

# ARTEM

## Defence

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ARTEM Defence is the free newsletter provided by ARTEM INFORMATION & STRATEGIES, A FRENCH CONSULTANCY COMPANY specialised in analysing Defence and Security markets. It is not a journal nor a surveillance report but a zoom on some important subjects concerning current Defence news, in correspondence with the activities of our company.

This No 10 issue of our Newsletter is dedicated to the three main exhibitions of the fall, i.e MSPO in Poland, DEFENDORY in Athens and AUSA in Washington as well as to the impressive tests of the PILAR by 01dB-Metravib, that have recently been carried out. Our teams were of course on the terrain once again to complete our industrial panorama in the domain of Defense and Security, to identify new systems and further enrich our data bases regarding fleets of equipment and market perspectives. As one of our main clients (whose name we will not mention but that will recognize itself ) likes to underline, ARTEM-IS does all it can to get closer to the news whether through meetings, with the men in the field, industrialists or State staff. Exhibitions along with dynamic demonstrations and exercises remain privileged moments for this type of encounters. And here are a few words on what we have observed ...

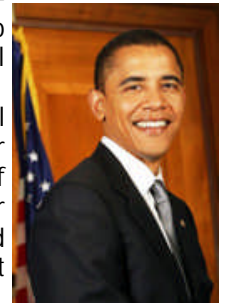
Patrick Cansell

### A « New Deal » for U.S. armed forces ?



The presidential elections have focalized the attention of the media on the United States and the enthusiastic election of Barack Obama indeed opens large perspectives at the level of international relations. The AUSA 2008 exhibition, which was held one month prior to the elections, had de facto this in particular in that it was the last exhibition of the G.W. Bush era and henceforth the last exhibition before the inexorable re-designing of the programmes and budgets for US Defence, linked to the questioning of the American strategy, to the operational engagements, and to the economical crisis.

This is certainly why the AUSA exhibition cannot be ignored in the fall of 2009! Occurring every year, alternatively with the AUSA Winter Session (more dedicated to the reflections and decisions of programmes) which is held at Fort Lauderdale in Florida, it is however exclusively dedicated to programmes and projects of the US Armed Forces and to proposed products and prototypes. It therefore does not represent a window on the Defense and Security technologies at the worldwide level, a role that is held by an exhibition like Eurosatory (largest in the world in the domain with 1,210 exhibitors from 53 countries). So why go to AUSA ? AUSA is indeed a technical/operational crossroad where are mingled the return from experience from Irak and Afghanistan and the know-how and technologies from the world industrial leaders. The first are inscribed in the 'short term' in



Source : US Senate

### Salon AUSA 2008



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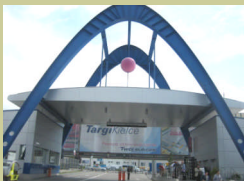
the form of needs and requirements regarding the evolution of equipments and the adjustment of new systems. Facing these stakes and ambitions is an impressive array of solutions and technologies that go from the turn-key kit 'systems' that can be immediately deployed, to Star Wars type high tech solutions. The profusion of small innovative companies and 'young' Defence subsidiaries of industrial groups mainly anchored in the civil domain that came to light with the explosion of the DoD budgets forces the traditional actors (BAE, Boeing, General Dynamics, L3, Lockheed Martin, Raytheon, Textron, etc.) to innovate or to find the best solutions of the market including via foreign partners (which is recent phenomena that is to be underlined). AUSA is de facto to be considered as the heartbeat of the world armament market, that gives the rhythm and the main orientations in terms of development of large systems as well as the expression of new utilization doctrines.

... to be continued p.4

#### - Coverage of the exhibitions by ARTEM team-



MSPO  
(Poland)  
8-11 sept. 2008



DEFENDORY  
(Greece)  
7-11 oct. 2008



AUSA  
(USA)  
6-8 oct. 2008



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## The PILAR METRAVIB : Firing Acoustic Detection Demonstration at La Valbonne - French military camp by Patrick CANSSELL and Florence DUPASQUIER - ARTEM-IS

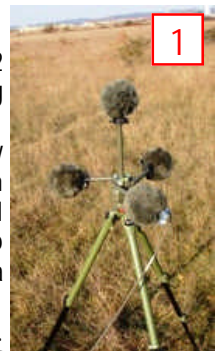


We had already quickly mentioned the products of 01dB-METRAVIB, French company of very high technologies specialized in the acoustic domain, in one of our previous newsletters. On the 14th November, ARTEM-IS was the only 'media' invited to the tests carried out by the technical teams of METRAVIB on one of the firing ranges of the La Valbonne military camp. To be noted is that historically the competences of this company of more than 300 employees, located in the Lyons region, go back to the time of the requirements for the reduction of vibrations and control of materials used on the first French submarine programmes, where very high precision skills are mandatory. Through the years, 01db-METRAVIB has managed to diversify and its sophisticated solutions in measurement and monitoring are found in large companies worldwide (Michelin, Intel, Corning, Caterpillar, Technip, DCNS and many others). As a company largely dedicated to export, it is provided with a Defence division which of course mainly relies on the acoustics skills. Its main product is the PILAR which is the most advanced acoustic firing detection system on the market, whose international references would be the envy of the largest French defence groups !

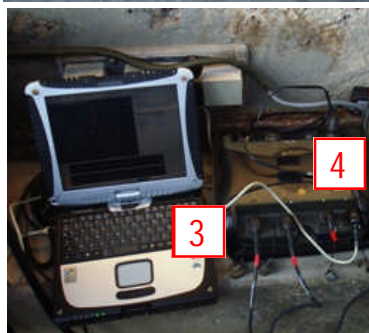


2 Under enemy fire !

The tests carried out on 14th November served to evaluate 2 configurations : a zone protection configuration (static) ; a moving vehicle protection configuration (dynamic). The threat is an ambushed shooter with several types of infantry weapons. The reception station of the PILAR [1] is connected to an optronic observation turret piloted by the PIVOT [2], the control system of a disembarked sensor developed by METRAVIB. Two PILAR detection systems distant by 100 to 200 metres, make up a protection line having a coverage of more than 300 x 2,000 m. ! The shooter opens fire in different configurations (see next page). The monitoring system serves to systematically identify the origin of all the detected shots (the system will also indicate the shots fired on another firing range at a distance of several kilometers) or filter on 'offensive shots' aimed at the zone covered the PILAR(s) deployed. Immediately, in less than 2 seconds, the trajectory of the firing is identified. This capability alone could answer the No. 1 problem met by forces deployed in overseas operations : identify the origin of the shots so as to be able to protect oneself or to deal with the aggressor (trajectory in red on the station screen [5]).



1



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But the system does more : one PILAR and its monitoring station triangulates the position of origin of the shot and gives its GPS coordinates ! In order to respond to the specifications of a customer, there are 2 PILARs used in tandem to simulate perimetric coverage. The result of the two triangulations (yellow lines [5]) appears on the monitoring screen [3] : here, a ruggedised PC equipped with the Shootguard software, completed by a DIAM external calculation module [4]). The system provides the user with all the following data : azimuth, elevation, distance, and GPS coordinates of the point of origin. Automatically thanks to PIVOT the optical turret is slaved to the point of departure of the firing [6]. The shooter is now easily identifiable. Even if the shooter has a very effective camouflage, a thermal optical sight will serve to detect the muzzle blast of the second shot (the first shot having served to give the alert and to aim the sight on the point of departure of the first shot). The DIAM and the monitoring sensor will soon be integrated into a single compact system.



5



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### A decisive advantage !

The PILAR has a trump card : while other solutions on the market require the Mach wave, propagated by the projectile, the PILAR also analyses the muzzle wave generated only by the detonation, even when it is deafened by a silencer or other hand made devices. So there are 2 data that are taken into account by the same device, which substantially increases the precision of the PILAR and serves to detect subsonic threats.

### An « exhaustive » system

In case a multiple shots of various origins, PILAR carries out a filtering (that can be parametered) in function of the caliber and the importance of the signal as obviously it can only deal simultaneously with a limited amount of shots. However, all are recorded and, in the absolute, could be processed by disembarked computer (within a command

post for example) to indicate all the positions of the enemy fires. Without forgetting that these recordings can be used, in case of litigation, as justification for firing back, which is very appreciated by the anglo-saxon customers of METRAVIB.

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The threat : ambush, sharpshooter, etc.

Within the framework of the demonstration of 14th November, it was a professional that opened fire on the test teams and potential customers of 01db-Metravib : Patrick JOUGIT, from the Humbert company, French subsidiary of the BERETTA group. Each time equipped with Sig Sauer 552 Commando assault rifle [1] then with the TIKKA T3 Tactical rifle, precision rifle that fires 7.62mm x 51 rounds and specially equips the National Gendarmerie and several GIPN forces [2], our shooter simulated many configurations: burst firing and shot by shot firing with his assault rifle, remaining static and then moving, and lastly isolated shots from a covered position. Systematically, PILAR records the shots and gives indications which are highly accurate as regards the trajectory of the shot and point of origin. The shooter is spotted for all the shots.



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### PILAR installed on a moving vehicle

The second phase of the test was dedicated to a sequence of shot detections from a moving vehicle. PILAR is here fixed on the roof of the test vehicle by a magnetic attachment device that bears 90 km/h [3]. In most cases, specially when dealing with armoured vehicles engaged in overseas operations, the system is bolted to the roof or anchored using pre-existing attachments. The firing sequence starts. It is astonishing to observe that when the vehicle moves [4], the ambient noise (although moderate given the type of test vehicle) totally covers the noise of the detonation. It is PILAR that gives the alert. Immediately, the monitoring screen indicates the origin of the shot [5]. The driver



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can then choose from several options, like getting out of the danger zone as quickly as possible (in the case of a VIP escort or convoy). The origin axis of the shot is clearly indicated. A visual or audio warning can complete the set-up.

To be noted is that the system can be connected to a NAVKIT, a solution that groups an inertial system unit and a GPS which is adjoined to the PILAR to optimize the analysis of the detected shots and to take into account the movements of the vehicle, including cross-country. [6]. Here, we are dealing with an old version as the version undergoing finalization is much more compact. This set-up is mandatory if one wants to obtain the same level of detail as for a PILAR installed on a tripod or installed on a static vehicle, positioned for observation.



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Source : METRAVIB

### « Catching the bad guys equates to saving lives »

(extract from a witnessing of the US Army after the first deployments of PILARs in overseas operations and their successful use in combat situation)

PILAR not only enables, after a few days of training, to identify the origin of the hostile fires, but also their nature : the system is capable of identifying with an accuracy above 90% if the weapon used has a caliber of more the 7.62 mm. It also serves to take into account RPG shots (contrary to systems that only capture Mach waves as the RPG rocket is subsonic), mortar fires (at a long distance, only the trajectory is identified, which is already an indication of the first level) and medium or higher caliber cannon munitions (although operationally this is not a priority, specially during asymmetric engagements).

It is more than probable that PILAR, successfully deployed in overseas operations by the Belgian, Polish, German, American, and British, etc. armies will soon be on the list of equipment procured urgently for the French Forces deployed in Afghanistan. Short term evolutions will serve to couple PILAR to portable observation systems and even to BMS (battlefield management systems) thereby enabling the transmission of enemy coordinates in next to real time including during ambushes (a computer could produce 3D images of enemy positions using the recordings carried out by PILAR and integrate them to a dynamic battlefield map !). This would make the system all the more mandatory, on a large scale, including in individual equipment, whilst the basic version, already deployed by allied forces , 'saves lives' every day.



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## A « New Deal » for U.S. armed forces ? (continued from p.1)

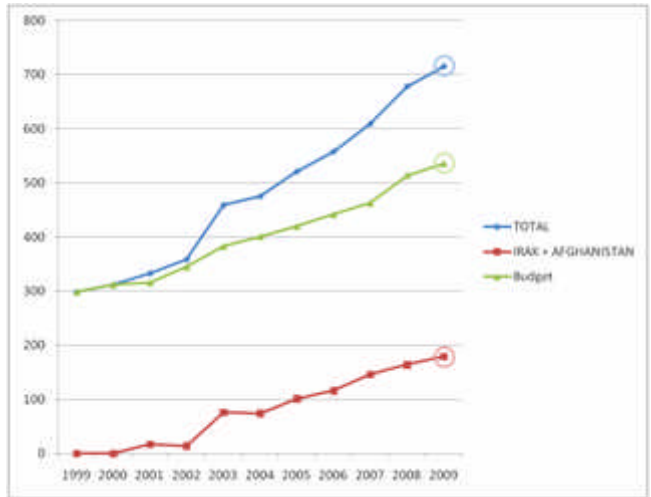


With this in mind, the election of Barack Obama is to be considered as a second 'tempo', imposed by the future 'POTUS' to US defence programmes. To be noted is that the margin of maneuver of the 44th US President is in absolute terms considerable.

- the overseas operations represent more than 100 billion US\$ each year (the 'Operations and Maintenance' budget now represents close to 180 billion US\$), of which not even 5% are dedicated to the Afghan theatre.

- the 'Procurement' budget represents roughly 100 billion US\$. Among the key programmes one has :
- the anti-missile shield (close to 9 billion US \$ per year for a global budget estimated at 247 billion between 2006 and 2024),
- the JSF (F-35 Lightning) programme, whose global budget has become heavier to go beyond 300 billion US\$,
- the F-22 Raptor programme, which would cost 'only' 70 to 80 billion but for a reduced number of machines: 183 (i.e. ten times less than the JSF programme target),
- the FCS programme, whose global cost will reach 170 billion for the life duration of the project , of which 22.4 for 2008-2011, with new platforms expected in 2014,
- the DDG 1000 Zumwalt (ex-DD(X) and DD21) programme, that was to initially enable the production of 24 new generation destroyers and for which the target has been over the years reduced to 3 units to the profit of more conventional or affordable platforms, and the LCS programme, for a global budget now estimated at 29 billion US\$ for two ordered ships! The cost of the unit ordered this summer is close to 3.3 billion US\$.

Budget's evolution of U.S. Defence 1999-2009  
(ARTEM-IS - sources : congres US, Arms Control Org., presse US)



DDG1000 - USS ZUMWALT  
(source : US NAVY)

Several programmes are mentioned as potential targets for severe cuts that the American administration is expected to operate in the US Defence budget: according to American analysts, the F-35, the anti-missile shield and even FCS are questioned, i.e. a small amount : 20 billion US\$ per year.



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Furthermore, the displayed wish to pull out of Iraq would enable a further lightening of expenses of several tens of billion US\$ per year (part of the means and budgets being probably re-allocated to the Afghan theatre). But careful: first, one must caution against announcement effects and also President Obama will no longer be the 'candidate' Obama.

However, we are orientating towards a 'new deal' ending certain programmes (financially exorbitant and totally inappropriate to present and future stakes) and redefining the

### A first battery of CAESARs soon in Afghanistan ?



"Always audacious" ! Just after having arrived in the French Army in July 2008, the CAESAR, produced by the French company Nexter, was reviewed at the military camp of La Valbonne, located next to Lyons, by the French Land Forces Chief of Staff (CEMAT), General Elrick Irastorza, last October 2nd. If the Army users praise the mobility of this 155 mm gun, the CEMAT see more specifically in CAESAR (34 of which should be in service in 2009), fire power and the additional range required to provide fire support needed by the troops deployed by France in overseas operations.



CAESAR at Canjuers  
(© Patrick Cansell)

It is the 68th artillery regiment of Africa (68th RAA) of La Valbonne that is the first regiment to receive CAESAR. It is scheduled in the short term that this regiment be brought to deploy a battery of CAESARs in Afghanistan. Such a deployment would enable the French soldiers to be provided with rapidly available fire support, with considerable range and unique accuracy for an artillery piece. To be reminded is that the Dutch self-propelled howitzer PzH 2000 has been deployed in Afghanistan since 2006 and that it benefits from new Rheinmetall RH40 (DM131) ammunition that also enable long range high accuracy fires.



PZH-2000 NL (source web)



## MEGGITT BADGER I and II : and why not a Badger III UGV engaged in a (competitive) war of robots?



If the first drones were developed on the basis of flying targets, most of the actors of military land robotics from demining robotics (machines dedicated to the destruction of suspect parcels) or from the surveillance of dangerous areas (nuclear power stations for example). These skills required the control at short range of machines that are frequently slow, not very mobile, or the pre-recording of simple repetitive routes.



(source : Urban Challenge)



MIT proceeds safely through a 4-way

The case of the United States is very specific : events like the 'challenges' of DARPA in the Mojave desert for the first sessions (Darpa Grand Challenge 2004 and

2005), and then in urban surroundings (Urban Challenge 2007) gather for several years now autonomous land machines developed by joint university and industrial teams. The solutions presented are based on civil vehicles and are not only equipped with a large array of sensors (3D radar, embarked cameras, etc.) but also with avant garde data and artificial intelligence systems. These solutions however remain very 'upstream' and are far from reaching theatres of operation.

Not surprisingly, companies having developed mobile land firing training systems via remotely controlled platforms have 'jumped on the waggon' of the UGVs. Let's take for example the BADGER solutions developed by Meggitt Training Systems Canada, subsidiary of the British group MEGGITT that employs 8,000 personnel worldwide. The Badgers have this in particular in that they are protected against 7.62 mm rounds. With their Soviet profile from the fifties, they serve for exercises and evaluations of anti-tank missiles, cannon systems, by pulling dummy tanks. The technologies implemented for the BADGER I and II enable control via radio frequency, with a range in the order of 10 km, a platform autonomy of six to eight hours for a maximum speed of 40 km/h.

Recently, MEGGITT has positioned its BADGER for reconnaissance missions which as the person we met at AUSA 2008 qualified as 'alternative'. Indeed, the BADGER can be entrusted with in depth reconnaissance missions by day as by night for designation of targets and remotely controlled detection, for demining and even logistics (with a considerable carrying capability of 91 kg and a tow hook). All that the future BADGER UGV lacks is the integration of an electric motor and better stealth by profiting from its high level of carrying capability to increase its autonomy and embark a range of sensors and equipment dedicated to the missions that his small remotely controlled 'armoured vehicle' can accomplish.

Unless the market is open to small very reactive industrial actors as for example Howe & Howe Technologies (small American company located in the State of Maine) with its Ripsaw-MS1, a tubular tracked all-terrain ultra mobile UGV now armed with a 7.62 mm remotely controlled weapon station PLWRWS, or other weapon systems for reconnaissance and convoy escort. Aside, the RIPSAW-MS1 accompanied by a M113 Command Post dedicated to the remote control of the UGV by Howe & Howe.

This impressive machine has a top speed of 80 km/h that it can attain in 4 seconds (see the videos on the H&H site) !! A first contract of 1.6 million US\$ has been attributed by the US Defense State Department to H&H for this project within the framework of the 2008 defence budget.



Stand MEGGITT at AUSA 2008 © ARTEM-IS - AUSA 2008



BADGER I from MEGGITT Training Systems (© ARTEM-IS - AUSA 2008) (source Meggitt TS)



RIPSAW-MS1 (source : H&H technologies)



## SCOOP : the ALSV re-skinned by Ceradyne



by Jean-Marie Le Stum  
ARTEM-IS

It was at the AUSA Washington exhibition that our team discovered the new version of the ALSV. It was indeed the occasion for CERADYNE and FLYER Defense LLC to present the new vehicle issued from their collaboration and targeted for the US Special Forces : the FLYER ALSV (Advanced Light Strike Vehicle).

### ALSV



© ARTEM-IS - AUSA 2008

We knew of the Californian company Ceradyne Inc. and of its relations with the US Special Forces for which it produces body armor based on composite materials. Re-skinned by this specialist in ballistic protection, the design of ALSV has no resemblance to the demonstrator presented at AUSA 2006 that was a hybrid between a buggy derived from the LSV (first vehicle produced by FLYER Defense LLC, the FLYER LSV is in fact a fast all-terrain buggy totally deprived of protection) and a cubic armoured cabin installed on the chassis.

The ALSV that we could observe at AUSA 2008 is a re-worked version with CERADYNE and is more in conformity in design terms with the standards of armoured vehicles even if it retains a special configuration based on speed and carrying capability (more than 900 kg of work load, with the tubular chassis and the rear engine of



Armored buggy demonstrator presented at AUSA 2006 by Ceradyne (source : Ceradyne)

the LSV. The version presented at AUSA was provided with a ceramic armour kit (FlexKit of 680 kg), whilst remaining dimensioned to be carried by CH-47 of the US Army, the CH-53 of the Marine Corps or the V-22 Osprey (the anchoring points are located in the mud guard, see photo). The ALSV has a weight of 3.5 tones in combat order.

In the category of the 4 doors armoured vehicles, the ALSV presents doors in a classical way differently from many JLTVs whose inversed openings at the rear protect the disembarkation of passengers. However, the ALSV shares with some JLTV presented at the exhibition the fact the the driver is centrally positioned. The ballistic protection obtained serves to protect the vehicle against 7.62 mm rounds.



© ARTEM-IS - AUSA 2008

To be noted is that behind the winch located in the front there are ammunition boxes that come in addition to those located outside the doors to improve carrying capability. The main armament presented was a Mk 19 grenade launcher but it

can be replaced by a 12.7 mm machine gun or a ATGW station (MILAN or TOW). The integration of a light remotely controlled weapon station can be considered (the demonstrator exhibited in 2006 was equipped with a 12.7 mm RCWS).

### The MULE turns to « ANIMAL »...

The ANIMAL is in fact a prototype of the logistic version of the now famous Mule by Lockheed Martin for the FCS (Future Combat System) programme. The programme, unveiled in 2003, continues and is beginning to take shape. We are yet far from the final version or from the ambitions displayed in the first 3D videos (we may recall that a Mule was seen to act as a rampart to protect a GI wounded in the first 3D film projected at AUSA !).

### « ANIMAL » from Lockheed Martin



© ARTEM-IS - AUSA 2008



## Metal Storm « sets fire » to AUSA



by Jean-Marie Le Stum  
ARTEM-IS

After a presentation to the Marine Corps during MDM (Modern Day Marine), a great annual event of the Navy at Quantico, the Australian company METAL STORM, based in Brisbane, exhibited for the third consecutive year its solutions during the AUSA exhibition in Washington.

There, we met up with their team that mainly presented three products : the FIRESTORM turret, the 3GL 40 mm grenade launcher and the MAUL (Multi-Shot Accessory Underbarrel Launcher).

### ○ FIRESTORM

The FIRESTORM turret weighs less than 75 kg, but is smaller than its big sister the Redback ROWS (Remote Operated Weapons Systems).

This system was initially presented on the systems by the Irobot company, a UGV of the FCS programme. The persons we met explained that its promotion was now also orientated towards equipping vehicles or fixed points.

The remotely operated weapon system is provided with 4 cannons. Each tube is loaded with four 40 mm rounds that can be mixed between HE (High Explosive), AB (Air Burst) or a non-lethal round. The optronics of the FIRESTORM was here the same as the Redback, i.e. a thermal sight and an image sight with a



© ARTEM-IS - AUSA 2008

range of 1.5 km for reconnaissance of vehicles and a laser telemeter with a range of 5 km.

One of the arguments of this electronic system lies on the suppression of mobile parts with respect to automatic grenade launchers, thereby offering optimal utilization (all weather and more reliable) and easier maintenance. The applications of the FIRESTORM remotely operated weapon system range from the protection of convoys, zone control, to special operations requiring important and rapid fire. The four cannons are independently managed by the control system.

Furthermore, firing can consist of one to four rounds fired simultaneously for each tube that are then fired like a tandem charge with the same trajectory and the same range. The test videos only present double firing but this however remains impressive as the trajectories of the rounds are rigorously the same.

### ○ 3GL

Positioned as a replacement of the M203, the 3GL is provided with three 40 mm rounds. It is installed under a rifle by means of a Picatinny rail. It can also be used independently thanks to its foldable butt. The three shots can be fired in less than 4 seconds.

3GL



© ARTEM-IS - AUSA 2008

### ○ MAUL

Six months ago, the Brisbane company was awarded a development contract by the US Navy for a total of 1.4 million Australian dollars. This contract led to the MAUL (Multi-Shot Accessory Underbarrel Launcher).

The MAUL uses the principle of electric rounds applied to four caliber 12 rounds installed one behind the other in the cannon. The MAUL is attached using a Picatinny rail under a M4 or M16 assault rifle and uses lethal or non-lethal rounds. The system also enables fires for the opening of doors.



MAUL (source : Metal Storm)

### What about Metal Storm and the JLTV ?

Already for the MPM-NLWS (Mission Payload Module - Non-Lethal Weapons System) programme piloted by the US Marine Corps Systems Command (MARCORSYSCOM), Metal Storm will have to integrate a zone control system using 'less lethal' rounds on a HMMWV or its successor, as also on unmanned land platforms and surface vessels.

Furthermore METAL STORM Limited is commercially located in Arlington (USA) under the name of MSI, Metal Storm Incorporated. To be noted is that Australia entered the JLTV programme hoping for industrial offsets (the following are mentioned : a JLTV towed vehicle programme and part the operational availability maintenance of the platform). We consider that METAL STORM could benefit from the opportunities created by this rapprochement to promote its range of innovative products corresponding to the different missions of the JLTV, either directly or via offsets.



by David Spindler  
SPINDLER CONSULTING

## The JLTV : business for platform producers or systems integrators ?



The JLTV : business for platform producers or for systems integrators ?

The American JLTV (Joint Light Tactical Vehicle) program was one of the main attractions at the AUSA exhibition in Washington DC last October. Since then, and according to the planned schedule, three amongst the candidate teams were selected for the following phase of the program and Australia has decided to join in.

The JLTV is nothing else than a light armoured vehicle, a sort of big VBL or small VAB (with reference to French Army vehicles). This vehicle is to replace the famous Humvee in operations of war, the latter remaining in service for less violent contexts.

Seven industrialists entered the competition. Several demonstration vehicles have been manufactured and tested.

Yet, four prime contractors amongst the teams were systems integrators and not vehicle producers and only three were managed by platform producers. Is it now necessary to be a systems integrator to ensure the prime contractorship for a simple liaison, patrol or convoy escort vehicle?

Up to now, the systems integrators managed complex projects for sophisticated weapon systems such as a main battle tank or a ground-to-air defence system. Has the JLTV become as complex as a Leclerc MBT?

One could well believe so. The JLTV is indeed full of electronics, first in the propulsion system (engine, transmission and suspension are controlled by computers). Also, the vehicle will be equipped with night driving infrared means, electronic surveillance and firing weapon station for self-defence, active protection comprising sensors, jammers, navigation, message transmission, communications, tactical situation, and vehicle component monitoring devices. All these systems are now quite deeply integrated so as to exchange with the inter-vehicle communications the position, mission, and enemy detection data as well as the data serving for preventive or curative maintenance and the re-supplying of the vehicle.

Certainly, commercial vehicles are also full of electronics and military vehicles mainly use components that were originally commercial. None the less, military specificities fundamentally go beyond commercial know-how and the commercial design departments are ill prepared for military projects.

To come back to the JLTV program, this is why even industrial teams lead by vehicle manufacturers all comprised systems integrators : Boeing, Northrop Grumman, Lockheed Martin, Raytheon, DRS, General Dynamics, BAE Systems (USA).

JLTV proposed by Lockheed Martin



source : ARTEM-IS -AUSA 2008

The two latter being well known as Land Systems integrators had for the occasion called upon specialised vehicle producers to carry the engineering of the platform : AM General for General Dynamics and Navistar International for BAE Systems.

To be noted is that the two latter, with Lockheed Martin associated to the tactical truck producer previously Armor Holdings (currently Mobility & Protection Systems division of BAE Systems) are part of the teams selected on 28th October last.

What one observes for the JLTV is probably a profound tendency that one will find in all the new modern armoured vehicle programs. In France, for example, one can bet that the future prime contractor for the VBRM family (Vehicule Blindé Multirole or Multirole Armoured Vehicle) will rather be a systems integrator than a platform producer.

More generally, the commercial strategies of the armoured vehicle producers will have to be more differentiated than they were in the past. In the developed countries, vehicle exporters will, for example, have to seek for partners that are more systems integrators than vehicle producers.



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  - ↳ 1 data sheet for each industrial actor at the origin of one or several of these platforms.
- Panorama covering Remote Control Weapon Systems (RCWS)
  - ↳ 66 “materiel” data sheets : description and market for each weapon system, versions, equipment items and industrial actors implicated;
  - ↳ 1 data sheet for each industrial actor at the origin of one or several of these weapon systems
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## SESM : transmission systems for tracked vehicles



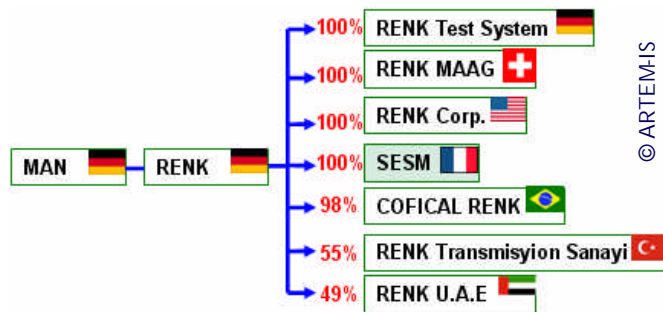
by Alexandre Targé  
ARTEM-IS

### Manufacture of SESM



source : Renk

We met up with the company SESM (Société d'Equipements Systèmes et Mécanismes) during the MSPO exhibition held at Kielce in Poland. This French company is specialized in the design, manufacturing and commercialization of automatic gearboxes and braking systems for heavy tracked armoured vehicles. SESM also proposes a power pack aimed at the T-72 and T-90 type main battle tanks.



### transmission system ESM 350



source : SESM

Based at Saint-Ouen-l'Aumône in the Paris region, it employs around 60 persons for a turnover of 20 million euros in 2007. SESM is a subsidiary of the German firm Renk.

The SESM team explained to us that they propose the

following products :

○ ENC200 : gearbox aimed medium tonnage armoured vehicles that notably equips the French AMX 30 B2 (with a power of 550 kw).

○ ESM500 : gearbox with 5 forward and 2 reverse gear ratios aimed at heavy main battle tanks (with a power of 1,000 to 1,200 kw). This system equips the French Army Leclerc MBTs.

### braking system



source : SESM

underlined is that this transmission, matched to a Wola 1,000 hp engine and equipped with a cooling system designed by SESM for tropical environments will constitute the power pack of the new Malaysian PT-91m MBT. This power pack can also be integrated in either new or retrofitted T-72 and T-90 MBTs. SESM also produces high performance carbon lined braking systems for MBTs in the 40 to 60 tones class. These systems equip the French Army Leclerc MBTs.

○ ESM350 : developed specifically for the T-72 and T-90 MBTs, this automatic gearbox can be coupled to an engine with a power of 850 kw max.. To be

## Russian projects at Defendory-1



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The Russian companies present at the Greek exhibition DEFENDORY, headed by the Rosoboronexport export agency exhibited a prototype of a modernized version of the BMP-3M and several mock ups of which some projects in the land and naval sectors. Most of these projects are for export.

○ naval : regarding the surface vessels, the Russian industry presented the "12421" and the "12418" projects which designate the Molynia patrol vessel as well as the Mirazh patrol vessel (project 14310).

### Model project 12421 : Molniya patrol vessel



### Model project 14310 : Mirazh patrol vessel



source : ARTEM-IS -Defendory 2008

It can reach 50 knots and is equipped with the Uran-E system (i.e. sixteen anti-ship 3M-24 missiles) and twelve Igla anti-aircraft missiles, with a 76.2 mm gun (caliber identical to the future Oto Melara cannon equipping some of the future Franco-Italian FREMM frigates), and with two 30 mm cannons. The vessels are mainly designed for export, notably small size navies. Ditto for the Mirazh 14310 project that corresponds to a patrol boat.

### Model project 636 : diesel-electric submarine



source : ARTEM-IS -Defendory 2008

Regarding submarines, one will note the 636 project (diesel/electric submarine of the Kilo class).



## GIDEON : the missing link



by Jean-Marie Le Stum  
ARTEM-IS

We had the opportunity of meeting up with the Executive Vice President of MDT Armor and with the designer of GIDEON, vehicle designed upon the experience feedback of the Israeli Army from the last war in Lebanon. It was the first time GIDEON was presented in an international exhibition.

For its project, MDT Armor selected a 6x6 Polaris chassis and entrusted the design of its new armoured cabin to a reservist of the IDF (Israeli Defense Forces). The latter presented GIDEON as the 'missing link' between the helicopter and the battlefield.



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Indeed, GIDEON is an armoured logistic vehicle that helicopters can, during a first stage, bring onto a zone via slings or in the cargo compartment. It is then in charge of providing supplies to the troops on the battlefield. Its passengers can if required open fire from the vehicle via firing openings or through the roof (optional opening). The rear doors open inversely so as to protect the disembarkation of the passengers.

It is protected against 7.62 mm rounds.

Thanks to its internal modularity, GIDEON can also extract from the fires two wounded persons and a doctor towards an extraction zone (airfield runway for example). The reservoir of this small diesel is not dimensioned for long routes or patrols. A UGV version is also scheduled.



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## Russian projects at Defendory-2



by Alexandre Targé  
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### BMP-3M



source : ARTEM-IS -Defendory 2008

In the land domain, the Russian industry presented the BMP-3M produced by Kurganmashzavod. Our team had long discussions with the exhibitors of Rosoboronexport that provided us with the main technical characteristics and specially with its evolutions.

The BMP-3M is provided with a UDT-32T engine and can be equipped with 100 mm laser guided rounds fired from the 2A70 cannon, or with the 9M117M1 Arkan missile produced by KBP. An active protection system can be integrated on this armoured vehicle; either the Arena (KBM) or the Shtora (Electro-mashina).

Greece ordered 420 BMP-3M in 2008. The deliveries should start in 2009 and end in 2014. The production of these armoured vehicles will begin in Russia and should be followed up by the Greek Hellenic Vehicle Industry (ELBO).

Several other countries, specially Venezuela, are said to be interested by the tracked combat vehicle whose vast range of embarked armament is particularly appreciated, including by customers such as the Armed Forces of the United Arab Emirates. To be reminded is that the latter had acquired 566 BMP-3 in 1992 and has been considering, for a few years now, the acquisition of a new (less cramped) platform whilst retaining the multi-role turret of the BMP-3. A first contract for 15 units has been awarded by the UAE to Patria to evaluate the pertinence of this project.

### Inside the BMP-3



© ARTEM-IS - DEFENDORY 2008

### AMV equipped with the BMP-3's turret



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## Novelties at MSPO 2008



by Alexandre Targé  
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The Polish Defence exhibition MSPO, which is held every year at Kielce, was an opportunity for our team to discover a few novelties, specially the following :

### 155mm CAESAR at MSPO



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### the « Polish Caesar » project

The 155 mm wheeled self-propelled artillery system Caesar by Nexter Systems was exhibited during the exhibition. The company could cooperate with the Polish firm HSW (Huta Stalowa Wola) in order to integrate the Caesar gun onto a Polish truck chassis. As for the fire control, it could be the same as the one of the Krab tracked self-propelled system, which might come back into the scene to equip the Polish Armed Forces. Due to the lead times regarding the integration of gun/chassis, the 'Polish Caesar' could only see the light around 2010-2011.

### "mortar turret" 120mm at MSPO



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### the 120 mm "mortar turret" by HSW

HSW presented its new 'mortar turret' that can be installed on wheeled or tracked armoured vehicles. This system can integrate C4ISR systems. The armament is a 120 mm mortar having an elevation of 85° to -3°. The turret pivots around 360°. It is provided with 8 pot launchers installed on each side. The firing rate is 10 to 12 rounds per minute. The range is 8 km for standard rounds and up to 12 km for improved range rounds.

### the Zubr armoured 4x4

The Zubr is a prototype developed by AMZ Kutno. With a combat weight of 14 tones, it can be equipped with a 7.62 mm to 20 mm RCWS (here below the Zubr presented with the ARX-20 by Nexter) and its protection

### 4x4 Zubr at MSPO



can go up to level 4 of STANAG 4569 for ballistics and 3b for mines. 5 to 10 soldiers can be embarked. The Polish Army could be interested

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in this vehicle, specially for its overseas operations. To be noted is that AMZ had presented another armoured 4x4 prototype (however with lower ballistic protection than the Zubr) a few months ago during the Eurosatory exhibition, the Tur-II, whose prototype had left the factory just a few days before the exhibition.



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