrupted autonomy in the field since 1973.

Bren-Tronics' expertise remains focused where no one can compromise safety, reliability and performance. We offer the next generation of Li-Ion batteries as an advanced energy solution for use in multiple applications including tactical radiocommunication, optronic, electronic warfare, weapon system, robots and more.

When it comes to helping military vehicle manufacturers and customers, Bren-Tronics answers three basic needs with the Li-Ion 6T format battery: Energy, weight and space. With this solution, they can drastically optimize their autonomy during silent watch missions.

POWER SOLUTIONS FOR ARMORED VEHICLES

An intelligent battery - a real system

Building a safe and capacitive battery requires a real expertise. Our 6T Lithium-ion incorporates multi superior electronic protections and safety features as well as a CAN BUS data access to monitor all battery parameters at all times.

A solution for today's requirements with a reduced cost of ownership

Bren-Tronics' 6T batteries dramatically changes the operational capabilities of armored vehicles and the way in which military organizations manage the inventories of their vehicle batteries. The battery cycle life is extended from hundreds of charging cycles to thousands of cycles compared to lead acid and the maintenance is reduced to only one complete charge every two years while in storage conditions.

Operational advantages

Bren-Tronics's 6T batteries offer the best trade-off between power and energy density. While the battery is able to sustain the vehicle pulse cranking requirement to start the engine, the battery can also be charged in less than one hour and provide enough energy to multiple loads. Several batteries can run in parallel for extended silent watch missions.

Yesterday's energy solutions mainly based on lead acid are too heavy and too low in energy to sustain the new silent watch requirements. Our innovative lightweight and safe product line of Lithium-ion rechargeable 6T batteries is a « drop-in » replacement of traditional lead-acid NATO batteries and triple the silent watch capabilities of armored vehicles.



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CILAS

COMPAGNIE INDUSTRIELLE DES LASERS



Weaponry



Protection

A subsidiary of ArianeGroup and Areva, CILAS, has been at the leading edge of lasers and optronics for more than 50 years, and has constantly brought innovations in these fields. CILAS develops, manufactures and markets products and systems using lasers and optronics for Defense and Security. The company is also involved in large-scale scientific laser programs.



INNOVATIONS IN LASER

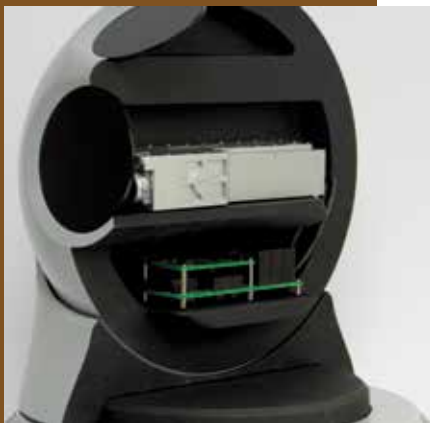
AT THE EDGE OF MODERN TECHNOLOGIES

Thanks to its unique expertise in laser and optronic technologies, CILAS proposes several products in the fields of designation, optical detection and high energy lasers, which can be intergrated into Muti-Role Armored Vehicles:

- Laser Target Designation brings the possibility to execute a surgical strike on enemy facilities from kilometers away;
- Laser Sniper Detector is designed to protect troops against sniper team, capable of identifying and locating the enemy observer point. It ensures the safety of the area during the mission;
- CILAS' High Energy Laser Multiple Application - Power (HELMA-P) is a Laser Weapon system designed to engage UAVs threats and also fixed targets. HELMA-P is a Counter UAVs solution which ensures immediat, silent and surgical shots, avoiding collateral damages.

LASERS AND BEYOND

- Aladem 80 & 150 are Lasers Target Modules which can be embedded in gimbal payloads or land sights. Aladem are athermal modules with a very low residual consumption in stand-by mode. They can operate long range designation, 10 kilometers and beyond. Aladem 150 encompasses an eye safe laser range finder.
- SLD 500 LRV: CILAS' Laser Sniper Detectors Long Range for Vehicles (SLD LRV) embeds cutting-edge laser technology and state-of-the art cameras to perform a preshot detection of snipers and clear identification of snipers and observers by detecting their scopes, day or night. It has been designed to be integrated in all type of vehicles, providing sight detection information to the battle management system.
- HELMA-P is a High Energy Laser Weapon system capable of detecting, locating, tracking and neutralizing soft aerial targets. Combined with a C2, it ensures the protection of a sensible area against UAVs. It can also be integrated on mobile platform for the security of military convoys.



CILAS
[COMPAGNIE INDUSTRIELLE DES LASERS]
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ECM

SYSTEM & MECHANICAL ENGINEERING FOR VEHICLE AND EQUIPMENT

DESIGN, MULTI-PHYSICS SIMULATION, PROJECT MANAGEMENT

Founded 1973, ECM is one of France's longest-running engineering company. ECM is a subsidiary of CRIT Services Group.

ECM operates in aeronautics, automotive, defense, and naval industries, dealing with OEMs and their Tier 1 suppliers.

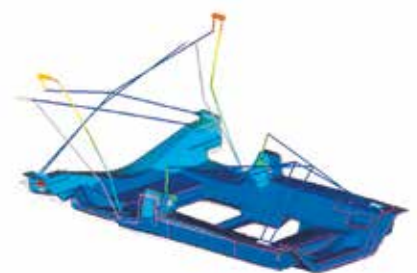
Specialized in vehicles architecture, cockpit/cabin layout, systems physical and functional integration, ECM engineers undertake systems development, from first concept, design, to industrialization phase.

The legacy of their relationship with the transportation industry brings ECM teams an extensive and transverse knowledge of various functional specifications and constraints.

ECM owns its design office and a large range of numerical validation means. ECM experts also provide their technical assistance to diagnosis and problem solving on our clients' field.

EXPERTISE, OPTIMIZATION, TROUBLE SHOOTING

- Vehicle architecture.
- Perceived Quality, Ergonomics.
- Lightweight design (composite parts, additive manufacturing).
- Cockpit: Seating design, dashboards design, airbag systems integration.
- Powertrain: Fuel Cell & Electric PWT integration.
- In-vehicle systems integration: Hydraulics, loading systems.
- Mechanical assemblies optimization.
- Cyber physics simulation.
- Process, validation and control tooling.
- Product and Process Quality Management, APQP.



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ECM
Engineering Conception Maintenance

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ELNO



ELNO is specialized in the design and manufacture of communication systems for harsh environments. Historical technological know-how and a strong capacity for innovation make ELNO the privileged partner of defence players and in particular of the French Army. The company has a very active research and development department and patented technologies.

ELNO IS SPECIALIZED IN INTERCOM SYSTEM AND AUDIO ACCESSORIES

COMMUNICATION SYSTEM IN HARSH ENVIRONNEMENTS

Elno, an innovative SME and a long term partner to the French Army has developed new solutions to meet the needs of armies. Thanks to its experience in manufacturing and supplying osteophonic and noise reduction technology, ELNO provides state-of-the-art solutions to help people communicate in harsh environments such as Infantry Fighting Vehicle or turreted vehicles.

HERE ARE SOME ELNO SOLUTIONS:

- Hoplite VH, a cartilaginous conduction headset. HOPLITE provides a high level of ease of use and passive protection thanks to its ergonomic ear pads and allows communication in noisy environments. Cartilaginous conduction offers the operator the possibility of using ear plugs for double hearing protection in very noisy environments.
- ELIPS™, a full IP Intercom. ELIPS™ responds to the need for consistency of operational capabilities and commitment of armies. The modularity of the network and ELIPS™ boxes results in:
 - The number and type of boxes connected within the same vehicle (scalability);
 - The configurable configuration of each box, according to the type of operator or the mission (customization);
 - Modular architecture according to the vehicle platform.

ELIPS™ is equally suitable for use in the simplest and the most complex configurations. It can be used in any wheeled or tracked vehicles for command, reconnaissance, support or troop transport missions.

- Moreover communications between both on and off-board infantrymen and their vehicle has become vital with modern Infantry Fighting Vehicles. The continuity of communications during mounted/dismounted phases is a major asset of the ELNO intercom system. To assume this functionality, ELNO developed the P2C: latest generation of smart push-to-talk. It can be connected to infantrymen radios. During mounted operations, as soon as the infantryman embarks, P2C allows not only instant communication with all soldiers connected to the vehicle's intercom but also controls onboard radios. P2C is compatible with any type of headsets.



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DESIGNER AND MANUFACTURER OF ENERGY CONVERSION SYSTEMS

DESIGN, QUALIFY, MANUFACTURE & SUPPORT

ENAG design, qualify, and manufacture energy conversion systems working in rugged environments for over 70 years. Our expertise in static and dynamic energy conversion is based on the most reliable technologies of power electronics and electro mechanics. Major international companies acknowledge our capability of providing first class service and products, both standard and customized, for intensive use in rugged environments. Used to supply AC & DC power to on board and ground military systems such as weapons systems and communication, our products are renowned for their quality and reliability.

Our sales team, R&D, production, quality and customer services assist our customers during the different phases of their projects, from the initial design through to qualification and commissioning.

LARGE RANGE OF PRODUCTS FOR ONBOARD APPLICATIONS

The Energy Systems developed by ENAG include battery chargers, DC/DC or DC/AC converters and distribution boxes.

Our Power Energy Systems are installed on military armed vehicles. They use different type of power sources: external AC grid, the alternator of the vehicle or the batteries of the vehicle. They can supply power to different onboard equipment with different output voltages (28Vdc, 48Vdc, 230Vac...).

Connected to the supervision of the vehicle, our systems are able send alarms on the global system status, the batteries or the outputs status.

Mounted on the shock absorbers, our systems are compliant with military vibration requirements.

Our distribution boxes are designed to facilitate the cabling of the different network on the vehicle.

All the products designed by ENAG meet Army requirements and respect the applicable standards (eg. MIL STD, STANAG...) and especially EMC standards (MIL STD 461...).

Designer and manufacturer of power electronics equipment for severe environments, ENAG offer a large range of products dedicated to defence applications (On board and Ground). Working closely with our customers, our solutions are developed and qualified according their requirements (thermal, EMC, chocs and vibrations).



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ENAG

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EXAVISION



EXAVISION, an independent French SME since 1990, designs, produces and qualifies complex, smart and stand-alone optronic solutions dedicated to battlefield surveillance, remote weapon stations for target recognition and identification applications.

LEADER IN END-TO-END MECHATRONICS, OPTRONICS AND IMAGE PROCESSING

MULTI-SENSOR CAMERAS AND TARGETING SYSTEMS

EXAVISION has developed bespoke optronic solutions integrated into global product lines:

- Multi sensor cameras covering the whole spectrum range (FHD day and night, thermal band I, II and III, LRF, DMC...);
- Stabilized and accurate rugged Pan & Tilt platforms.

EXAVISION range of equipment combines superior performance, high reliability and competitive price, to satisfy system integrators on:

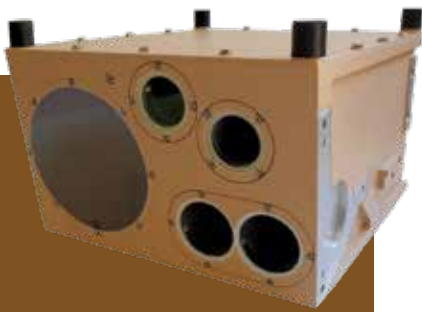
- New development programs, from adaptation and qualification of existing solutions, to serial production;
- Refit programs, with Fit Form Function solutions, improving performance, availability and technical sustainability of the systems.

SOLUTIONS FOR LAND VEHICLES AND WEAPONS STATIONS

Observation and Targeting Electro-Optical Systems: designed using various types of sensors, integrated into weapon systems or on naval vessels and land vehicles. These systems are qualified under extreme conditions such as shocks and explosions, vibrations, salt spray, temperatures and electromagnetic environment. Their robust and lightweight casings machined from solid blocks of aluminium are compatible with terrestrial, maritime and military operating environments and standards.

- Smart combination of daylight sensors and uncooled thermal cameras, associated to Laser Range Finder, and integrated into a waterproof and fully qualified mechanical assembly.
- Dual Field of View uncooled thermal cameras, THOR and THOR-LRD solutions, allowing NATO target (2.3m x 2.3m) identification up to 1.5km and 2km.

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EXAVISION

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SOLUTIONS FOR HIGH-TEMPO LAND OPERATIONS

INERTIAL NAVIGATION FOR ALL TACTICAL VEHICLES

Based on the Fiber-Optic Gyroscope technology, the Advans Inertial Navigation Units are designed for land applications requiring mobility and accuracy, even in GNSS-denied environment: artillery launchers, antiaircraft systems, surveillance or counterbattery radars, forward observers, reconnaissance vehicles, weapon carriers, tanks and infantry fighting vehicles, etc.

Cost effective, the Advans Inertial Navigation Units are highly reliable and do not require any periodic maintenance. Very compact, adaptive to all communication protocols, fitted with « Web-based » user interface, all models use the same interfaces making them easy to integrate and operate. They do not contain any ITAR-restricted components.

TWO AXIS GYRO-STABILIZED PLATFORMS

With over 30 years in mechatronic expertise for motion simulators, iXblue is an independent leader in platform stabilization solutions for optronic, radar, antennas and weapon systems. iXblue's solutions meet the highest Line-Of-Sight (LOS) accuracy while being compliant with the most extreme operation conditions. Scalable and easy-to-use, iXblue's systems have strong hardware, software and interface commonalities, allowing for great savings in terms of integration, installation, configuration management, logistics, training and maintenance costs. This also results in a greater flexibility to dimension the product according to the payload type, weight and size. All of our off-the-shelf stabilized platforms are ITAR-free and in order to minimize the costs, cutting-edge hardware as well as COTS software are used as often as possible.

IXBLUE

iXblue is globally recognized for the design and manufacturing innovative systems and solutions devoted to inertial navigation, positioning and pointing. Serving over 60 armies and navies worldwide, using its unique in-house technology, the company offers turnkey solutions to its customers to carry out their sea and land operations with optimum efficiency and reliability.



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iXblue

IXBLUE
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LACROIX

Vehicle
Architecture

Weaponry



Protection

Communication
Information
Systems

The concept of survivability is central to the design of combat vehicles. GALIX provides a holistic approach to SOFT KILL protection against Battle Field threats. GALIX systems currently equip over 16,000 platforms (armoured and unarmoured) in France and abroad. Since its development, our system has significantly evolved into a fully integrated system, operating cutting-edge technologies with the vehicle's battle management system.



GALIX...: AT THE CORE OF COMBAT VEHICLE SELF-PROTECTION AND SURVIVABILITY

SOFT-KILL SYSTEMS & CAPABILITIES

The system delivers decisive protection within only 1 second thanks to the ammunition's unique terminal effects and maximizes vehicle and crew survivability by computing data received from the various sensors operated onboard.

The Galix system is combat proven and LACROIX demonstrates its full interoperability with various types of sensors (LWS, acoustic, etc.) and vehicles, From MBTs to light (SF).

The AOS version of GALIX should be considered as an entire brick of the self-protection suite, including threat detection, situation analysis and reaction with manoeuvre recommendations...

PROVEN EFFECTIVENESS FOR ANY KIND OF PLATFORM

The effectiveness of the GALIX system and its ammunition resides in its capacity to mask, in under 1 second, vehicles in the visible range and all laser wave bands (against laser designator, laser range finders, etc.) and infrared large band (0.8-14 microns), covering bands I, III & IV, with a duration of up to 90 seconds.

GALIX, an instantaneous protection cloud (40 and more 130 metres, 8 launchers) of non-toxic smoke is created from ground level up to a maximum height of 7 metres and between 20 and 60 metres from vehicles.

Optimised integration and operation concept:

- Easy installation or retrofit into vehicles without roofpenetration;
- Compact and common standardised control and display units combine latest soft- and hardware components with expandable interfaces and open technical structures for future functionalities.

Current market tender, demonstrating that major programs are moving towards fleets composed of AFVs, APCs, and the exponential place of turrets (RCWS - RWS) ... make us confident about the credibility of our comprehensive sensor suite and it's potential for Small Vehicle requirements (LAVs, LTVs), considering the weight reduction with our dedicated and new GALIX Screening (GS) Ammunition.

GALIX increases protection and survivability for vehicles and their crews.



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Mobility



Weaponry



Protection

Communication
Information
Systems

THE EUROPEAN MISSILE SYSTEMS REFERENCE COMPANY

MMP ON VEHICLES

MMP is the first combat proven 5th generation missile that can be operated in « fire and forget » or « man in the loop » modes and that can be fired against beyond line of sight targets with a retargeting capability. It can address a large panel of cold or hot targets thanks to its uncooled dual channel seeker and to its multi-purpose warhead.

MBDA is integrating MMP missile on several types of vehicles and turrets:

- On the NEXTER T40 turret in line with the development of the French Army's JAGUAR recce and combat armoured vehicle (EBRC or Engin Blindé de Reconnaissance et de Combat), which other main weapon is the 40 mm cased telescoped armament system;
- On several light remote-controlled turrets, such as MBDA IMPACT turret, designed to be easily fitted to an extensive range of vehicles;
- Through the use of a special bracket to adapt infantry firing posts on all types of vehicles (armoured or not).

MPCV, MULTI PURPOSE COMBAT VEHICLE

The latest generation of high firepower weapon system for ground based air defence operations, offers high mobility and crew protection. The weapon system can be fitted on a wide range of armoured vehicles. MPCV provides air defense units with a weapon system combining high mobility, crew protection and high fire power. The turret of the system includes high performances electro-optical sensors, a heavy machine gun and four ready to fire MISTRAL missiles, operated from a firing console installed inside the vehicle or deported outside. Integration of the weapon system has been designed for being integrated on a wide range of high-mobility armoured vehicles. MPCV is a MBDA's answer to today's requirements for a weapon system that combines high fire power, short reaction time, day/night surveillance and engagement capabilities, tactical and strategic mobility, together with a high level of crew protection.

ATLAS RC

Mistral ATLAS RC is MBDA's response to today's requirements for air defense system that combines high fire power, short reaction time, surveillance and engagement capabilities. MISTRAL ATLAS RC is a new MISTRAL system based on a remotely controlled turret, equipped with two Mistral missiles (4 in option) and a latest generation thermal sight, capable of being mounted on a wide range of high-mobility armoured or non-armoured combat vehicles such as the URO VAMTAC ST5, the ARQUUS SHERPA. The ATLAS RC system provides greater protection to the crew, since it can be operated from within the vehicle's cabin or, remotely, through a state-of-the-art fully mobile workstation. Its 360° revolving, motorised turret is easy to operate, provides an optimized operational capability with a minimum crew (1 or 2 people). It is designed to be integrated into a coordinated air defense network system.

MBDA

MBDA, a world leader in missiles and missile systems, is a multinational group with over 10,000 employees. MBDA has three major shareholders - BAE Systems, AIRBUS and Leonardo, and is the first truly integrated European defence company. MBDA is the only Group capable of designing and producing missiles and missile systems to meet the whole range of current and future operational requirements for the three armed forces (army, navy, air force).



MBDA
MISSILE SYSTEMS

MBDA

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METRAVIB DEFENCE



Over 25 years in the service of world-wide security for the protection of people, sites and vehicles, METRAVIB DEFENCE has developed high-performance threat surveillance, detection and localization solutions for the defence and civil protection sectors. Propelled by the French Army's Scorpion program, acoustic detection is establishing itself as a central technology for collaborative defense.

ACOUSTIC GUNSHOT DETECTORS

AT THE HEART OF THE INFOVALORIZATION AND DIGITALIZATION OF THE BATTLEFIELD

METRAVIB DEFENCE, the inventor of acoustic gunshot detection and supplier of acoustic localization systems for « Griffon » VBMR (Multi-Role Armored Vehicles) and « Jaguar » EBRC (armored reconnaissance and combat vehicles), fits perfectly into this new operational approach, by offering solutions to exploit, fuse and share data from theatres of operation.



PILAR V is the essential sensor in the vetronics enhancing situational awareness. Its unique and innovative architecture allows interoperability with the SICS (1) Battlefield Management System, which shares data between « connected » vehicles in order to maximize the infovalorization and digitalization of the battlefield.

METRAVIB is always innovating for a better tomorrow, with major development lines such as the detection of a wider spectrum of threats (big caliber, mortars, RPGs, etc.), data fusion from several acoustic sensors and even fusing acoustic data with optical ones to increase PILAR V's uses, especially for the vehicle modernization program including wheeled and tracked vehicles.

TO ENTER IN THE ERA OF COLLABORATIVE COMBAT

Lessons learned from data fusion and METRAVIB DEFENCE's innovative capacities to miniaturize and integrate its « acoustic ear » should perfectly contribute to upcoming studies preparing future capabilities such as:

- The integration of drones and robots into the combat system;
- Connection with the dismounted soldier and their different pieces of equipment, such as thermal sights, head-up displays, multi-function goggles, smartphones...;
- Management of multiple sensors.

Our solutions are Combat Proven in more than 25 countries, allow detection and accurate localization of small & medium calibres thanks to the sound waves generated by the shots.

METRAVIB DEFENCE possesses its own production tool, meaning it can control its products from design to manufacture.

- Protect the Soldiers with PEARL - Ideal mission kit for enhanced survivability.
- Protect the convoys with PILAR Vehicle - Essential sensor for the vetronics for an advanced Situational Awareness and for a greater Force Protection.
- Protect the sensitive infrastructures with PILAR Ground - Fully interoperable with fire support.

Certifications

- ISO 9001
- ISO 14001



METRAVIB DEFENCE

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Mobility



Protection



Logistics

MUSTHANE

EXTENSION OF THE RANGE OF ACTION

BALLISTIC SELF-SEALING PROTECTION FOR FUEL TANKS

Musthane manufactures a self-sealing protection material which is able to prevent leakage of the vehicle fuel tank in case of ballistic impact.

This innovative solution is lighter, thinner and offers an effective protection against the most commonly used calibers. The protection can be installed on an existing fuel tank in metal or plastic.

By using this solution, the vehicle manufacturers can increase the survivability and reduce at the same time the weight of the vehicles.

ADDITIONAL FUEL OR WATER STORAGE CAPACITY

Musthane offers the capability to use available spaces in the vehicles in order to transform them into fuel or water storage capacities. The concept uses flexible composites which are designed to match the location where the tank is to be placed. The flexible tanks are then placed and can be equipped with pumps, gauges or other necessary accessories.

VEHICLE RECOVERY SYSTEM

Musthane manufactures an innovative and the only very light weight and mobile vehicle recovery solution for heavy vehicles (more than 3,5 tons).

The vehicle recovery solutions are roll out mats made of aramid fabrics coated with an abrasion resistant rubber. The grips and studs positioned on the mats make them very effective on extreme conditions.

The products are made to be used many times in the course of the same mission.

Musthane designs and manufactures products made of composite, elastomers (rubber) and technical textiles. Our Engineering department is involved in weight and survivability improvement of the vehicles. We have also solutions for extending the range of action of the vehicles by increasing the water and fuel storage capacities.



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Musthane

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NEXTER



Vehicle
Architecture



Mobility



Weaponry



Protection



Communication
Information
Systems

For more than a hundred years, NEXTER has provided combat vehicles to address the whole spectrum of operations, from high intensity to stabilisation and homeland security. Nowadays, NEXTER keeps developing world class platforms able to protect soldiers by defeating modern and future threats in various & multinational industrial teamings, thanks to a strong expertise in systems integration.

NEXTER VEHICLES: COMBAT SYSTEMS FOR TODAY AND TOMORROW

MODERN AND MULTIPURPOSE VEHICLES

VBCI was chosen more than fifteen years ago by the French land forces as their new 8x8 mechanized combat vehicle dedicated to high intensity engagement. More than ten years of operations have provided with operational feed-back and NEXTER is able to offer an updated version fitted for today threats, armed with highly lethal remote weapon system and equipped with state of the art C4I.

To address stabilization contexts, NEXTER developed TITUS®, a 6x6 armoured vehicle in close partnership with TATRA, as a chassis designer. Designed to be deployed in difficult and urban areas, under high threat, TITUS® warrants survivability and tactical mobility to the 13 personnel squad embedded. Fully agnostic, TITUS® matches perfectly with current needs in terms of versatility and low life cycle cost.

NEXTER: A MAJOR PLAYER IN THE SCORPION PROGRAM

NEXTER, with its GME partners (Nexter, Thales, Arquus), provides the French army with new vehicles within the SCORPION programme:

- LECLERC Main Battle Tank, the decisive capability of the French land forces is currently renewed to integrate SCORPION programme;
- JAGUAR, armed with a 40 CTA canon and an anti-tank missile by MBDA will be the new 6x6 light cavalry vehicle, more than 25 tons of aggression;
- GRIFFON, the 6x6 armoured personnel carrier of tomorrow is already in service and can endorse any mission from command post to, embedded mortar, engineers, medevac or artillery observer;
- SERVAL® will shortly join GRIFFON as the new versatile 4x4 for any remote mission, with up to 26 reversible variants and the assault landing capacity for asymmetric contexts, homeland security or high intensity support mission.

These new vehicles (and shortly VBCI) are included by their vetronics and their common battle management system in SCORPION collaborative combat in which NEXTER plays a leading role, alongside with the French army, to fight more efficiently in complex operational environments. To keep fitting in the next few years, these vehicles keep both high soft and hard growth potential.



nexTER K+N
A COMPANY OF D+S

NEXTER

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Protection

NUANCES TECHNOLOGIES

EXPERIENCED MANUFACTURER AND INTEGRATOR

ADVANCED ELECTRONIC COUNTERMEASURES

Drawing on extensive experience with RCIEDs and the jamming of communications, Nuances Technologies has developed a comprehensive range of products used by armed forces: protecting soldiers, their combat vehicles, convoys, sensitive positions and places, etc. The whole range has been deployed and battle-proven in theatres of operations.

Nuances Technologies equips the NATO and UN forces in conflict zones, Police and Army units through the world. Thousands of vehicles have been equipped with our systems. Our solutions can be adapted to any type of vehicle thanks to integration kits specifically designed by our teams.

MODULAR AND EVOLUTIVE SOLUTIONS

Nuances Technologies solutions are evolutive and can be adapted to any type of mission. Any new threat appearing on the market will be integrated into our systems. Combining state-of-the-art technologies and complying with high quality standards, our systems guarantee the best level of protection.

Our teams can integrate complex jamming solutions on all types of vehicles, civil or military, without changing their characteristics. Each integration will be studied as a specific case and a dedicated architecture will be designed, offering the best performance while optimizing the available space in the vehicle.

Capabilities

- Convoy protection.
- Self-protection.
- Route clearance protection.
- Crowd communications control.
- Collection of information.

Solutions

- RCIED jammers.
- Active, reactive and hybrid technologies.
- Communications jammers.
- Anti-drone solutions.
- Long-range cellular blocking systems.

Services

- Simulation.
- Customized design.
- Integration.
- HERP measures.
- Efficiency measures.
- Training.
- Maintenance.

A wireless communications security expert since 1991, Nuances Technologies designs and integrates advanced solutions dedicated to armed forces and homeland security forces. These tactical systems are intended to control, simulate, detect, intercept, jam, block, locate or secure any type of wireless communication.



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NUANCES TECHNOLOGIES

NUANCES TECHNOLOGIES

Sales Team

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OMAT



OMAT is specialized in national and international sales of re-conditioned and valuable used military equipment and in the maintenance in operational condition. Our team composed of specialised mechanics, of experts and of ex-servicemen is ready to go on site to study needs and propose adapted solutions.

SPECIALIST IN USED MILITARY VEHICLES AND OPERATIONAL MAINTENANCE

OVERHAUL, RECONDITIONING, TRANSFORMATION

OMAT can both refurbish your fleet of vehicles and provide you with former military vehicles reconditioned in our workshops.

OUR KNOW-HOW:

- Maintenance in operational conditions: OMAT can do the maintenance in operational conditions of a whole vehicle fleet;
- Technical assistance for project management: OMAT's experts are able to assist you in the implementation, the development and validation of your projects (implementation of production lines, technical expertise...);
- Mechanical overhauls: Our team of specialized technicians carry out all necessary mechanical overhauls and repairs;
- Reconditioning to new: We can study and realize every desired refurbishing (new engine, modernized lighting system...);
- Vehicles transformations: Raised exhaust pipe, rollover protection added or any kind of bodywork modification; our teams of technicians can study your requests and develop adapted solutions;
- Custom made options added: We can equip your vehicles with additional options such as rear-view camera, shield and add-armour... We also have certified technicians able to insulate and air-condition them. OMAT also has developed its own air-conditioning system;
- Logistic support and transport: OMAT is working with reliable partners in the road and maritime transport sectors.



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Protection

Communication
Information
Systems

PROENGIN

PROENGIN - EXCELLENCE IN CBRN THREAT MANAGEMENT

DETECTING, ALERTING

For almost four decades, Proengin has been mastering the AP4C technology. The company is innovating in order to develop, manufacture and market comprehensive chemical and biological detection systems. The detectors are designed to detect, in real time traditional CWAs, derivatives, fourth-generation CWAs such as Novichok, PBAs (eg: Fentanyl), and also dangerous or suspect biological particles.

UNIVERSAL DETECTION

Proengin proposes a full range of chemical & Biological detectors for very severe environments.

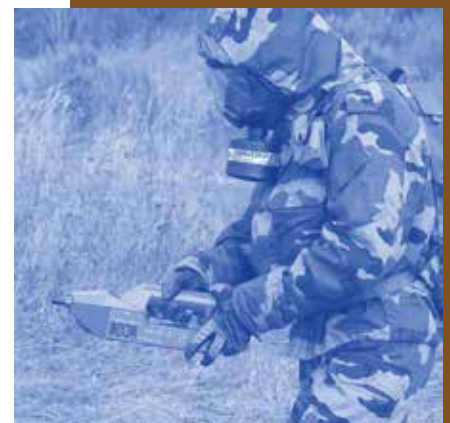
Our Solutions for military or first responders' vehicles can provide chemical or combined chemical/biological detection capabilities. Visualization and control modules, communication technologies can be added in order to build a full CBRN System that is easy to install, environmentally harden and proven to work in harsh field conditions.

Also designed to be operated into harsh sea conditions, Proengin detectors run 24/7 and have been deployed on several civil and military navy programs around the world.

Critical Infrastructures such as government buildings, airports and commercial centers are increasingly equipped with CBRN detection systems. Proengin CBRN systems ensure enhanced detection capabilities with high reliability and as well as low maintenance costs.

Proengin is proposing training solutions, technical assistance and worldwide maintenance support.

Proengin proposes chemical and biological detection systems for military forces, first responders, but also for vehicles, ships and critical infrastructure. They detect simultaneously and in real time Chemical Warfare Agents, Toxic industrial, Pharmaceutical Based Agents but as well dangerous or suspicious Biological particles such as bacteria, viruses or toxins.



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Proengin

PROENGIN

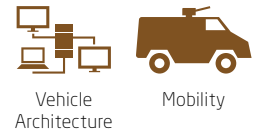
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TEXELIS



Texelis has been designing and producing axle systems and drive-lines for military vehicles, metro, trams, busses and trucks for over 40 years. Its key expertise is converting the power generated by the motor, whatever type, into effective vehicle motion.

INNOVATIVE SOLUTIONS

HIGH TECHNOLOGY AND ENGINEERING

In order to always offer tailor-made solutions to its customers, Texelis has a leading design office and a high-performance physical testing and validation center.

Texelis develops innovative products, anticipating the expectations of manufacturers.

Permanent attention is paid to technicality, robustness and adaptability in order to always meet the needs and requirements of end users.

MODULAR DRIVELINE SYSTEMS

The T700 Modular Driveline System is a lightweight modular driveline system for military and commercial 4x4 vehicles with gross axle weight requirements of up to 7000kg.

The T700 axle system utilises proven modular sub-assemblies such as wheel hubs differentials from the Texelis rigid axle range in conjunction with Independent Suspension technology.

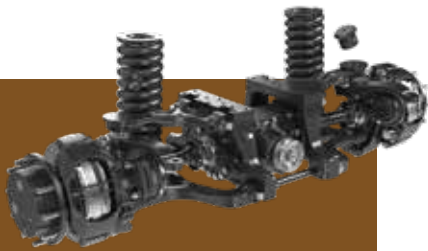
The T900 Modular Driveline System is designed for vehicles requiring Independent Suspension Drivelines rated at up to 9000kg on a single axle.

For 4x4, 6x6 and 8x8 applications. Arduous testing and many thousands of kilometers of usage have proven the T900™ System to be robust and reliable and to meet the demands of the most extreme conditions.

The T900 has been designed by Timoney and is manufactured by Texelis under licence.

Thanks to its experience, Texelis is now expanding its offer by developing complete mobility solutions such as versatile chassis for 4x4 vehicles in the form of mobility kits for monocoque hull or complete rolling chassis. The use of the mobility kits is the assurance of reliable, experienced and qualified equipment.

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TEXELIS

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NOTES





The French land defence and security
industry association

GICAT, a professional group, created in 1978, has over 270 subscribers, corporations, midmarket companies, SMEs and startups. These members cover a wide range of industrial, research, service and consulting activities for military and civil organizations, of national or international scope, involved in land and/or airland security and/or defence.

The international ambitions of GICAT are reflected in its international exhibitions, EUROSATORY in France, Expodefensa in Colombia, ShieldAfrica in Ivory Coast, and Platinum Security Exhibition in Monaco, organised by its subsidiary, COGES, and a certain number of other defence and/or security exhibitions overseas.



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