Multi role armored vehicle (MRAV)
Trends for a future multi role armored vehicle

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.

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.
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 (recon, 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 40 mm 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.

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/navigating and integration of Battle management systems (FF, “blue force tracking” and platforms cooperation). The stakes implied by the issues of coordination and management of embarked subsystems (veteran) 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 digitalized 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

This operational breakdown of the Land Warfare Platform brochure, presenting the products and skills of armored and non armored vehicles’ equipment and systems suppliers. This division relies on six operational categories which were validated to a host of qualified representatives of companies. To this date no amending was requested by these representatives. The division is thus validated for our vehicle brochure. The operational division also reveals 21 technological subsections, some of them are being gathered such as the GMP’s cinematic chain and pneumatics. It is also suggested to gather these subsections in wide categories in order to classify the skills of both the prime contractors, the integrating architects, the suppliers or the subcapacities’ experts for one or many technologies.

The breakdown projects becomes

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 (head Lights, Black out, …)

Weapony

- Armour (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/GPS-thermal)
- Vetronic (connectors, wires, inboard electronic and energy)

Logistics

- Repair equipment (wrenches, cable, tools, cleaning) - MRD
- Ventilation and Cooling systems
- Oil and Lubricants (Refuelling, Stocking, tanks)
- Electrical Energy: generator, battery
APRRES Industries comes from the world of K.O.C. (Keeping in Operational Condition) and I.L.S.(Integrated Logistic Support) and has participated over the past 15 years in the maintenance of military vehicles, loading and lifting equipment, mining and power generators.

APRRES-Industries’ expertise in mechanics, electrics, hydraulics is recognized for:

• Maintain,
• Repair,
• Refurbishing,
• Civilian and military vehicles either in its 6000 m² workshop.

Its engineering team is equipped with SOLIDWORKS 3D Mechanic and 2D Electric and is therefore able to:

• Carry out design and development studies,
• Make and assemble prototypes in its workshop,
• Reproduce identical articles in small series with reverse engineering,
• Solve problems related to obsolete components or define suitable substitutes.

Thanks to close historical relations with a network of original equipment part suppliers, APRRES-Industries can efficiently meet military central procurement’s requirements, supply original or adaptable spare parts in a timely manner and at competitive prices.

APRRES-Industries is positioned next mainly constructors, as a robust alternative to support aging vehicles or mobile equipment either to extend or to give another life.

Particularly recognized on any intervention of the power transmission chain, APRRES-Industries has specific experience for refitting or upgrade engine and gearbox for the repowering vehicles.

Its multidisciplinary team can implement solutions tailored to business and technical needs, taking into account both logistics and budgetary constraints.

Contact: APRRES Industries
ZI Marly, 405 Route de Briennon - F-42 300 MABLY-FRANCE
Tel.: (+33) 04 77 67 82 56 - Mail: AI-GENERAL@aprres-industries.com
Website: www.aprres-industries.com
Industeel is a subsidiary of ArcelorMittal producing special steel hot rolled plates, ingots and formed pieces in the world widest dimensions range.

Specialized in carbon and stainless steels, Industeel offers a complete range of high quality steel grades designed to meet the strictest specifications. Industeel offers the widest dimensional range (from 2.5 mm/0.1" to over 1000 mm /39") to meet all customer requirements thanks to its 3 integrated mills located in Belgium and France. Our tailor-made solutions are adapted to your projects thanks to a rich metallurgical and ballistic know how based on a very long experience.

Industeel offers ballistic protection steels called MARS® for over 150 years

Industeel is specialized in ultra high hardinesses up to 650HB (MARS® 300) and Perforated MARS® 300 and thin thicknesses down to 2.5 mm/0.1" with reduced internal residual stress universally appreciated. Industeel has developed a new ultra high hardness (600HB) solution, MARS® 600, which combines impressive ballistic performances with an improved workability never reached before. Polyvalent futurist material, its great properties suggest unlimited possibilities of implementation and are now internationally recognized and appreciated.

BREN-TRONICS (International Solutions SARL)

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

Military vehicles and the growing amount of on-board equipment require more and more energy. Yesterday’s power solutions are too space restrictive and heavy and are not enough powerful to sustain today’s power and energy needs. That’s why at Bren-Tronics, we worked hard to design and manufacture innovative high energy light-weight Lithium-Ion 6T 24V batteries.

The most capacitive 24V 6T Lithium battery for military applications

Bren-Tronics has developed the most capacitive 6T Lithium-ion battery on the market to help military vehicle manufacturers and customers answer three basic needs: energy, weight and space. Our 24V battery replaces two 12V lead-acid batteries, offering four times less weight, half the space and all the required power for vehicle cranking and silent watch applications.

Not just a battery but the state of art of technology

Building a safe, high energy battery requires real expertise. Bren-Tronics has been designing and manufacturing Lithium-ion rechargeable batteries for military applications for over 20 years. Our 6T Lithium-ion battery was designed with multiple internal protections and CAN Bus communication protocol. The battery incorporates features such as built-in-self balancing, automatic and resettable protections and provides high continuous charge/discharge performance. Battery status is monitored at all times and can be used in real time by the user.

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

Today’s requirements are stricter than ever, especially when it comes to performance, logistics and storage. At Bren-Tronics, our goal is to provide the most effective solution that will last as long as possible with the least maintenance required. The LCD state of charge present on the battery along with the fast re-charge capability of the battery require little user interface, connect the cables and start charging. Thanks to the very low self discharge the battery is able to be stored for years without any maintenance required.

• Safe
• Quick charge
• Lightweight • High energy density
• Tremendous cycle life
• Reduced cost of ownership and logistic burden

When you think power, think Bren-Tronics.
**ELNO**

ELIPS - IP Digital Intercom “plug & play” is a major milestone for communication inside armoured vehicle.

The system, developed by ELNO is an intercom allowing full duplex communication on an IP bus. This Interphone over Internet Protocol complies STANAG requirements.

The system is decentralized, and therefore operates without a central processing unit. All the intelligence is distributed in the crew units and radio interfaces (gateways).

Thanks to its versatility, equally suited to the simplest or the most complex configurations, ELNO offers a universal solution for different types of vehicle, from IFVs (Infantry Fighting Vehicles) to turreted vehicles.

ELIPS responds to present and future needs to align the operational and engagement capabilities of armies. It respects the modularity of platforms by:

- Increasing the number of operator units connected within one vehicle,
- Configuring the services allocated to each operator according to mission
- Using a non-dedicated standard IP multimedia bus. Each operator unit is interfaced like a network peripheral.
- Using shared technological platform configurable.

Moreover communications between both on and off-board infantrymen and their vehicle has become vital with modern IFV or Infantry Fighting Vehicles.

So far an infantryman must change his radio or his headset in order to stay in contact with the vehicle crew, to the detriment of his operational capacity or even his speed of reaction. Similarly, the commander loses contact with his vehicle when he leaves it at a checkpoint.

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 (up to 3). 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.

**CILAS (Compagnie industrielle des Lasers)**

For over 40 years, CILAS has been at the leading edge of the modern technology sector thanks to its unique expertise in laser and optronic technologies.

CILAS develops, manufactures and markets products and systems using these technologies for defense, and civilian or military security. The company is also involved in large-scale scientific laser programs and in industrial and scientific instrumentation.

**Laser Designation Modules**

CILAS has developed two laser modules which can be embedded in gymbals or optronics payload, the AlaDeM - R and the MiniDeM - R. They have been conceived with innovative athermal technology to deliver an accurate semi-active laser guidance for all types of precision guided ammunitions. These modules have a very low residual consumption in stand-by mode. The AlaDeM - R is for long range designation using (up to 10 Km) and the MiniDeM - R for medium range designation using (up to 5 Km). The artillery observation vehicle in Scorpion will be equipped with AlaDeM - R.

**Laser Range Finding**

Designed for extreme environments, CILAS’ rangefinders are flash or diode pumped athermal lasers, giving ultra compact and low power consumption solutions. They are suited to land platform applications and are easily integrated in optronics payload or firing control system. CILAS’ rangefinders are eye safe and provide long range and accurate distance performances. More than 8000 models have been operated by major defense forces worldwide. In particular, CV 90 and AMX 10 RCR are fitted with a CILAS’ rangefinder.

**Sight detection and active imaging**

CILAS’ Laser Sniper Detectors (SLD) embed 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. Laser Sniper Detection products can be integrated in vehicle, providing sight detection information to the battle management system.

CILAS is also developing active imaging to allow observation by armored vehicles’ crews in bad weather conditions and improve identification. This function is designed as well to help drivers by giving them a better perception of the environment.

**Contact:**

Jean-Christophe Dias  
8 avenue Buffon - CS 16319 - 45063 Orléans Cedex 2  
Tel.: +33 (0)2 38 64 41 26 - Mail: dias@cilas.com  
Website: www.cilas.com

**Contact:**

Eric RICHAUD  
43 rue Michel Carré - 95100 Argenteuil - France  
Tel.: +33 (0)1 39 98 44 44 - Mail: sales@elno.fr  
Website: www.elno.fr
ENAG

Designers and manufacturers of power electronics equipment for severe environments, ENAG offer on-board and ground products adapted to customer requirements.

Based on customer specifications, ENAG design, qualify and manufacture complex and rugged equipment to supply AC & DC power to on board military systems such as weapons systems, communication…

The Energy Systems developed by ENAG include battery chargers, DC/DC or DC/AC converters and distribution boxes using the alternator of the vehicle as a power source. Our sales team, R&D, production, quality and service assist our customers during the different phases of their projects, from the initial design through to qualification and commissioning.

At ENAG, we are equipped with all the necessary resources in house to design and manufacture our products while ensuring our reactivity and control

- **Research and development:** Mechanical and electronic CAD, mechanical and thermal simulation tools,
- **Production:** Electronic assembly, cable harnessing, mechanical welding, machine shop, vacuum pressured impregnation, paint booth,
- **Test:** Test benches and burn in equipment, electrical test, climatic chambers, Faraday cage, electric supplies up to 350kVA, variable load bank 2 x 300 kW

The products designed by ENAG meet Army requirements and respect the applicable standards (MIL STD…, EG13….) and especially EMC standards (MIL STD 461…).

Contact: Denise BARRY / Thierry CORNIC
31 rue Marcel Paul - Z.I. Kerdroniou est - 29000 Quimper - France
Tel.: +33 (0)2 98 55 51 99 - Mail: dba@enag.fr / tco@enag.fr
Website: www.enag.fr

EXAVISION

For over 25 years, EXAVISION has been and remains a leading supplier of complex optronic solutions dedicated to military fields: ground army, navy, special commandos...

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

Thanks to its high level of knowledge and competence in mechatronics, optronics and digital image processing, EXAVISION has developed bespoke optronic solutions integrated into global product lines including

- **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,**
- **Non lethal effectors** (strobe light and laser illuminators, Long Range Acoustic Device…).

Adapted from elementary qualified blocks, EXAVISION observation, surveillance and protection solutions comply with all technical and environmental specifications for Multi Role Armoured Vehicle (MRAV). EXAVISION systems are already field proven on military theatres of operations.

Our product range is based on:

- **OMNICAM surveillance turret:** smart rugged and compact turret with visible and thermal cameras
- **CAMEZOOM and CAMIR** discrete cameras, for day and night observation,
- **DIGISCOPE 360:** 5 to 7 colour cameras for MRAV proximity surveillance and protection
- **NEYE’s-CAR:** integration of fully passive very low light or uncooled cameras for totally covert night driving assistance, without any lighting system.

Contact: Loïc HIMMESOETE - Defence Business Manager
ZAC Trajectoire - # Avenue Ernest Boffa - 30540 MILHAUD
Tel.: +33 (0)4 66 74 66 00 - Mail: info@exavision.com
Website: www.exavision.com
MPCV, Multi Purpose Combat Vehicle

MPCV, 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 defence 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.

MMP on vehicles

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 a light remote-controlled 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).

LACROIX

Self protection for all ranges of vehicles.

The Etienne Lacroix Group is an innovative manufacturer of countermeasure systems and ammunition to meet land vehicles’ requirements for vehicle survivability

GALIX Launchers and Ammunition

Lacroix, in cooperation with Nexter Munitions, develops, manufactures and installs Galix systems, a passive close-range self-protection solution for various types of land vehicles, ranging from light unarmoured vehicles to MBT. This systems consist of launchers and wide range of armament: unrivalled multiband smoke screening, crowd control, AP effect in close area protection around, training ...

Self-Protection Systems

Lacroix also provides complete solutions, including threat detection, situation analysis and appropriate reaction to defeat the threat. Various modes can be implemented: fully manual or automatic, stand alone or fully integrated, single use or integrated in a communication network, and retrofitting to various types of vehicles or direct integration.

Proven Effectiveness

Used in numerous countries, these solutions are employed in the latest theaters of operation and on various types of vehicles.

Contact: Thierry de Guillebon
Route de Gaudiès - 09270 MAZERES (France)
Tel.: +33 561 677 929 - Mobile: +33 615 919 920
Mail: thierry.deguillebon@etienne-lacroix.com
Website: www.lacroix-defense.com

MBDA

The European missile systems reference company.

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- Through the use of a special bracket to adapt infantry firing posts on all types of vehicles (armoured or not).

Contact: Thierry Dehouve
1 avenue Réaumur - 92358 Le Plessis-Robinson - cedex France
Tel.: +33 1 71 54 11 06 - Mobile: +33 6 74 82 95 55
Mail: thierry.dehouve@mbda-systems.com
Website: www.mbda-systems.com

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Contact: Thierry Dehouve
1 avenue Réaumur - 92358 Le Plessis-Robinson - cedex France
Tel.: +33 1 71 54 11 06 - Mobile: +33 6 74 82 95 55
Mail: thierry.dehouve@mbda-systems.com
Website: www.mbda-systems.com

PILAR Gunshot Detection System instantly detects and efficiently locates shots from small and medium calibre weapons and RPGs. PILAR is a full passive device providing real time threat detection, identification and localization. This efficient protection drastically increases survivability of vehicle and its crew. Information is provided to the BMS, RWS terminal or to a specific PILAR display.

Threat discrimination and precise target designation provided by PILAR enhances full situation awareness, immediate reaction and efficient return fire (slew-to-cue capacity of RWS). Perfectly adapted for MRAV protection, PILAR can be used on stationary and moving vehicles in all terrains. Compact and ruggedized, PILAR can be provided as an integrated solution or as a standalone mission kit quickly deployable. PILAR is a polyvalent system covering all mission profiles of modern multi role armored vehicles

Vehicle and troops protection in combat or reconnaissance missions, self-protection of troops during stationary missions (base camp, check point protection, camp mine clearance…), convoy protection against asymmetrical threats in a hostile area…

Further to the successful deployment on the VAB vehicles of the French Armed Forces in several operational theaters, PILAR has been selected to equip EBM2 - the latest generation of MRAV delivered in the frame of the SCORPION program.

Testimonial from General Charles Beaudouin, Director of STAT (French Army technical division)

“The PILAR system has shown its worth in operational situations, proving to be an essential threat sensor that should be fitted on all modern armored vehicles. This battle proven detector is very easy to couple with a Remote Weapon Station, enabling quick slew-to-cue. The information provided by the PILAR system can be automatically transmitted to other units by the armored vehicle’s information system. It is for these reasons that the PILAR system has won the admiration and confidence of French armored vehicle crews in theaters of operation.”

Since 20 years, METRAVIB Gunshot Detection Systems (also in its individual soldier, ground and helicopter versions) are protecting lives of soldiers of more than 25 countries. METRAVIB Gunshot Detection Systems have been deployed in Afghanistan with 8 NATO Armies. They have also been used during international operations in Iraq, Mali and Central African Republic.

Contact: Celine CARASSIO (Defense Assistant)
200, Chemin des Ormeaux - 69760 Limonest
Tel: +33 4 72 52 48 00 - Mail: celine.carassio@acoemgroup.com
Website: www.metravib.com

The heir of centuries of armoured vehicles design, development and manufacture.

Today, Nexter offers a complete and modern range of armoured vehicles, from the VBCI (armoured infantry combat vehicle), to the ARAVIS®, and the latest addition to the range, TITUS®.

The references of the Nexter range:
• VBCI: an 8x8 armoured vehicle, available in several configurations
• TITUS®: a 6x6 armoured vehicle dedicated to troop transport, combat support and logistical support in low- and high-intensity environments
• ARAVIS®: a 4x4 armoured vehicle with a high level of protection

Nexter develops its systems in order to broaden the scope of their missions, to adapt them to new threats and to benefit from feedback from the field that can improve them.

The VBCI, which has been already deployed in various theatres of operations, and in particular with the French Army, has benefited from recent technologies and an increase in its main capacities in terms of mobility, protection, ease of use and the fire function.

The version unveiled in 2015, called the VBCI-2, is equipped with the 40 CTA turret. Nexter is also developing an Internal Security version of TITUS®, a multi-function armoured vehicle offering exceptional mobility. This version meets the increasing need for protection and mobility in urban environments.

Finally, ARAVIS®, a 4x4 armoured vehicle designed to protect the crew against all types of threats, including IEDs, has been used in Afghanistan by the French Army and is currently deployed by the Gabonese armed forces in Central African Republic as part of the MINUSCA mission. The various configurations (SWAT, combat engineering, observation and fire support) enable this vehicle to accomplish various types of missions.

Contact: Nexter Systems
13 route de la Mineure - 78034 Versailles Cedex
Tel: +33(0)1 30 97 37 37 - Fax: +33(0)1 30 97 39 78
Website: www.nexter-group.fr
Since 1991, Nuances Technologies has been designing systems intended to control, simulate, detect, jam, block or locate any type of wireless communication.

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 of 32 different types have been equipped with our jamming systems. Our solutions can be adapted to any type of vehicle thanks to integration kits specifically designed by our teams.

**Capabilities**
- RCIED active/reactive/hybrid jamming
- Communications jamming
- Convoy protection
- Self-protection
- Route clearance protection
- Crowd control
- Collection of information

**Features**
- Available frequency ranges: 20MHz to 6GHz
- Specific frequencies upon request
- Total available power: 5 to 1000W
- High-performance arbitrary waveform generator
- MIL STD 461/MIL STD 810F
- Adaptation to the emergence of new threats

**Services**
- Drafting/analysis of specifications
- Specific design
- Integration
- Simulation
- HERF measures
- Efficiency measures
- Training
- Maintenance

**NUANCES TECHNOLOGIES**
Advanced ECM solutions against RCIEDs – battle-proven equipment.

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**PEWAG**
Defence and security, naturally from pewag.

**Your partner for lifting, lashing and traction chains**

Pewag’s Mission Statement expresses the goals of our actions as follows:

- Because of our joy and determination to innovate, we at pewag strive to manufacture the world’s best products wherever we compete today and in the future. The high quality of our products and services, as well as the passionate performance of our employees are our biggest assets to reach excellence and total customer satisfaction.

**The latest technologies for difficult missions:**

- For many years pewag has been a leading supplier for numerous military forces.

**Now as a technology leader we offer innovative, reliable and proven solutions for the most difficult applications:**

- The field in defense and security comprises: traction chains from light up to heavy armored vehicles.
- Lashing and lifting points as well as lashing and lifting chains for a safe transport on a low bet trailer - on railway - during convey by ship - or during an air transport.

For the safety and security of your staff and your equipment.

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Contact: Nuances Technologies  
92, avenue de Wagram - 75017 PARIS  
Tel.: +33 (0)1.80.06.80.70 - Mail: info@nuances.fr  
Website: www.nuances.fr

Contact: PEWAG France s.a.s  
3, rue des tropiques - 38130 Echirolles  
Tel.: +33 04 76 96 41 50 - Mail: pewag@pewag.fr  
Website: www.pewag.fr
PRONERGY brings its experience by configuring a complete electric system answering your needs.

Automation
- Rugged Ethernet Switch PSW-D is a compact high-performance Ethernet switch designed for use in military combat vehicles. The unit has 24 copper Gigabit ports and 4 fibre-optic 10G ports. Manageable Layer 2 and 3 for routing and security functions.

Power Converter
- Rugged Power Converter Equipment are designed for harsh environments (temperature, vibrations, etc.), fully waterproof IP65, integrated bus interface for merging with customer energy management system.
- Units include power filters, overvoltage/transient protection and output current limitations functions.
- Typical products: DC/DC converters, battery charger, UPS, AC/DC power supply, DC/AC inverter, filters...

Integration
- Mastering engineering allows to design equipments meeting all requests with harsh environments, technicity and performance. Through quality management certified EN 9100, PRONERGY offers all step from study to realization via prototyping and qualification.

Power Storage
- Store and release energy is an essential function for electrical systems. PRONERGY build custom battery packs, BMS, supercapacitor rack and operate in research and development for new batteries technology.
- Products meet military standard MIL-STD-1275, MIL-STD-461, MIL-STD-810, STANAG and environmental conditions RoHS, REACH.

Contact: EECKEMAN Florian
12 Bis Avenue des Tropiques - 91940 Les Ulis - France
Tel: +33(0) 1 69 19 43 03 - Mail: f.eeckeman@pronergy.com
Website: www.pronergy-aero.com
STARTER

Military Winches and Engineering.

Starter is a French manufacturer of winches for trucks and vehicles, including armored and special vehicles. Established in 1971, Starter has developed a range of high level recovery winches dedicated to military applications that are used around the world.

STARTER’s military winches

Our range of electric and hydraulic winches for difficult environments have forces ranging from 0 tons to 70 tons and can be mounted on the side, rear, front, inside the chassis and behind the cabin of the vehicle.

- Front mount: Electric & Hydraulic 0 to 10 kN
- Side mount: Hydraulic 6 to 20 kN
- Rear cabin mount: Hydraulic 6 to 30 kN
- Twin winches: Hydraulic 10 to 50 kN
- Rear mount: Electric & Hydraulic 0 to 10 kN

STARTER’s engineering know-how

Our design department lies in the deep knowledge of the military automotive industry. Our manufacturing know-how is based on our long experience in welding mechanics and hydraulic, air and electric power so that every component used in our production is mastered, proven and certified.

Winch designed for military applications

Our winches are also developed to be used in difficult environments and are equipped with heavy-duty protection for shock, sealing and electromagnetic interference. Furthermore their simple design and compact structure make them easy to maintain and cost effective.

Services from dedicated engineers

This also includes mounting, training and after-sales, with a spare parts policy based on reliability and availability. From solution design to maintenance through mock-up and setting, our team offers full support to your project. Our dedicated engineers can work side by side with our customers anywhere in the globe.

Contact: M, Marc MEZERETTE
5, Avenue du Vert Galant - 95310 Saint-Ouen-l’Aumône
Tel: +33 1 39 09 19 19 - Mail: marc.mezerette@groupedld.com
Website: www.starterwinches.com

SYSNAV

Navigation and Geopositioning Equipments for GPS-denied conditions - Blue & Red force Tracking.

Red force tracking (RFT)

To give military intelligence a decisive advantage to face counter-measures:
- A discreet and stand-alone beacon to enhance your situation awareness and control at all times.
- Can track vehicles in real time or discreetly store the data and forward them afterwards at programmable times.
- Communications control to keep you undetectable: all communications to and from the beacon can be controlled and programmed.
- Multiple alerts to be scheduled and customized.
- Sysnav smart power® to extend the battery life.

Blue force tracking (BFT)

To equip all your light vehicles with a high-performance inertial system:
- Robust to extreme situations: extended loss and jamming of the GPS signal, GPS-spoofing attempt, lack of communication infrastructure, high temperatures, etc.
- A fully miniaturized, autonomous, plug & play system to quickly equip new vehicles or retrofit existing ones.
- Can connect to the vehicle data to enhance even more its capabilities.
- Can interface easily with comprehensive command and control centers.
- Highly secure encrypted data transmission.

Contact: SYSNAV
57, rue de Montigny - 27200 Vernon
Tel: +33 (0)2 78 77 03 46 - Mail: contact@sysnav.com
Website: www.sysnav.com
Our systems of tire pressure monitoring and adjustment while travelling allow a lot of benefits for military application.

The primary application is to improve the mobility and liaison on the ground, optimizing the contact surface of the tire according to:

- The terrain surface (road, sand, field, track, mud, …)
- The vehicle’s speed
- The vehicle weight and payload

More than 70,000 special valves are currently in service on all continents.

They improve vehicle mobility:

- Progression through difficult terrain
- Crossing soft soil (sand dunes, wetlands, …)
- Limits skidding

They enhanced security and comfort with the:

- Detection and compensation of punctures in-motion
- Reduces risk of burst
- Lessens shock & vibrations

To meet requirements of vehicle manufacturers, we are certified ISO 9001, ISO 14001, OHSAS 18001 and ISO / TS 16949. Each Téléflow product is designed in-house, assembled and individually tested before shipment. Téléflow systems are installed as original equipment on the assembly line of the world’s greatest vehicle manufacturers.

Each Téléflow system has unique advantages provided by its patented valves which can be customized for each vehicle. The positive piloted Multifunction valve design ensures quick adjustment pressures and operation in the harshest conditions.

Central tire inflation system (C.T.I.S).

TELEFLOW

Drawing on decades of military experience serving the French Army, Texelis designs and manufactures complete systems that provide outstanding compactness, robustness and adaptability for off-road conditions.

Texelis is a 70 year old company that specializes in transmission solutions for heavy duty applications.

Part of Renault Trucks until it became independent in 2009, Texelis is made up of 280 engineers, mechanics and support staff whose goal is to deliver innovative, value for money transmission solutions, particularly for volumes between 50 and 3000 units per year.

Texelis has developed new generations of rigid and independent suspension axles. Cost-effective, compact modular system with an extremely wide range of application, these axles are an example of Texelis’ original, high performance solutions for the most demanding vehicles.

With its own R&D team, machining, heat treatment facilities and assembly lines and in house test center, Texelis is one of the few specialist transmission companies that can offer a completely customized, full service solution from concept to long term aftersales support.

Texelis can also provide completely engineered “plug and drive” systems, from wheel to steering wheel, including suspension and frame attachments.

Contact: Paul GERMOND
405 route de Briennon - 42300 Mably - France
Tel: 04 77 70 71 73 - Mail: paul.germond@teleflow.net
Website: www.teleflow.net

Contact: Damien DELANNOY
72 route du Palais - 87000 Limoges
Tel: +33 (0)5 55 11 70 00 - Mail: contact@texelis.com
Website: www.texelis.com

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THALES

An open innovative vehicle electronic architecture.

Land environment is becoming ever more complex, with rapidly evolving threat as well as an increase of electronics in vehicle for improved operational capabilities (protection, mobility, combat, Command & control).

In this context, the concept of Multi-Role Armoured Vehicle is essential in modernisation of land forces. By delivering a state of the art open vehicle electronic architecture (Vsys-Net) designed to optimise integration of all vehicle electronic equipment, Thales bring the mandatory adaptability and agility to the development of multi-role platform. A common platform may be deployed in various variants (command post, reconnaissance, fire support, ... ) by integration of different kits of electronic sensors/effectors.

Vsys-Net addresses these challenges

• Common, platform agnostic, vehicle electronic architecture for a wide spectrum of missions.
• A vehicle IT infrastructure, based on NATO GVA Standard, optimizing integration of on-board electronic equipment (sensors/effectors).
• Operational value creation from the data collected while feeding crew members applications with critical information.
• Modularity and flexibility to meet rapidly changing requirements.
• Computerized power management & distribution system, optimized mission efficiency with innovative hybrid-energy solution (DYON).

Upgrade modular solutions and through-life cycle support

• Platform modernization (in partnership with a platform manufacturer): engines and drive lines, armour, anti-blast seats, tracks, energy hybridation.
• Support: training, maintenance, technical assistance, supply chain management.

With direct operational benefits

• Optimized crew utility (common multi-function displays, re-rolling capability)
• Enhanced survivability and reduced collateral damage (through better local & extended Situational Awareness, correlation & dissemination of critical information, target allocation).
• Improved tempo and co-ordination (sharing of information within the vehicle and through the battlefield).
• Increased crew space within the vehicle (fewer boxes & displays, far less cabling).
• Comprehensive support solutions to ensure availability, operational performance & scalability.

UNAC

Hydrostatic vehicle creator.

UNAC is manufacturer of hydrostatic vehicles in small and medium series. The particularity of UNAC is to design tailor-made products from a particular specifications written by the customer.

• UNAC knowledge in military product is constantly improving for more than 30 years thanks to the range of vehicles used in the French Land forces.
• UNAC builds multifunction engineering vehicles with many functions: earthworks, ground stripping, snow removal, road clearance, laying mats for mobility improvement.
• UNAC develops for each function, different tools: bucket, blade, mats laying system, backhoe, and specific railway tool.
• UNAC is also able to develop high technology vehicles like the bulldozer TNA which can be airdropped by a C130, C160 or A400M. For all of its products, UNAC is able to provide all the support to the user in operational conditions: User Technical Documentation, e-learning, training, Integrated Logistic Support.
• UNAC is also able to armor its vehicles according to STANAG 4569. This additional armour can be included in the vehicle or removable. The removable kits can be assembled by the user in less than two hours.

On duty vehicles

TNA: the TNA is an airdropable bulldozer of 6.3 tons, used by the Parachutist Engineering Regiment. Its main missions are: preparation and improvement of airport platforms (levelling, snow-removal, mulching, etc.) to allow air plane landing and take-off, the opening and basic landscaping of access roads, removal of obstacles on the runway, creation or restoration lanes for recovering loads. It also has a backhoe.

EGAME: EGAME is a multi-purpose wheeled earth mover. Its main missions are earthworks, grading, urban combat including barricade destruction. With its tools it can also remove snow and lay mats for mobility improvement on sand or mud.

EGAME for Police Forces: police forces have also their own EGAME. This one allows to maintain crowd, it is fire-resistant and dispose of specific options.

20TRR: the 20TRR is a high-capacity road-rail excavator which can perform earthwork tasks directly from a railroad track with great freedom of movement and with a large lifting capacity. Delivered with its tools, it permits to build or repair a railway network during an operation.

160C: the 160C is a mulching forestry vehicle which permits to make forestry clearing and others works.

Contact: Benjamin ESPANA
21 - Av. de Camargue - CS 42004 - 30110 VERGEZE
Tel: +33(4) 66 35 02 53 - Mail: benjamin.espana@unac.fr
Website: www.unac.fr

Contact: Laurent LETELLIER
4 avenue des Louvresses 92622 Gennevilliers
Tel: +33 1 46 13 26 53 - Mail laurent.letellier@thalesgroup.com
Website: www.thalesgroup.com
GICAT (French Land and Air-land Defence and Security Industry Association) is a professional organization established in 1978 grouping over 200 French companies, including the main industrial prime contractors, equipment suppliers, system integrators and a network of dynamic and innovative SMEs.

These companies, which have a diverse range of activities (industrial contractors, consultancy and service providers, as well as clusters and research institutes), offer the full range of skill and know-how adapted to the operational requirements of the land and Air-land Defence and Security sector.

GICAT’s international development is based on the Eurosatory international trade show, organized by its subsidiary COGES, and mainstream defence and/or security trade shows abroad.