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Presents

# International Armoured Vehicles

## Defence IQ **ARMOURED VEHICLES** MARKET REPORT 2014





# FOREWORD

In 1914, the British War Office placed an order for a Holt tractor – one of the most famous forebears of the military battle tank – and began trials at Aldershot in the hopes of delivering a solution to the stalemate of trench warfare through the use of an armoured ‘land ship’. One hundred years on and Aldershot will again be host to the world’s largest conference dedicated to armoured vehicles, the very descendants of that Holt tractor. Modern armoured vehicles will take to the Long Valley Test Track as part of the International Armoured Vehicles 2014 exhibition and conference. Ahead of this key event, Defence IQ has published this report to provide a broad overview of how the international industry looks today.

Two overriding trends struck me while reading this report: First, there is a discernible shift – a far more palpable one than I’ve seen in previous iterations of this annual report – of armoured vehicle demand in the growing economies of the Middle East, Africa and Latin America while the more established markets of North America and Europe suffer the effects of the economic downturn.

And second, it is clear that, despite protestations to the contrary over recent years, the era of the tank is certainly not dead. While new technologies and ‘smart’ platforms continue to roll off the production line, the survey data and analysis in this report demonstrate that there will always be a requirement for armoured vehicles, be it for expeditionary missions or peacekeeping operations.

Despite the tough economic context, nations continue to spend considerable sums on maintaining capable armoured and protected mobility forces. The likelihood is that new vehicle programmes will be few and far between while some current programmes will be stretched, de-scoped or have their vehicle Out of Service Dates (OSDs) pushed back – the bottom line is that we need to do a better job of getting the most out of our existing capabilities.

As the NATO drawdown from Afghanistan begins in 2014, international armed forces will inevitably turn their attention to ‘contingent’ or ‘expeditionary’ operations: the ability to deploy at short notice to far-off conflicts, but without the infrastructure that more recent campaigns have developed. This ‘return to contingency’ will be a key theme over the next decade and should be considered within the context of this report on the global armoured vehicles market.

I would encourage you to join me at the International Armoured Vehicles conference in February to examine the themes presented in this report along with the heads of international militaries and representatives from the leading OEMs and SMEs in the industry.

Best Wishes,  
**Lieutenant General Sir Gary Coward KBE CB**  
Chairman  
International Armoured Vehicles 2014 Conference



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03–06 February 2014  
FIVE, Farnborough, UK  
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# EXECUTIVE SUMMARY

In 2012, the global armoured vehicles market was assessed to have then been worth \$10.97 billion<sup>1</sup>, primarily springing from US and European existing programmes and “resurgent countries” including China, India and Turkey. More recent revisions for 2013 have assessed spending and forecasts at \$12.61 billion.

Despite being blighted with uncertainty, the market is expected to remain stable until 2021, according to analysis from Frost & Sullivan<sup>2</sup>, with much of the growth being driven by countries in the Asia-Pacific and Middle East and those others with a strong need to replace their cold war era systems. Other, more established nations primarily in North America and Europe, will continue to spend to sustain existing capabilities in spite of a reduction of fleet size and new programmes. The majority of international militaries are confident in growth and improvement, believing their armoured vehicles fleets to be more potent in 2023 than at present.

Estimated international figures for unit numbers are expected to increase from 408,639 units in 2012 to 418,109 units by the end of 2021. Exploring further, according to Strategic Defence Intelligence analysis (Dec 2012)<sup>3</sup>, the global armoured vehicles MRO market is expected to increase at a CAGR of 5.68% to reach \$7.1 billion by 2022, driven by factors such as aging military equipment, and internal and external security threats.

At present, armored wheeled logistics vehicles represent the highest volume of production for the Europeans at 2,545 units, according to Forecast International. Meanwhile, a continued and far-reaching boom in blast-resistant/mine-protected vehicles is estimated at a cumulative market value from 2012 – 2021 to be \$265 bn. Communications and lethality are generally seen as the most critical vehicle requirements for the future, with mobility following closely on the priority scale.

Manufacturers continue to project business towards the emerging markets of the Middle East, Asia and Latin America, where the needs for border protection and internal security are driving forward many modernisation programmes. However, it should be noted that these “emerging markets” are perhaps not truly “emerging” anymore, but have instead been spending in this area for some years now and are firmly established in many respects. India retains its position as the most targeted market, but investment into the market is on the decrease.

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**“Manufacturers continue to project business towards the emerging markets where the needs for border protection and internal security are driving forward modernisation.”**

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Africa appears to represent a genuine growth spot, particularly as Defence IQ readers in early 2013 pointed to this region as the ‘centre of world growth’<sup>4</sup> and survey respondents rating high confidence in its market potential. The growth foreseen in Africa, according to industry analysts, expect governments to spend \$20 billion on armoured vehicles in the coming decade with Algeria being the biggest spender.

1 <http://www.defencetalk.com/the-armoured-vehicles-market-2012-2022-41405/#ixzz2abp46qTU>

2 <http://www.frost.com/prod/servlet/press-release.pag?docid=267989002>

3 <http://www.army-technology.com/features/featuredssi-mro-global-armoured-vehicles-market>

4 <http://www.defenceiq.com/air-land-and-sea-defence-services/articles/africa-is-the-centre-of-world-growth-says-defence/>





On a global level, light- and medium-weight armoured vehicles are expected to continue to be most in demand. Meanwhile, IED and blast protection is still considered to be a critical technology in this domain, as it has been for several years. However, while reliability of these systems has improved greatly, the Afghanistan drawdown and the uncertainty of future conflict environments represent a threat to the health of the MRAP market.

A report on military vehicles from Forecast International<sup>5</sup> indicates that 8,400 light tracked vehicles and 18,634 light wheeled vehicles will be globally produced from 2013-2022, representing a value of respectively \$18.1 billion and \$8.4 billion. The company further projects a global production of 5,200 MBTs worth \$23.3 billion over the forecast period.

Despite many opportunities in sight when it comes to advanced equipment, budget constraints have – and will continue – to demand that affordability remains a key priority for procurement managers. Contemporary armoured vehicles must balance an insistence for modularity and adaptability, while offering protection and mobility, and providing a proven design strategy to minimise operational and through-life support costs.

Aside to financial pressures, the majority of the industry sees working cohesively with governments as its most significant challenge.

5 <https://www.forecastinternational.com/fistore/prod.cfm?categoryid=105&ProductID=250&l3=10501>



*The sun is setting on ISAF involvement in Afghanistan*



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# REGIONAL MARKET ANALYSIS



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The downturn in the world economy was of course particularly resonant in Europe and it is no secret that most defence budgets have been significantly cut back in the past few years. However, expenditure on land force assets during the Afghanistan conflict has seen many of these militaries provided with a range of new vehicles to cope with the extremes of the environment and the ubiquitous IED – the number one killer of coalition forces throughout the campaign. As a result, many new personnel carriers and fighting vehicles were gleaned through Urgent Operational Requirements and have outfitted fleets with heavily protected solutions focused primarily on new survivability measures.

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**“Many new personnel carriers and fighting vehicles were gleaned through Urgent Operational Requirements and have outfitted fleets with heavily protected solutions focused primarily on new survivability measures.”**

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With the drawdown, European NATO nations are now collectively looking at readdressing the purpose for their land forces and are concluding that mechanised units should remain at the core of any future force structure. The **British** Army's recent 2020 strategy, for example, places infantry and logistics into a purely supporting role to three main mechanised brigades. The major issue is what capabilities will be required for potential future engagements to avoid the same situation that the early years of Afghanistan posed: forces woefully lacking in vehicles that met the specific threats of theatre. Without the benefit of a crystal ball, horizon scanning is incredibly challenging and, coupled with enduring budget limitations, there remains a question over whether the vehicles

acquired by European forces in response to Afghanistan should – or could – be scrapped without a great deal of controversy. Yet, if plummeted into a new conflict environment, there may be significant risk in keeping vehicles in service that are outfitted to suit a different situation.

While Europe is unlikely to return to the days of high intensity large-scale land warfare seen during the early 20th Century, there remains the possibility of high intensity military force being applied in support of limited political objectives as part of “coercive diplomacy”. The 2008 Georgian conflict provides a relevant example – a short, sharp and politically decisive event that saw large amounts of armoured vehicles deployed in a clear projection of power.

Theoretically, NATO may well require a high end warfare capability to deter these scenarios, while retaining the skills and equipment relevant for asymmetric out-of-area campaigns.



*Italian SUPERAV 8x8*

Even as the war in Afghanistan draws to a close, most strategists believe that the IED threat continues to present real challenges and the global defence community now recognise IEDs as a threat even for future non-expeditionary conflicts. In this particular case we are seeing a re-emergence of the IED, such as mines and ordnance, quickly repurposed in other nations, including Libya, Yemen, Pakistan and India. Nations further away, including Colombia, Thailand and Nigeria, are also suffering to combat the problem as it is routinely employed by terror, revolutionary and organised criminal groups. At the same time, the task of integrating protected vehicles into a coherent force development plan is becoming apparent in terms of its scale and potentially its cost. Given another land-based conflict involving European militaries, it seems inconceivable that the IED will not play a role in an attempt to even the odds.

The sophistication of anti-tank/armoured vehicle ordnance continues to develop apace and so the sophistication of active protection solutions is also increasing in a like-for-like effort. While infantry weapons do not typically represent more of a threat, the prevalence of RPGs is increasing and is fuelling a boom in applique armour sales.

European militaries must also consider the likelihood of violent public unrest, as experienced in recent years by the UK, Greece and Spain, to name a few. In these instances, both law enforcement and army personnel must be enabled with the option of traversing the streets with close quarters protection in mind, be it safeguards against Molotov cocktails or external CCTV to prevent ambush when leaving the vehicle.

Analysts believe that from 2013-2022, Europe will hold over 30 percent of the global end-user armored vehicle market [Forecast International], which in theory would make the continent the world's biggest regional market for vehicle production, in large part due to smart businesses solidifying new partnerships and pre-empting national requirements.

Across the continent, those nations that have seen armoured vehicle expenditure and modernisation halted in response to the economic crisis – including the **UK, France, Spain** and **Germany** – have looked to instead develop joint programmes and shared developments as a way to offset the shortfall.

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## “Germany is predicted by analysts to be the biggest regional spender by value on armoured vehicles over the next 10 years.”

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**Germany** is predicted by analysts to be the biggest regional spender by value on armoured vehicles over the next 10 years, with its key development the Puma infantry fighting vehicle currently under development by the Krauss-Maffei Wegmann and Rheinmetall consortium. The total number of Puma vehicles on order has dropped from 405 to 350, but as the first production model due for delivery to the German Army in 2014, widespread attention will be on its operational performance.

The consortium is also delivering 472 Boxer multi-role armored vehicles between the Netherlands and Germany on completion of this much anticipated programme.

As of this year, the **UK** intends to retain its vehicle fleet in a similar structure to that seen in the Afghanistan campaign, flying almost 3,000 vehicles home from Helmand, including the likes of Ridgebacks, Mastiffs and Huskies. Vehicles purchased as UORs, such as Foxhound protected patrol vehicles, will remain within the main order of battle for the foreseeable future.

Fleet Management will also be a key goal of the privatised Defence Support Group (DSG) as it supports UK vehicle fleets. The Government has announced that survivability measures will be assessed after the vehicles return from Afghanistan.



Notably, the MoD is spending around £1 billion on the modernisation of Warrior infantry fighting vehicles and announced in September that 24 additional Foxhounds are to be purchased in a \$23 million deal, bringing the total number up to 400. At time of writing, Foxhound has logged no combat losses.

More than 1,080 vehicles and pieces of major equipment have been redeployed to the UK from Afghanistan, with a total of around 3,345 vehicles set to be salvaged by 2014.

**Italy** is preparing to finalise its delivery of all 249 Freccia 8x8 wheeled armoured fighting vehicles to its Army in 2014. The Iveco-manufactured vehicle is also being eyed for a follow-on repeat order should budgets allow, alongside a new order for the Centauro 2 wheeled tank destroyer. In addition, Iveco has finalised development of the SuperAV 8x8 amphibious vehicle in its APC configuration for potential delivery to Italian forces – as the Veicolo Blindato Anfibia (VBA) – and the export market.

Meanwhile, **France** is holding steady with its acquisition of the home-built VBCI 8x8 armoured infantry combat vehicle, seeing in 500 vehicles by July 2013, many of which have seen action in Afghanistan, Lebanon, and more recently, Mali.

Despite the general European downturn, there is notable and positive movement in Scandinavia.

**Norway** interestingly bucked the trend at the end of 2012 by making one of its largest ever investments into the Army with the announcement of a £500 million deal to upgrade and manufacture 146 CV90 armoured combat vehicles. The programme is set to be completed in 2017 after upgrading 103 current CV9030s and building 41 other new vehicles.

**Denmark** is in the midst of trials to replace its armoured personnel carrier in what is currently the largest armoured vehicle competition in Europe. Up to 360 vehicles will eventually be delivered but in either a display of open-mindedness or indecisiveness, the competing vehicles are a mix of tracked and wheeled platforms.

**Sweden** announced in September that it will purchase 100 more BvS10 all-terrain vehicles from BAE Systems Haggblunds in an estimated £100 million deal that adds to the procurement of 48 units agreed in 2012.

The decision will assist Swedish Forces with humanitarian aid and disaster relief (HADR), but can be configured for many other roles, again highlighting the attraction to flexibility that most European nations are now valuing above all else.

In **Finland**, Patria has unveiled that its next generation Armoured Wheeled Vehicle (AWV) concept is now beginning company trials. The vehicle “leverages” from the current production Armoured Modular Vehicle (AMV) 8x8, of which 1,400 units are already under contract or are being delivered, including 62 in service with the Finnish Defence Forces. Patria previously won a major contract in 2010 to deliver 113 AMVs to Sweden, which will begin fielding in 2014. Finland intends to launch a new competition towards the tail end of 2013 for a contingent of light armoured logistics vehicles.



*The German Puma programme will be one of the biggest vehicle projects over the next decade*



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Further East, **Russia** has confirmed that it will be proceeding with a delivery of the BMP-3 infantry fighting vehicle, backtracking on previous disagreement in 2010 over the vehicle's quality. Although Kurganmashzavod was fined \$90 million by the government for failing to meet contract expectations, the vehicle is now understood to have undergone modifications to increase its life expectancy.

On a more forward-thinking note, the Russian Military-Industrial Company has this year completed testing of its newly designed Krymsk APC that is not only intended to be a near-silent hybrid-powered carrier, but is also in planning stages to be remotely operated and to field directed energy weapon systems.

Baltic and Eastern European countries are also exhibiting signs of life on the market with murmurings of interest being reported in **Latvia, Estonia** and **Lithuania**, to name a few.

**Poland** is looking to replace its ageing fleet of Honker, Honker 2000, Skorpion-3 vehicles and UAZ469 jeeps with 1,600 4x4 light multipurpose vehicles in an estimated \$60 million programme. Poland has a major requirement for tracked and wheeled vehicles and is anticipated to release an RFP in 2014. In October 2013, it ordered 307 additional Rosomak 8x8 multipurpose armoured vehicles under license by WZM S.A, which are due for delivery by 2019. Meanwhile, Poland Defence Holdings unveiled a new AFV concept this year. The PL-01 from Obrum and BAE is designed to fulfil Poland's plan for a Universal Modular Tracked Platform, offering a three-person crew, auto-loading 120 mm main gun, unmanned turret and a proven chassis based on the CV90 in order to meet the intended timeframe for delivery.



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There is an enduring threat of militant and insurgency operations and a growing complexity of contemporary threats presently causing risks to internal security across Africa. This, coupled with the lack of updated armoured vehicle equipment, programmes and training, has meant that sub-Saharan defence budgets are being focused towards modernisation plans, procurement priorities and indeed the investment and strengthening of local industrial bases to promote stability in Africa.

Sub-Saharan defence budgets are – like many militaries worldwide – cash strapped. Despite this, a number of modernisation programmes and procurement initiatives are valued continent-wide at up to \$20 billion over the next decade for armoured and tactical vehicles alone, according to forecasts at the Armoured Vehicles Africa conference in July 2013.

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**“A number of modernisation programmes and procurements initiatives are valued continent-wide at up to \$20 billion over the next decade for armoured and tactical vehicles alone.”**

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Big national spenders are not confined to one specific continental region, but include **Nigeria** in the West, **Kenya** in the East and, unsurprisingly, **South Africa**. However, the largest armoured vehicle market remains in the North where countries battling Islamist insurgencies are faced with improvised explosives and are working to keep a lid on violent uprisings.

While there are various regional bodies actively addressing conflict situations – for example, the African Union and Ecowas – driving factors behind the African nations’ defence policy relate to both conventional and unconventional warfare. In terms

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**“The largest armoured vehicle market remains in the North where countries battling Islamist insurgencies are faced with improvised explosives and are working to keep a lid on violent uprisings.”**

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of the conventional, there is a concern on containing any possible threats from neighbouring countries. As for the unconventional, African nations continue to face considerable threats from insurgency groups, particularly around Mali, Central African Republic, the Democratic Republic of Congo, Somalia and Sudan. Many of these threats have also triggered the need to increase participation in international operations from militaries globally. Recent events in Mali, for instance, which have seen the international cooperation of the US, France, and the UK who are assisting in ground military combat operations, training and logistical support.

Due to the fact that the continent as a whole sits on the cusp of a broad vehicle spending surge, nations outside of Africa, including the likes of Russia, Italy, China, the UAE, Serbia and the Czech Republic are pursuing business here, with a number of local plants being set up to meet governmental offset policies. Sharing of resources, advisors, labour and direction in this sense are also inflating these already high expenditure projections.



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**South Africa** is still focusing on replacing its Casspir and Mamba armoured vehicles and is looking to replace the Olifant tank. In addition, indigenous technology from South Africa outperforms all others on the continent and, in some areas, is challenging European industry. Paramount Group, Africa's largest privately owned defence company, has seen extensive global interest – from the US to China – in its Mbombe and Marauder vehicles, as they are said to counter both traditional and non-conventional threats. The nation is considered by many to be the first real “inventor” of mine-resistant vehicles as a result of innovations made in the Rhodesian Bush War (1964-79).

A contract signed towards the end of 2013 will see more than 200 Badger New Generation Infantry Combat System vehicles built by state-owned Denel SOC Ltd for the South African National Defence Force (SANDF) over the next 10 years, a move that is being said to be of significant impact to the country's defence industry in its entirety.

However, across the rest of sub-Saharan Africa, most armoured vehicles and related equipment are in dire need of upgrades or indeed complete replacement. In the spotlight are light armoured [multi-purpose] vehicles (APCs and IFVs), and a requirement for cost-effective upgrades to increase survivability – whether it be Blue Force Trackers (to enhance situational awareness), training or simulation training technologies, upgrades to turret accuracy/lethality (night/thermal vision) or system upgrades to legacy fleets such as the T-series MBTs.

Procurement across Africa – with the exception of South Africa – is unlike the lengthy bureaucratic planning and development process common to western militaries. Indeed, it is rather a case that when a government identifies a gap, it makes deliberate and focused effort to fulfill that gap. Having said that, there are broader categories that Africa will focus on depending on its individual requirements – for example light armoured vehicles for reconnaissance missions.

One of the key goals for some African Nations future requirements programme (e.g. Nigeria, Tanzania, Kenya) is to manufacture a suitable light armoured multi-purpose vehicle which combines mobility, agility, protection, communication, navigation, stealth and observation for reconnaissance.

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## “Of the projected \$20 billion expected to be spent by African governments by 2023, Algeria is predicted to be the biggest spender.”

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Of the projected \$20 billion expected to be spent by African governments by 2023, **Algeria** is predicted to be the biggest spender. Spend on vehicles, as well as on all other defence requirements (projected by some analysts at a growth of over 6 percent in the next five years), stems from a number of factors. Large-scale terrorist attacks within the country's borders, a continued “arms race” with neighbouring nations and the Defense Ministry's takeover of the Municipal Guard from the Ministry of Interior have all played a part in these remarkable procurement projections. Towards the end of 2012, German government officials were cited as expecting its home industry to produce 1,200 Fuchs APCs for Algeria during this same period. Algeria has also formed a partnership with the United Arab Emirates to jointly produce NIMR vehicles for its military, police and peacekeeping forces, and designed to not only be a modular, flexible option but also specifically integrated with a high grade cooling system to cope in excessively hot climates. Algeria recently ordered over 300 T-90 tanks from Russia to compliment its 325 existing T-72s, as well as 150 T-62s, and 270 T-54/55 tanks that are reaching the end of their useability.

Over the border, **Morocco** has recently received the full contingent of an order of 88 BearCat 4x4 APCs for its Auxiliary Forces. As a low cost, easy to use vehicle designed for rugged terrain and capable of accommodating up to 12 occupants, up to five different variants have been acquired, ranging from SWAT to Riot Control (including integration of non-lethal systems). Morocco also made a formal request in 2012 for the upgrade and refurbishment of 200 M1A1 Abrams tanks to M1A1-SA. The country already fields 200 modernised Russian T-72s, 300 American M60s, and 105 ageing Austrian SK-105 light tanks.





*Lenco BearCat 4x4s are used by Auxiliary Forces in Morocco*

**Tunisia** has been affording greater attention to border security, working on cooperation with Libya and also with Algeria, where progress has been made in “neutralising” a group of terrorists in Al Chaabni. In September, it was announced that 300 armoured trucks and 150 tanks have been supplied to Tunisia by Germany to specifically assist in counterterrorism efforts.

**Libya** is looking to rebuild its capabilities, following an extended period of international embargo coupled with a regime fearful of over-strengthening its own national military. The civil war also resulted in the destruction of many land platforms, ammunition houses and engineering stations. In the wake of a new government, renewed defence spending and the partial removal of the arms ban has seen an order for 350 vehicles from the Czech Republic, consisting of the amphibious BRDM wheeled combat reconnaissance vehicle and BVP-1 tracked infantry fighting vehicle, following earlier acquisitions of Puma armoured cars from Iveco and NIMRs. The deal is valued at approximately \$51 million. Tanks, however, remain an acquisition priority. After the recent conflict, existing military materiel has been spread in Libya inconsistently – and, in some instances, illegally – leaving vehicle fleets dry and lacking.

Like Libya, **Egypt** continues to see turmoil amid the Arab Spring, and with the second change of government in three years, civil division has seen a sporadic requirement for the use of armoured vehicles. With the latest regime change led largely by military powers, loyalists to the ousted government have engaged in violent contact with armed forces, giving scope for the new leaders to demand vehicle deployment. No new acquisitions for land platforms have as yet been declared but if the conflict

heightens, requests are likely to be made. Bi-lateral agreements formed between the Morsi government and Turkey for the trade of defence equipment have evidently become void. Previously, Egypt has enjoyed a number of indigenous vehicle manufacturing programmes generally based on foreign designs and modified to Egyptian standards (such as the Ramses II MBT and EIFV).

**Nigeria's** police force has been in the market in the past year to expand its mine-resistant ambush protected vehicle fleet as IEDs are proving to be one of the most devastating tactics employed by home-grown extremists. In addition, the first ever locally-built tactical armoured personnel carrier is due to be unveiled by the Nigerian Army, and is understood to include variants to cover police, ambulance, missile weapon carrier, command and control and combat surveillance.

**Kenya** has announced a \$700 million defense budget, which also includes a plan to acquire more and better-protected armoured military vehicles in the 2013-14 fiscal year, including peacekeeping and logistics vehicles, and a programme to replace its Vickers Mk3s. Its overall spending will go up to \$800 million in the 2015-16 budget as it moves ahead with modernisation plans.

**Ethiopia**, boasting the second strongest military on the continent, has seen flared tensions on its border with **Eritrea**, fears of conflict with Egypt, and peacekeeping operations in Somalia that have been blighted violence and “huge losses”. The country is believed to been involved in purchasing military vehicles and related components within the past two years to augment its arsenal of Soviet-era vehicles and M113s, as well as having an active defence manufacturing industry. Reportedly, the land force consists of between 250-300 MBTs, and 400 reconnaissance, armored personnel and infantry fighting vehicles.



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**Tanzania** is also struggling to protect its peacekeeping forces as it operates in Darfur and the Democratic Republic of Congo. The government however believes it has solved its troop transport shortage, with the People's Defence Forces (TPDF) having taken delivery of 679 military vehicles and a number of ambulances from India this past year. Still, calls for heavier weapons and support in these troubled areas remain vocal. Meanwhile, diplomatic dialogue with Rwanda has hit a new low and conflict seems continuously on the cusp.

**Zambia** continues to look to upgrade its current vehicles and sustain capacity into the coming year. UN peacekeeping operations in Mozambique, Angola and Sierra Leone have exposed limitations in the capability of its present fleet. Some of its contingent are "not able to meet the challenges of today", Deputy Army Commander Major General Topply Lubaya told Defence IQ this year. The onus is on fleshing out its light and medium vehicles to counter the asymmetric threat, with wholesale modernisation or replacement of MBTs, wheeled APCs, medium light-tracked and amphibious vehicles.

In mid-2013, the **Rwandan** Defence Force was understood to have transported a contingent of T-54/55 tanks with Israeli modifications, including a 105 mm rifled gun, and enhanced penetration and fire control. These tanks have been stationed on the border with the **Democratic Republic of Congo**, which continues to fight militant rebels.



*Russian T-90s are now heading to Algeria  
[Photo [www.volganet.ru](http://www.volganet.ru)]*



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# NORTH AMERICA

## United States

The advent of sequestration is hitting military budgets hard, not least that of the US military's armoured vehicle fleets. Although the US will continue to downsize their forces and procure fewer vehicles over the next decade, there will be an enduring requirement to sustain existing capabilities and invest in maintaining its current force structure.

There are three major armoured vehicle programmes in the works: Joint Light Tactical Vehicle (JLTV), Amphibious Combat Vehicle (ACV) and the Ground Combat Vehicle (GCV). The Government Accountability Office (GAO) has said that, "the procurement of all three programs is expected to continue for a decade or more."

The Army will have to spend in the region of \$37.9 billion between 2014 and 2030 on 1,748 GCVs, with around \$7 billion of that on research and development. A recent Congressional Budget Office (CBO) report suggested four options for the struggling GCV: purchase the Israeli Namer armoured personnel carrier instead; buy new, upgraded versions of the Bradley infantry fighting; purchase the German-made Puma infantry fighting vehicle; or cancel the GCV programme and improve existing vehicles in the Bradley fleet to extend its lifecycle.

GCV is being billed as the second highest acquisition priority for the U.S. Army. But at an American Enterprise Institute Q&A in July, Chief of Staff of the Army Gen. Ray Odierno said, "We need the Ground Combat vehicle and we have to have it. Now, we might have to delay it because of budget cuts. I don't know; we haven't made the decision yet." The Army is preparing to absorb \$52 billion in cuts in fiscal year 2014.

Declaring it a "perfect storm of continuing resolutions, sequestration and government shutdown," Heidi Shyu, assistant secretary of the Army for Acquisition, Logistics and Technology, said that the future of GCV is uncertain. Speaking at a modernisation press conference, the U.S. Army's top acquisition official said the budget is "lurching" and difficult decisions need to be taken about which programmes stay, which go and which will be delayed. GCV is top of that list, with a line already crossed half through it.

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## **"The US Army's top acquisition official said the budget is "lurching" and difficult decisions need to be taken about which programmes stay"**

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At the operational level, GCV is seen as an absolute must. At the International Armoured Vehicles conference in February 2013, Col. Charles Climer, who at the time was senior TRADOC LNO to the UK, insisted that "Bradley has really passed its longevity." He continued, "We can't push the Bradley any further – we need to replace it."

The US expects to buy 49,000 JLTVs, which is set to replace AM General's now ageing Humvee, and the Marine Corps is planning on acquiring 5,500 vehicles. Despite the budget cuts and continued uncertainty of the impact of sequestration – not to mention the recent government shutdown – the military is committed to purchasing the full contingent of vehicles it set out to and is not anticipating reducing numbers further.

Marine Corps Lt. Col. Mike Burks, deputy manager of the Joint Program Office for the JLTV, said at the Association of the United States Army conference that there is no planned reduction in force structure for JLTV.

"Let me be clear on the front of Marine Corps commitment to JLTV: We are in," Lt. Col. Burks said.

"Right now, in the current conversation, in the context of the size the Marine Corps is looking at, 5,500 JLTVs is good enough to meet deployed commanders critical mission needs in the Marine Corps' most dangerous combat mission profiles."







*BAE Systems Close Combat Vehicle CV9035 MkIII  
[Photo BAE Systems]*

Prime contractors Oshkosh Defense, Lockheed Martin and AM General are in the running for the \$14 billion programme after seeing off competition from BAE Systems, Navistar Defense and General Dynamics. The JLTV programme is now in the Engineering and Manufacturing Development phase, under which 22 prototype vehicles and other equipment will be ordered at a cost of \$65 million for testing.

JLTV will be funded under a continuing resolution until early 2014 but after that, the Army – despite its rousing call to arms and positive rhetoric – will have to firmly commit to the programme and assign funding for it in the next budget.

“We are planning for success here, and we are going to keep the train on track for as long as we possibly can keep it on there,” said Col. John Cavedo, manager of the Joint Programme Office for the JLTV.

“Some really hard decisions are going to have to be made in the second quarter, mid-second quarter of this [fiscal] year. And from where I sit, I certainly hope that for JLTV, the hard decision is to keep it on the tracks. But that may not be what the Army decides.”

Another programme in the works is the Armoured Multi-Purpose Vehicle (AMPV), which is billed as the high-tech replacement for the Vietnam-era M113 infantry carriers. AMPV will focus on five missions: general purpose; medical evacuation; medical treatment; mortar carrier; and mission command. The Army is expected to acquire 2,097 AMPVs at a total unit cost of around \$3.8 billion over 13 years.

Following a new draft request for proposal (RFP) issued in October, the AMPV programme is being delayed by 12 months. In the previous RFP issued in March the engineering and manufacturing development (EMD) contract phase was due to run for four years – in the October redraft that is now scheduled to take five. The cost of the EMD is also expected to increase from a \$388 million estimate in March to \$458 million in October.

BAE Systems and General Dynamics Land Systems lead the field currently with the former offering a reworked version of the Bradley with a V-shaped hull and the latter putting forward a tracked variant of its Stryker vehicle.

Commandant Gen. James F. Amos, the Marine Corps chief, has said that he is prepared to axe the JLTV from his future force structure but not the ACV, which he said was indispensable.

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**“The Marine Corps is prepared to axe the JLTV but the ACV is ‘indispensable’.”**

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*The Swedish CV-9035 is one of five vehicles being assessed for the Ground Combat Vehicle [Photo US Army]*



## Canada

The Close Combat Vehicle (CCV) programme is already two years behind schedule and Senior Department of National Defence officials have now admitted they misjudged the complexity of the \$2 billion purchase. The Canadian Army called for the project to be cancelled earlier this year. The request was declined by the government, leading to accusations that the Harper government was sacrificing the needs of the Canadian armed forces at the expense of a realpolitik agenda.

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**“The Canadian Army called for the CCV project to be cancelled earlier this year but the request was declined by the government.”**

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The CCV programme was conceived to develop and supply high survival medium weight vehicles to help the Canadian Army bridge the gap between the light armoured vehicles III (LAV III) and the Leopard 2 main battle tanks.

Nexter, General Dynamics Land Systems and BAE-Hagglunds are competing for the CCV contract amid controversy over its relevance and affordability, with the army facing a 22 per cent budget cut. A 2015 delivery deadline has been set for the 108 CCV's.

The Tactical Armoured Patrol Vehicle (TAP-V) is designed to replace the RG-31 bomb-resistant vehicle and Canada is also upgrading 550 Light Armoured Vehicle (LAV) III's.



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# MIDDLE EAST

Many next generation armoured vehicle programmes are facing delays and cancellation in Europe and North America. Finding new ways to combat threats on a shoestring budget is the military's target, and industry's mission. However, not every government is faced with the same fiscal constraint. Countries in the Middle East are fuelling growth and will be responsible for sustaining and stabilising the global market through the next decade.

Countries in the Middle East region, including Turkey, are continuing to modernise their armoured vehicles and acquire new fleets. The Middle East, together with the APAC region, is expected to boost vehicle procurement volumes significantly over the next ten years and offset anticipated reductions in the US and Europe.

**Turkey** in particular will bolster the armoured vehicle export market as its indigenous industry gains traction, continuing to mature over the next decade and develop into a world-class hub for armoured vehicle capabilities. Turkey, with the second largest military in NATO, an economy that effectively sidestepped the global downturn and a hostile neighbour in Syria that is locked in civil war, is primed to be a robust defence import and export market for years to come.

Turkey's biggest armoured vehicle firm has developed a new MBT: the Altay. Otokar decided to develop the Altay entirely in-house without foreign input, specifically so that it can export to the Middle East and Asia without needing approval from other governments. It is already looking at a deal in **Saudi Arabia** for hundreds of vehicles. An official with the SSM, the Turkish defence procurement agency recently said: "The Altay is not available for immediate sale, but is potentially a powerful export product when you think of a medium-term deal. Saudis are good customers with available cash, good political ties and their need for new tanks. We are hopeful about a future deal [for the Altay]."

Turkey's other armoured vehicle contractor, FNSS, has put a partnership in place with Indonesia's state-owned PT Pindad to jointly develop medium armoured vehicles. Tawazun, the UAE's armoured vehicle behemoth, signed a contract with FNSS in May 2013 for the Turkish company to market, sell and potentially manufacture NIMR vehicles in its home market.

The Russian T-72M1 MBT, manufactured by UralVagonZavod, is the most prevalent armoured vehicle in the region. BAE Systems' Bradley is a popular Infantry Fighting Vehicle choice in the region but increasingly the Russian Kurganmashzavod BMP-3 IFV is taking preference. The BMP-3 IFV is well armed and uses a common platform for different variants. It is clear the MBT is alive and well in the region: **Iraq** took delivery of 140 M1A1SA Abrams MBTs and with a plant just outside Cairo, Saudi Arabia is upgrading its M1A2 MBTs to the latest M1A2S standard, while Egypt is producing the M1A1 Abrams Main Battle Tank in partnership with General Dynamics Land Systems.

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**"Considering Ankara's development of its next generation MBT in the Altay, the near-term future of the main battle tank looks to be secure."**

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Moreover, considering Ankara's development of its next generation MBT in the Altay, the future of the main battle tank look to be secure, at least in the Middle East, despite decades of naysayers asserting that the age of the tank is dead. As David Willey, the curator at Bovington's Tank Museum, states: "The history of the tank is: it's always redundant ... If you turn on the TV, you always see a main battle tank. There are weapon systems that will do what a main battle tank can do, but why is it you still turn up in a tank? [Because] the best thing to defeat a tank is a tank."



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Notwithstanding the robust requirements for MBTs in the Middle East, wheeled vehicles are clearly on the rise in the region as more and more governments look at 6x6 and 8x8 vehicles to cope with the terrain and because of their lower maintenance costs.

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## “More governments are looking at 6x6 and 8x8 vehicles to cope with the Middle East’s terrain.”

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Although the **UAE** also recently upgraded its 436-strong fleet of Nexter Systems Leclerc MBTs and armoured recovery vehicles (ARVs), it also has a requirement for 600 8x8 wheeled combat vehicles and has 5 Patria AMV 8x8s on order. The UAE market is vast, and growing. After decades of war and conflict, the emirates states are investing in armoured vehicle capabilities. It also has the benefit of being well placed geographically. In Abu Dhabi last year the Streit Group opened the largest armoured vehicle manufacturing facility in the world.

“The UAE is a very well located country, geographically,” said Guerman Goutorov, Streit’s Chairman. “You have access to Asia, Africa, Europe and the other Middle East countries ... you’re connected to the [entire] world.”

At IDEX in March the UAE announced a record \$3.8 billion worth of deals, including the \$381 million contract with Oshkosh for 750 M-ATV all terrain-armoured vehicles. The UAE Armed Forces has ordered 1,800 NIMR armoured vehicles from Tawazun Holdings. The firm also signed an agreement in 2012 to establish a joint company producing NIMR armoured vehicles in Algeria. The deal with Groupement de la Promotion de l’Industrie Mécanique (GPIM) was designed to create an Algerian-based armoured vehicle manufacturer.

**Saudi Arabia**, which was identified as a significant target market for respondents to Defence IQ’s survey, spent nearly \$57 billion on defence in 2012 according to SIPRI, making it the seventh highest spending nation. Since the mid 90s, Saudi Arabia has been acquiring advance military technologies and now

touts one of the most densely armed nations in the world, with 200,000 active military personnel. With a limited indigenous defence industry, the country relies heavily on imports from its allies such as the US. Most armoured vehicles are imported, although the Al-Fahd IFV and the Al-Faris 8-400 APC were manufactured by the Abdallah Al Faris Company for Heavy Industries. Saudi is negotiating a deal for 655 HMMWVs with a further batch of 724 LAV II 8x8 are being delivered and 84 more requested. Turkey’s Altay MBT is a possible option for the Kingdom as talks between the nations are ongoing.

Ahead of the World Cup in 2022, **Qatar** has been reported to be procuring 118 Leopard armoured vehicles from Germany along with 16 tank howitzers for an undisclosed sum. The deal is in addition to the 62 Leopard tanks and 24 howitzers that German Chancellor Angela Merkel’s government agreed to supply in early 2013. The armoured vehicles will be manufactured by Krauss-Maffei Wegmann and Rheinmetall. The Army is now assessing whether to retire swathes of its APCs and IFVs, as part of its modernisation and replacement programmes.



*Armoured Patrol Vehicle 6x6 [Photo NIMR]*

**Israel** has been a global innovation centre for armour development for decades and continues to export its advanced technologies to international customers. Israel is upgrading its Achzarit APC fleet and is due to receive 600 NAMER APCs.



*M1A2 Abrams with prototype TUSK equipment and Common Remotely Operated Weapons Station (CROWS)*

In 1999, **Jordan** entered the defence industry in its own right with the establishment of the King Abdullah Design and Development Bureau (KADDB). Although one of the most militarised nations in the world, the country's military expenditure as a percentage of GDP has been slipping over recent years – it stood at 5.8 per cent in 2009 but just 4.6 percent in 2012 according to The World Bank.

**Kuwait** is understood to have recently finalised delivery of a fleet of ADVS 6x6x6 Desert Chameleon armoured personnel carriers, featuring removable V-hulls and adaptable armour modules.

**Iran** announced in mid-2013 that it will be unveiling optimized Scorpion APCs and simulation systems before the end of the year as further proof of its growing self-sufficiency and technological advancement. The Army also plans to equip all of its armoured vehicles with reactive armour to minimise damage from missile blasts. In 2012, Iran unveiled a new “ultralight” armoured vehicle, called the Howeize, and an indigenous APC called the ‘Talaeiyeh’, but the credentials of these vehicles cannot be confirmed.

**Lebanon** has 100 NIMR II protected carriers on hold and is awaiting German approval of the sale of Belgium's surplus Leopard 1/A5 main battle tanks.

**The Afghan National Army** is set to acquire around 600 Mobile Strike Force Vehicles (MSFVs) from Textron Marine & Land Systems, which is based on the M1117 Guardian Armoured Security Vehicle (ASV). ANA's MSFVs will come in a number of variants with capabilities including a 40mm grenade-launcher, a 7.62mm machine gun and a 90mm cannon. Textron are currently working on a command and control variant too, although ANA chief General Karimi said that is still in the development stage. With NATO forces scheduled to exit Afghanistan next year, Karimi outlined his plans for making the ANA a capable and efficient force to maintain peace in the region, explaining that, “In the future we will need high-end armoured capabilities ... [armoured vehicles] are critical to the survival of the state to develop capabilities to fight insurgents.”

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**“The Afghan National Army is set to acquire around 600 Mobile Strike Force Vehicles (MSFVs) based on the M1117 Guardian Armoured Security Vehicle (ASV).”**

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# ASIA-PACIFIC

With the global armoured vehicle market estimated to have been worth \$10.97 billion in 2012, the role of Asia in this diverse and shifting market will be paramount over the next decade. While the US and Europe – with some notable exceptions such as Norway and Poland – are spending less on their armoured vehicle capabilities, it is emerging markets such as those in Asia and the Middle East that will drive growth in this sector for years to come.

Some analysts predict that the global armoured vehicle and counter IED market will decline over the next decade, with traditional markets in the West taking the brunt of the collateral. However, while the global market is set to wane, demand in Asia will actually increase during the period. ICD Research forecasts that the market in Asia will be worth \$5.4 billion in 2021, up from \$4.4 billion in 2011. The vast majority of this will likely be spent on tactical trucks, main battle tanks (MBTs) and armoured personnel carriers (APCs).

The boom and bust nature of the armoured vehicle market will see US and European fortunes suffer following the withdrawal from Afghanistan while territorial disputes in Asia begin to come to prominence in the shadow of China's rise, leading to inevitably heightened tension in the region. Add in the new US foreign policy of pivoting towards the East to offset China's presence in the Asia Pacific region and it is clear to see that demand for armoured vehicles will escalate. Aside from China, countries such as Thailand, Singapore, Pakistan, India and South Korea face threats from insurgent groups, further increasing the requirement for armoured vehicles and other military equipment.

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**“It is China’s rise as an economic and military powerhouse that will drive market growth over the next decade and beyond.”**

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The imbalance of power in the region caused by China's massive military build-up is forcing neighbour countries to follow suit. Were military forces to stay the same amid China's build-up, many governments could be susceptible to heightened Chinese influence. The wars in Afghanistan and Iraq fuelled the growth in the armoured vehicle market during the first part of the 21st century but it is China's rise as an economic and military powerhouse that will drive market growth over the next decade and beyond.

Notwithstanding the near impenetrable Chinese market, **India** is the heartbeat of the APAC region as it continues to invest in its defence industrial base and build a world-class military force. In a recent address to delegates at an industry conference, Lt. Gen. (Rtd.) Dalip Bhardwaj, the former Director General of Mechanised Forces in the Indian Army, said: “In India, the aerospace and defence market is growing at an unprecedented rate and is emerging as a key participant in the Asia-Pacific region.”

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**“India is the number one target market for global armoured vehicle manufacturers, and competition is not even close.”**

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But India is not just the principal growth market in Asia; it is in fact the world's principal growth market. In Defence IQ's annual survey, India was identified as the priority market for industry over the next ten years with 46 per cent of respondents identifying it as having the greatest potential for growth. India was followed by Saudi Arabia (34 per cent) and the UAE (33 per cent) in the poll. The conclusion: India is the number one target market for global armoured vehicle manufacturers, and the competition is not even close.



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But while there is money to be spent – India is reportedly investing \$100 billion on modernising its military force structure over the next decade – New Delhi's armoured vehicle programmes are under strain. The \$10 billion Future Infantry Combat Vehicle (FICV) contract is the largest land system programme India has ever undertaken. The purchase of 2,600 vehicles look to have been shelved for now, however, after India announced it would accelerate the upgrade of its BMP-2 infantry combat vehicles. The tender for 2,000 engines is due to be released in a retrofit programme worth \$1.2 billion over the next five years.

A pivotal ally to the West of strategic importance in the region, **Australia** is an unassuming and burgeoning market. But with only one in ten respondents identifying it as a target market, perhaps the government's slow-paced acquisition process is hampering its potential for growth.

The AUD 7.5 billion (\$7.6 billion) Land 121 modernisation programme will see the Australian government acquire 7,500 vehicles in light, medium and heavy variants. Land 121 – also known as Project Overlander – is the largest land project in Australia's Defence Capability Plan.

In July, after a lengthy consultation period, the government announced it had awarded a \$1.45 billion contract to Rheinmetall MAN Military Vehicles Australia to supply 2,500 logistical vehicles to the Australian Defence Force.

Despite being conceived over a decade ago, the requirements for Overlander have yet to be finalised and the first trucks will not be delivered until 2016. However, with the ADF's vigorous testing process for the vehicles this due date is expected to slip further.

**Pakistan's** elite are snapping up armoured vehicles as the number of killings and kidnappings in Karachi escalate at an alarming rate. Armoured vehicle manufacturers are benefitting as a result; Streit Group, the world's largest private armoured vehicle maker, says its Pakistan business has doubled in the last 12 months. Although Pakistan's indigenous market is beginning to gain traction, the highly-anticipated Burraq MRAP being built by state-owned Heavy Industries Taxila is being held back, reportedly due to lack of cash.

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## “The world's largest private armoured vehicle maker says its Pakistan business has doubled in the last 12 months.”

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More opportunities are available in **South Korea** as its defence industry booms. In 2006, South Korean arms exports reached \$250 million but in the first ten months of 2013 exports have already surpassed \$2.6 billion. It is an indication of the surge in advanced technologies the country is responsible for, underpinned over the last decade by the global expansion of Seoul-based conglomerates such as Hyundai and Samsung, both of which have interests in the defence industry. So not only is South Korea one of the world's fastest growing exporters, data from the Stockholm International Peace Research Institute (SIPRI) also shows it is the fourth largest arms importer. The K2 Black Panther MBT is due in service in 2016 to replace the K1 MBT. The Republic of Korea Army (RoKA) has placed an initial order of 100 vehicles although this could increase to 600. The K2 is reported to be the second most expensive tank in the world behind Nexter's AMX Leclerc with a unit cost of around \$8.5 million.



*Malaysian Deftech AV-8 [Photo Malaysia Flying Herald]*



Following President Benigno Aquino's promise to modernise the **Philippines'** Armed Forces, the nation is set to underline its intentions in resisting continued aggression from China over territorial disputes. The Philippines has a modernisation plan to acquire 110 tracked Armoured Infantry Fighting Vehicles (AIFVs).

**Malaysia** is progressing with its Deftech AV-8, an 8x8 APC to be the nation's next generation multi-purpose, multi-mission, wheeled armoured vehicle. The AV-8 is due to replace its ageing Radpanzer Condor APC and will be delivered in 12 variants.



*K2 Black Panther MBT*

With 240 million inhabitants, **Indonesia** is one of the world's largest democracies and is an important source of stability and commerce in the region. As the country seeks to participate in UN peacekeeping missions it requires comparable equipment that aligns to the military standards of its partner nations. In this regard, Indonesia recently finalised a deal to procure 102 modernised Leopard 2 MBTs, 42 upgraded Marder 1A3 IFVs and 11 armoured recovery vehicles from Rheinmetall in a €216 million (\$289.6 million) deal, which includes logistical support.

**Taiwan** is in the market for amphibious vehicles with the Marine Corps stating it wants additional AAV-7A1 amphibious assault vehicles to supplement the 54 it bought back in 2006. Almost 50 AAV-7s are required to replace the ageing LVTP-5A1s acquired in the 1970s.

**Singapore's** ST Kinetics is becoming a dominant force in the export market, most notably when it overcame competition from BAE to supply the British Army with the Warthog All-terrain Tracked Carrier. In early 2013, it acquired 90% of Technicae Projetos e Serviços Automotivos Ltda, an automotive maintenance, repair and overhaul (MRO) services company based in Brazil, indicating both its intent to grow globally as well as its focus on MRO, which will be an important market over the next decade.

In November, **Thailand's** state-run defence research and development organisation, the Defence Technology Institute (DTI), unveiled the 'Black Widow Spider' – an 8x8 armoured vehicle it has been developing for the last two years. It is said to meet a range of Thailand's future armoured vehicle requirements, which include 200 MBTs required by 2017 and another 100 MBTs to replace the M41s. The country is also ordering 21 WIN 4x4 Armoured Multi-Purpose Vehicles (AMPVs).



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# LATIN AMERICA

Latin American countries are expected to continue individual drives to modernise their armed forces over the coming years, with the air force, navy, and other electronic and cyber warfare capabilities prioritised. The demand for armoured vehicles in the region will witness a slight increase, but Latin America will account for just 4.7 per cent of the global armoured vehicles market into next year.

According to IHS Jane's, the region is experiencing a new defence spending boom thanks to a combined growth in economic power and heightened concerns over national security, while SIPRI's latest report sees continental military expenditure having increased by 4.2 per cent in 2012. The widest respective national increases in the region were by Paraguay (43 per cent) and Venezuela (42 per cent). The increasing role of the military in combating drug cartels encouraged Mexico to increase its spending by 9.7 per cent.

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## **"Brazil is without doubt the heart of the Latin American armoured vehicle market."**

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Still, Brazil is without doubt at the heart of the Latin American armoured vehicle market. It's 2011 Defence White Paper (a first of its kind) set out to implement the 2008 Defence Strategy towards a more open mode of defence procurement and a more joined up method of cross-service procurement. It is widely acknowledged that the Army is taking the 'lion's share' of the national budget. The country is currently undergoing a major re-equipment programme with the target completion date of 2020. As of this year, it was ranked as the tenth biggest defence spender by **SIPRI** despite a slight decline since 2010 in overall expenditure, representing just a fraction of the GDP which hovers at 1.5 per cent. Further defence cuts were announced in 2013 but major programmes are said to be unaffected.

While the local defence manufacturing industry is growing, there have not been many recent exports to countries outside Latin America since the early 1990s. Within the continent, in the field of armoured vehicles specifically, most countries look to Brazil to first develop some of the mainstays of armoured vehicle technology and then follow suit.

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## **"There are two competing forces in Latin American defence procurement: the drive to internationalise their provider base and achieve cost effectiveness and the drive to support local industry."**

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There are, however, two competing forces in Latin American defence procurement: the drive to internationalise their provider base and achieve cost effectiveness and the drive to support local industry.

There are many unmet army requirements such as support vehicles or unarmoured vehicles which may not get funding for several more years – MBTs and IFVs being two of the major shortfalls. Light Armoured Vehicles, APCs and MRAPs, on the other hand, are fully in the spotlight as national interests demand them with urgency. Approximately 8,500 light armoured vehicles exist in the region while 11,000 light tracked vehicles are forecast to be produced over the next decade at a value of over \$30 billion, along with 27,000 light wheeled vehicles at an estimated \$12 billion.



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**Brazil** has seen violent public protests as of summer 2013, part of which have been in response to such high levels of military expenditure and security concerns relating to the upcoming FIFA World Cup and Rio Summer Olympics 2016, and requiring the deployment of armoured vehicles to take to the streets. The Brazilian Armouring Association states that private sales of armoured vehicles doubled in the period of 2004 to 2009. Colombia has similarly seen public unrest despite making significant progress in settling the long-running and devastating dispute with revolutionary guerrilla rebels. However, the widespread use of improvised explosive devices during the conflict period has left the country blighted with unexploded ordnance, making mine resistant personnel carriers a necessity.

The drastically escalating violence surrounding **Mexico's** drug war has left law and order in dire straits. Kidnappings have tripled since 2005 according to the government's own statistics. Mexico's leaders have attempted to de-emphasise the military's involvement in fighting drug cartels, but as criminal organisations are considered to be a direct adversary to the state and with the national police force without the strength to deal with the problem, there is no alternative but for armed forces to take action. Private sales of armoured cars in Mexico have also jumped between 10-20 per cent year on year for the past five years, significantly overshadowing government sales.

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**“Private sales of armoured cars in Mexico have jumped between 10-20 per cent year on year for the past five years.”**

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On a more pro-active note, the Mexican Army has announced that it will invest \$6 million into doubling its manufacturing and engineering capabilities, and expand production of its DN-XI tactical armoured truck production to 200 per year. With a requirement of 1,000 DN-XIs by 2018, 50 have been delivered to date.



*The EE-9 Cascavel 6x6 on display in Ecuador*

Other nations impacted by the regional cartels include **Venezuela** (effectively the transport hub for much of the international drug trade and blighted by one of the highest murder rates in the world alongside a rise in kidnappings), **Guatemala, Bolivia, Colombia**. Meanwhile, **Peru**, having overtaken Colombia as the leading producer of coca leaf, presents something of a 'blip' in that it is a relatively safe country – at least on record – and does not currently experience the same demand for sales of armour as its neighbours.

**Argentina** and **Chile** are also relatively unaffected by the large-scale violence of organised crime but are being advised to consider a more asymmetric threat compared to their traditional spending on 'conventional' force structure as organised crime continues to seep through the regional borders.

However, it is worth noting that the surge in commercial armoured vehicles for personal security across the continent is tapering off, largely because most of those in need of such protection are thought to have already invested, even as the power of rifles and IEDs increases.

**Argentina** is operating on a \$6 billion defence budget for 2014. Much of it is to be spent on the repair and upgrade of equipment, including that at the Armoured and Mechanised Vehicle Modernisation, Repair and Conversion Centre, which is modernising the Army's M113s, Unimog 416 tactical vehicles and TAM MBTs.



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**Chile** has invested more heavily into its 'Northern Border Plan' by increasing the presence of police and armed forces across the region, while its military is providing limited "support" functions to local authorities without infringing on the laws preventing armed forces being used for internal security. Budget constraints are preventing major replacement or procurement but the Chilean Army is exploring acquisition in the areas of maintenance and recovery, spare parts, vision and night fighting technologies and target acquisition. It is also emphasising the continued development of training centres to improve the versatility and professionalism of its fleets in any given situation.

**Colombia's** geography means troops must operate across a range of deserts, mountains, plains and jungles. Forces have seen some success in offsetting the financial demands for this diversity by converting commercial vehicles to armoured tactical vehicles.

**Peru** has been undertaking trials of Russian T-90S MBTs for potential acquisition of up to 170 units. Reports suggest that programme managers have been impressed with the results to date. In addition, of the country's estimated \$508 million defence budget, close to \$45 million has been projected for light patrol vehicles and \$15.3 million for anti-riot vehicles.

Elsewhere, smaller nations in the region with growing budgets but non-expeditionary defence strategies continue to look to other regional partners to supply or lend vehicles in exchange for stronger financial ties.

**Suriname** has recently taken delivery of a number of refurbished Cascavel 6x6 armoured cars from Brazil, while Venezuela's main indigenous vehicle – the Tiuna multipurpose military vehicle (see spotlight box) – has seen successful export to a number of regional partners, including **Cuba, Bolivia** and **Ecuador**.

**Ecuador** is looking carefully at provisions for "new roles" perceived to be a focus for its land forces, including peace keeping, natural disaster relief and custom vehicles for internal security. Sweeping upgrades are being made to current systems, with the elements of engine overhaul, improved aiming and artillery systems, and enhanced communications (voice and data) within the priority list.



*The VCR-TT APC is a formidable presence in the Mexican Army*

# SURVEY DATA AND ANALYSIS

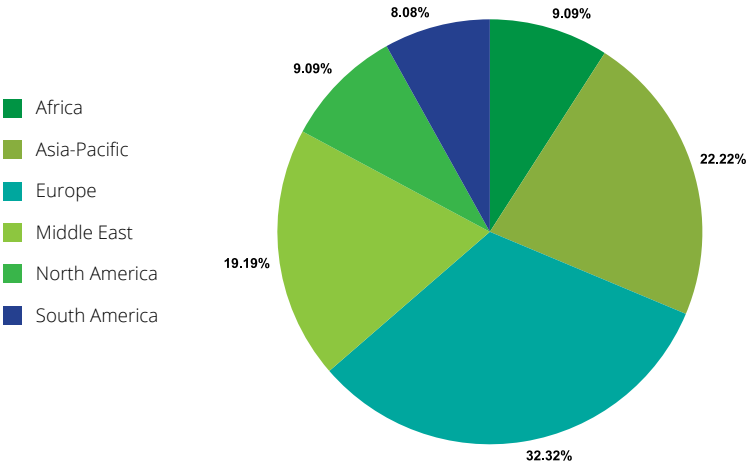


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The data in this report is based on a survey of senior executives and professionals within the armoured vehicle domain, including respondents from the commercial sector as well as from the military and government organisations. Topics examined include; the key emerging global markets, global procurement requirements, the key challenges facing armoured vehicle manufacturers over the next decade, armoured vehicle design requirements, and the enduring impact of the economic crisis.

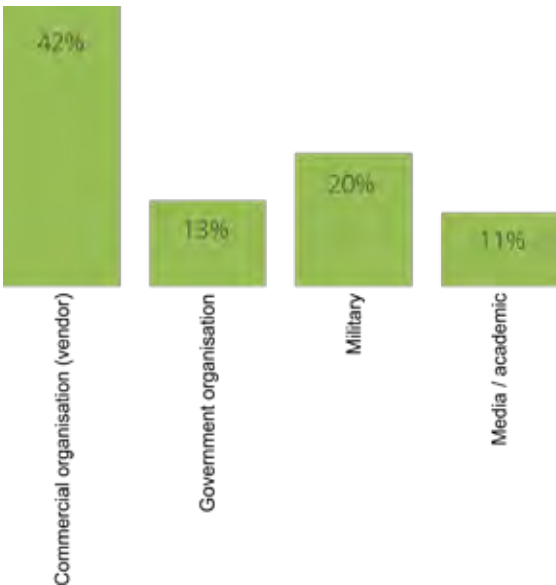
# 1. OVERVIEW OF RESPONDENTS BY REGION

What is your region of interest with regards to armoured vehicles?



# 2. ANALYSIS OF RESPONDENTS BY TYPE

Please select which of the following categories best describes your current role with armoured vehicles.





### 3. OVERVIEW OF KEY ARMoured VEHICLE GROWTH MARKETS

Which countries present the greatest potential for growth and will be targeted as a priority over the next 10 years?

India	46%
Saudi Arabia	34%
UAE	33%
Brazil	30%
Turkey	25%
China	23%
Qatar	23%
USA	20%
Nigeria	18%
South Korea	18%
Pakistan	17%
South Africa	17%
Israel	14%
Russia	14%
UK	14%
Malaysia	11%
Poland	11%
Australia	11%
Colombia	11%
Germany	9%
Mexico	9%
Thailand	8%
France	8%
Canada	7%
Central America	6%
Sweden	4%
Finland	3%
Netherlands	3%
Norway	3%

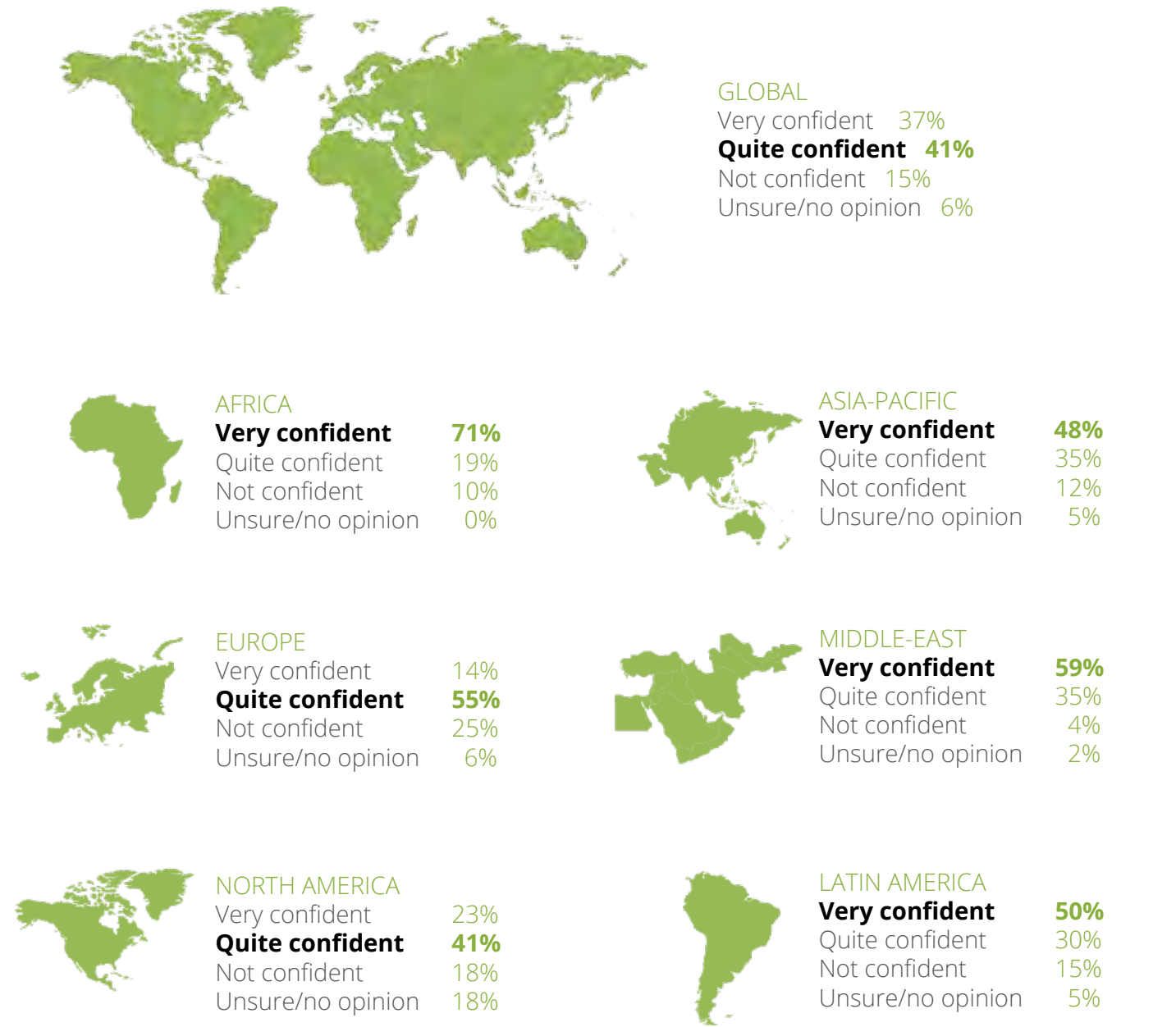


When asked to specify their specific region of interest and knowledge as pertains to armoured vehicles, respondents were then asked to quantify how confident they felt about the armoured vehicle market in that region.

The majority of respondents from all regions barring Europe and North America are ‘very confident’ in the future of their armoured vehicle market, underlining the shift in focus towards the maturing markets in Asia and the Middle East as well as the emerging market in Africa.

## 4. ANALYSIS OF ARMoured VEHICLE MARKET CONFIDENCE

How confident are you in the future of the armoured vehicle market in your region over the next 10 years?



## 5. ANALYSIS OF KEY ARMoured VEHICLE ATTRIBUTES OVER THE NEXT DECADE

Please rate how critical you view the following attributes in terms of key armoured vehicle requirements over the next 10 years.

	Unimportant	Somewhat important	Very important	Critical
Ballistic protection	1%	12%	51%	36%
Blast protection / counter-IED	2%	5%	38%	55%
Environmental control systems	7%	46%	41%	6%
Interoperable communications	2%	18%	50%	29%
Load carrying capacity	2%	42%	48%	8%
Mission range	2%	33%	50%	15%
Modular / interchangeable mission role (adaptability)	4%	30%	43%	23%
Power/weight ratio	1%	28%	51%	21%
Reducing repair/maintenance costs	2%	22%	58%	18%
Speed/ maneuverability	2%	27%	51%	20%
Easily transportable	5%	34%	42%	19%
Reduced unit cost out of factory	4%	37%	42%	17%
Reliability	1%	9%	45%	44%



Blast and IEDs are considered to be the most significant threat globally. Interestingly, only 52% of respondents in Latin America identified it as a key threat while in the Asia-Pacific region it was 79% and 76% in the Middle East. Even though a smaller majority of respondents in Latin America perceived the IED threat to be significant, it was still a majority.

The only region where the IED was not the top threat was in Africa. The RPG was considered to be the most potent and pervasive threat in the region according to 90% of respondents from the region.

## 6. OVERVIEW OF KEY THREATS TO ARMoured VEHICLE SURVIVABILITY

Thinking specifically about the requirements in your region of interest, which threats should armoured vehicles seek to protect against most when considering the present and future threat landscape?



GLOBAL	
CBRN (Chemical Biological Radiological Nuclear)	27%
Small arms ballistic attack (up to and including 7.62mm)	56%
HMG ballistic attack (above 7.62mm)	57%
Blast / IEDs	78%
Directed energy systems attack	17%
RPG	65%
Unfamiliar and difficult terrain / climate	38%

### AFRICA

CBRN (Chemical Biological Radiological Nuclear)	19%
Small arms ballistic attack (up to and including 7.62mm)	71%
HMG ballistic attack (above 7.62mm)	71%
Blast / IEDs	76%
Directed energy systems attack	10%
RPG	90%
Unfamiliar and difficult terrain / climate	38%



ASIA-PACIFIC	
CBRN (Chemical Biological Radiological Nuclear)	31%
Small arms ballistic attack (up to and including 7.62mm)	56%
HMG ballistic attack (above 7.62mm)	52%
Blast / IEDs	79%
Directed energy systems attack	15%
RPG	60%
Unfamiliar and difficult terrain / climate	44%



### EUROPE

CBRN (Chemical Biological Radiological Nuclear)	27%
Small arms ballistic attack (up to and including 7.62mm)	41%
HMG ballistic attack (above 7.62mm)	55%
Blast / IEDs	68%
Directed energy systems attack	19%
RPG	56%
Unfamiliar and difficult terrain / climate	32%



## MIDDLE EAST

CBRN (Chemical Biological Radiological Nuclear)	22%
Small arms ballistic attack (up to and including 7.62mm)	57%
HMG ballistic attack (above 7.62mm)	41%
Blast / IEDs	76%
Directed energy systems attack	4%
RPG	57%
Unfamiliar and difficult terrain / climate	28%



## NORTH AMERICA

CBRN (Chemical Biological Radiological Nuclear)	22%
Small arms ballistic attack (up to and including 7.62mm)	32%
HMG ballistic attack (above 7.62mm)	45%
Blast / IEDs	64%
Directed energy systems attack	27%
RPG	50%
Unfamiliar and difficult terrain / climate	41%



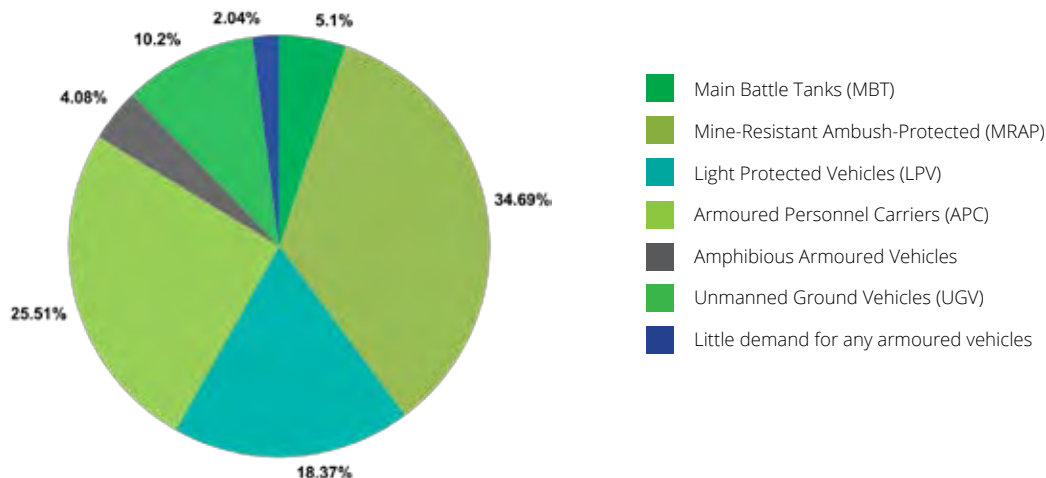
## LATIN AMERICA

CBRN (Chemical Biological Radiological Nuclear)	6%
Small arms ballistic attack (up to and including 7.62mm)	39%
HMG ballistic attack (above 7.62mm)	50%
Blast / IEDs	52%
Directed energy systems attack	18%
RPG	44%
Unfamiliar and difficult terrain / climate	21%



## 7. ANALYSIS OF GLOBAL DEMAND FOR ARMOURED VEHICLES THROUGH 2024

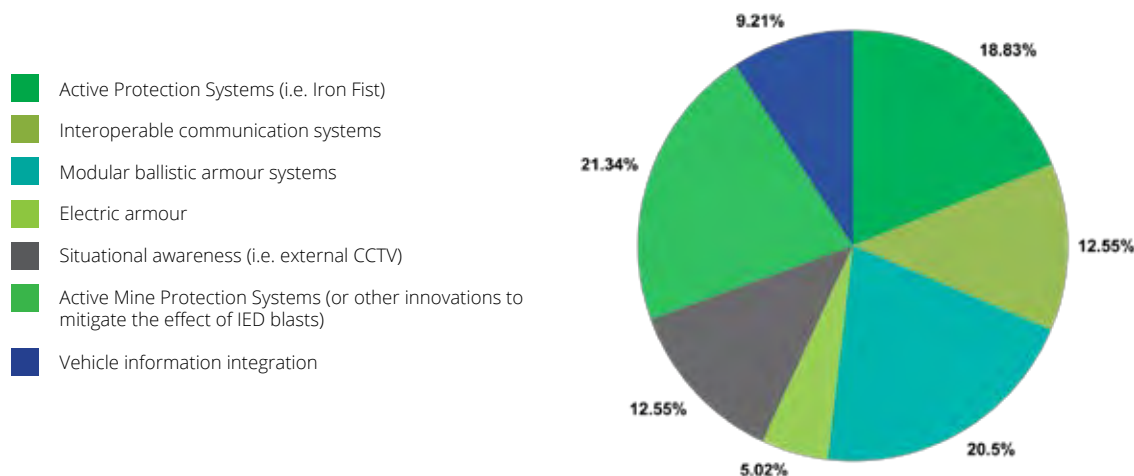
What is your region of interest with regards to armoured vehicles?



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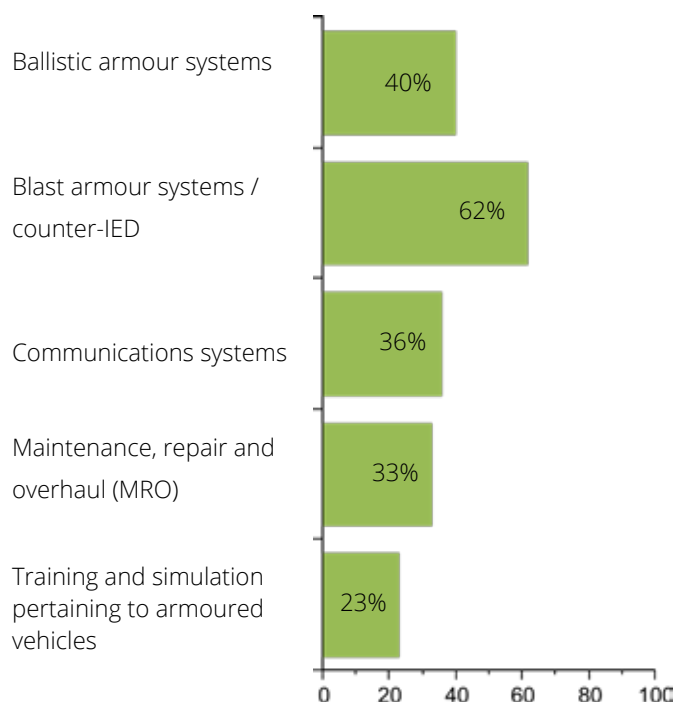
## 8. OVERVIEW OF NEW TECHNOLOGY IMPACT ON ARMoured VEHICLE MARKET

In terms of improving performance and survivability, which technology do you think will have the greatest impact on the armoured vehicle market over the next decade?



## 9. ANALYSIS OF TECHNOLOGY INVESTMENT OVER THE NEXT DECADE

Thinking about how governments will apportion budgets over the next 10 years, which areas of armoured vehicles will see the greatest investment?





# 10. ANALYSIS OF ARMoured VEHICLE CHALLENGES THROUGH 2024

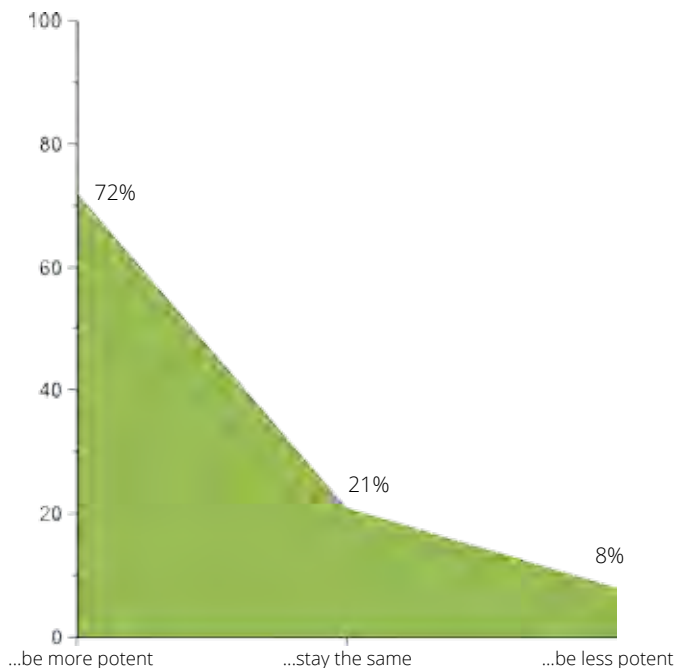
To what extent do armoured vehicle manufacturers in your region of interest find the following a challenge?

	Unimportant	Somewhat important	Very important	Critical
Budget limitations	6%	27%	65%	2%
Getting a foothold in new and emerging markets	5%	43%	45%	6%
Understanding the future theatre of operations and requirements	9%	38%	48%	6%
Working with government	11%	42%	38%	9%
Working with suppliers	21%	51%	26%	2%

Figures 11 and 12 were only completed by those respondents who identified themselves as 'military'.

# 11. OVERVIEW OF GLOBAL MILITARY PERCEPTION OF ARMoured VEHICLE FLEET POTENCY

In ten years time do you foresee your armoured vehicle fleet to...



## 12. ANALYSIS OF GLOBAL MILITARY PERCEPTION OF KEY ARMoured VEHICLE REQUIREMENTS

Please rate how critical you view the following attributes in terms of key armoured vehicle requirements over the next 10 years.

	Unimportant	Somewhat important	Very important	Critical
Lethality	11%	32%	43%	14%
Survivability	18%	39%	29%	13%
Mobility	8%	18%	70%	4%
Scope for modernisation	18%	29%	44%	9%
Communications	19%	33%	33%	14%
Flexibility (for foreign conflict and homeland security operations)	27%	32%	32%	8%
Speed	13%	42%	34%	11%
Value for money	18%	42%	32%	8%



# PROGRAMMES AND REQUIREMENTS



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COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Albania	M113 Tracked APCs	Programme for the procurement of a wheeled APC is expected
Austria	MBTs: 56 LEOPARD 2A4s (+58 stored), 206 KURASSIER (all stored) AIFVs and APCs: 112 ULANs, 71 PANDURS, 20 DINGO 2s, 12 DINGO 2/NBCs, 3 DINGO 2/Med	
Belgium	MBTs: 30 LEOPARD 1A5s AIFVs: 12 YPR-765 APCs: 25 M-113s (Engineer), 9 M-113s (BSR), 45 PANDURs (Recce), 14 PANDURs (Support), 220 DINGO-2s (includes Armoured Ambulances), 99 PIRANHA IIICs Armoured Support vehicles: 440 IVECO LMVs, 6 LEOPARD CEVs, 14 LEOPARD ARVs, 4 LEGUAN AVLBS	The Piranha IIIC has been selected under the AIV programme to replace all tracked vehicles (Leopards; YPR-765's; M-113s)  APC; Command Post; Engineer; Ambulance and Recovery Vehicle Variants are being procured
Bosnia and Herzegovina	MBTs: 72 T-84/M-84s, 45 AMX-30s, 45 M-60A1/A3s, 162 T-55s, 12 T-54s, 5 T-34s, 12 others Armoured combat vehicles: 32 BOV-1s, 21 BOV-VPs, 91 M-80s, 21 M-80A1s, 18 M-60Ps, 80 M-113s, 15 OT M-60PBs, 23 AMX-10PHQs, 4 BTR-50/50Ks, 1 BTR-60, 3 BTR-70s, 4 BOV-Ms, 1 MT-LB, 1 PT-76, 1 BRDM-1, 2 BRDM-2s, 3 SNAR-10s, 8 9P-122s, 9 9P133s, 5 M-60PBs, 62 others	
Bulgaria	MBTs: 80 T-72s AIFVs and APCs: 180 BMP-1s/BMP-23s, 37 BTR-60Cs, 301 MT-LBs	
Croatia	MBTs: 75 M-84s AIFVs and APCs: 102 BVP M-80s, 37 M-83 POLOS	The modernisation of 56 M-84s is on hold due to financial difficulties 126 Patria AMV 8x8 wheeled AFVs are being delivered (delivery completion 2013). 40-50 of these may be sold
Cyprus	MBTs: 68 T-80U/UKs, 52 AMX-30B2s, 40 AMX-30Gs AIFVs and APCs: 43 BMP-3s, 126 VABs, 168 LEONIDAS Is, 124 EE-9 CASCABEL	
Czech Republic	MBTs: 30 T-72 M4CZs AIFVs: 118 BMP-2s, 55 PANDURs 8x8 CZ APCs: 27 DINGO-2s	

**\*Current holdings sources: S. Philpott, Miltech Almanac, ASD. Information is intended for research purposes only and is subject to change. Defence IQ is not responsible for the use of this information.**

# SPOTLIGHT PROGRAMME: DENMARK'S ARMoured PERSONNEL CARRIER

## *How the Scandinavian trials are solving the question of tracks or wheels*

Presently the largest European vehicle competition underway, the Danish Army's campaign to find a production-ready fleet of armoured personnel carriers has now completed evaluation trials.

The Danish Defence Acquisition and Logistics Organisation (DALO) has allocated over half of the vehicle requirement towards APC and command post variants, while the remainder will be split between other roles, including those of recovery, engineer and ambulance.

The project has the attention of militaries, investors and manufacturers worldwide as the nature of the winning vehicle is expected to have broader ramifications on worldwide acquisition decisions.

In 2012, eight international defence companies were placed in the running to win a potential contract to meet Denmark's newly announced requirement for an estimated 360 vehicles.

The acquisition would help the Army completely replace its mechanised capability previously dominated by the ageing M113 fleet, which is already being phased out with the country's CV90 variant.

As the Army could not decide on whether the vehicle should run on tracks or wheels, it took the approach of pitting the competition against four specialist suppliers from each side of the spectrum, all of whom qualified for consideration through an evaluation process at the start of 2012.

Previous tests by other militaries to ascertain the merits and shortfalls of either type have yet to show any definitive benefit of choosing one over the other when vehicles are required for a variety of missions and environments.

Recognising that budget constraints are still of highest consideration for most European nations, the answer has fallen into the strategic realm, relying on whether the Danes believe themselves to need an all-terrain/all-weather fleet, or whether they will streamline for specialist expeditionary situations.

According to early studies on the subject, "tracked vehicles offer the best solution for a versatile platform that is required to operate over diverse terrain, including extremely difficult ground, because tracks inherently provide a greater surface area than wheels, resulting in a lower VCI (Vehicle Cone Index)... [whereas] wheeled vehicles inherently attain faster road speeds." \*

So while overall mobility may have been benefitted by tracks in a traditional combat zone, the transition to greater urban and irregular environments may demand wheels. However, limiting vehicles to primarily on-road use would be a risk.



*The Nexter VBCI is one of the finalists in the Danish APC competition*



Likewise, wheeled platforms have progressed in leaps and bounds since the beginning of the campaign in Afghanistan, where operational requirements for once vulnerable tyres and axels have pushed innovative upgrades from mine-resistance to traction over sharp slopes. That said, tracked vehicles possess the tighter turning radius and greater route flexibility – even if that involves rubble or other urban obstacles.

Also significant to the argument is the wheeled vehicle's lower noise signature and ease with which repair and maintenance can be supported – should for example, an IED disable one or more of the wheels. Yet the tracked option allows for greater weight spread and could potentially be scaled to carry heavier weapons and other equipment, which could otherwise sink a wheeled vehicle on soft or loose ground.

In 2013, the eight bidders were whittled down to two wheeled 8x8s – Nexter's VBCI and the Piranha 5 from General Dynamics European Land Systems (GDELS) MOWAG – and three tracked vehicles – the GDELS Santa Barbara Sistemas ASCOD 1, the FFG (Flensburger Fahrzeugbau Gesellschaft) G5 and the BAE Systems CV90 Armadillo.

Those that fell out of the running were wheeled contenders from ARTEC and Patria, and a tracked option from Rheinmetall Landsysteme.

Around 375 tests were carried out on each remaining platform during the field evaluation, with members of the Armed Forces testing the vehicles to the limits of their capabilities, from ergonomics to operational ease of use.

The unconfirmed Danish requirement falls between 206 to 450 vehicles, and is likely to be affected by the manufacture and lifecycle costs of the chosen platform, as well as the level of disrepair in the M113 fleet.

The contract is set to be awarded in mid-2014 and will include spare parts and through-life support.

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## **“Analysts predict the total expenditure to exceed \$1 billion.”**

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Although the exact value of the contract has not been made public, analysts predict the total expenditure to exceed \$1 billion.

\* “Wheels or Tracks,” Military Technology, Vol XVIII, Issue 7, Jul 1994, 14.



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COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Denmark	MBTs: 57 LEOPARD 2A5s AIFVs and APCs: 45 CV9035 MkIIIs, 284 M-113s APCs, 16 PIRANHA IIIs, 11 SISU ambulances (on lease from Finland), 85 MOWAG EAGLE IVs, 26 MOWAG DURO IIIP 6x6 armoured ambulances	Requirement to replace M-113 APCs. Up to 450 required – contract award planned for February 2014
Estonia	APCs: 50+XA-188s, 58 XA-180S, 20 BTR-80s, 7 MAMBAs	81 SISU XA-188 wheeled AFVs being procured from Dutch surplus, for delivery by 2015
Finland	MBTs: 100 LEOPARD 2 A14s AIFVs: 110 BMP-2s, 102 CV90s APCs: Total 300 tracked (BMP-1TJs, MT-LBUs, MT-LBVs, BTR-50YVIs) and 675 wheeled SISU XA series	25 more BAE Systems RG32M Armoured patrol vehicles are being procured, for delivery from April to July 2013 (following orders for 26 in 2010 and 23 in 2011)
France	MBTs: 320 LECLERCs (reducing to 250) Armoured cars: 342 AMX-10RCs, 192 ERC-90s AIFVs and APCs: 200+ VBCIs, 335 AMX-10P/PCs, 840 VABs, 15 ARAVIS, 5 BUFFALOs, 53 BvS10 MkIIs	630 Nexter 8x8 VBCI IFVs are being delivered in 2 variants- 520 VCI (infantry combat vehicle) and 110 VPCs (command post vehicles), with deliveries continuing until 2015 300 AMX-10RC being upgraded 558 VABs are being upgraded to TP configuration 108 AMX-10P/PCs are being upgraded Scorpion programme- 1000 VBMR multi-role armoured vehicles to replace VAB from 2016 First 70 EBRC armoured recce/combat vehicles to replace AMX-10RC and SAGAIE armoured cars from 2019. Total of 293 required
Germany	MBTs: 422 LEOPARD 1A5/2A5/2A6s AIFVs and APCs: 374 MARDERS, 244 FUCHS TPZ-1s, 100+ GTK BOXERs, 473 EAGLE IV, 62 Bv-206S, 143 DURO, 400+ MUNGOS, 689 DINGO 1/2, 101 WIESEL 1	272 KMW BOXER 8x8 are being procured for delivery by 2016. 350 PUMA IFVs are on order to replace MARDER Is 472 GDEL Eagle IVs are being delivered by 2013 KMW and RMMV are competing for the GFF4 class vehicle competition
Greece	MBTs: 170 LEOPARD 2A6 HELs, 183 LEOPARD 2A4s, 236 M-60A1s/A3s, 526 LEOPARD 1A4/A5, 507 M-48A3/A5 Armoured cars: 229 VBLs AIFVs and APCs: 398 BMP-1s, 439 LEONIDAS Mk/Mk2s, 1,818 M-113A1s/A2s	
Hungary	MBTs: 111 T-72s APCs: 616 BTR-80/BTR-80As	

COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Ireland	Tanks: 14 SCORPIONS Armoured cars: 19 AML-90s, 16 AML-60 re-tur-reted with 20mm cannon APCs: 80 PIRANHA IIIs, 27 RGM-32 Light Tactical Armoured Vehicles (LTAV)	
Italy	MBTs: 200 ARIETE Armoured cars: 300 B-1 CENTAUROS AIFVs and APCs: 398 M-113, 2,238 VCC-1/VCC-2, 15 LVTP-7, 200 DARDOS, 14 VBRI NBC, 560 PUMAs, 109 Bv-206Ss	249 IVECO Freccia IFVs are being procured in 4 variants, for delivery by 2014. 1150 LINCE (IVECO LMV) are being delivered in a 5 year programme. 16 VTMM armoured ambulances are on order
Lithuania	AFVs: 224 M-113A1/A2 APCs, 10 M1114 HMMWVs (Recce), 114 HMMWVs (other versions), SISU E13TP 8x8 armoured trucks	
Macedonia	MBTs: 31 T-72s APCs and AIFVs: 10 BMP-2s, 1BMP-2K, 12 BTR-80s, 58 BTR-70s, 28 M113s, 9 LEONIDAS, 81 HERMELINS, 3 HERMELIN Sn, 10 MTLBs	
Netherlands	AIFVs and APCs: 192 C9035 MKIIs, 6 FOX-NBC-RS, 86 BUSHMASTERS, 410 FENNEKS	212 BOXER 8x8 AFVs are on order for delivery by 2016 (including 27 cargo only variants)
Norway	MBTs: 52 LEOPARD 2A4NOs AIFVs and APCs: 104 CV-9030Ns, 500 M-113s, 74 Patria XA-Series wheeled APCs, 24 DINGO 2s	146 new or re-manufactured BAE Hagglands CV-90s are being procured- 74 IFVs; 15 command posts; 16 combat engineering vehicles; 16 multi-role vehicles; 21 reconnaissance vehicles; 4 training vehicles
Poland	MBTs: 128 LEOPARD 2A4s, 232 PT-91, 319 T-72Ms Recce: 268 BRMD-2s NBC: 108 BRDM-2RS, 250 DECON Track (IRS-2)  AIFVs and APCs: 1,136 BWP-1s, 363 ROSOMAKs, 208 HMMWVs	Looking to replace its Honker, Honker 2000, Skorpion-3 vehicles and UAZ469 jeeps with 1,600 4x4 light multipurpose vehicles at approx \$60 million  Ordered 307 additional Rosomak 8x8 multipurpose armoured vehicles for delivery by 2a019  Has a major requirement for tracked and wheeled vehicles and is anticipated to release an RFP in 2014.

COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Portugal	MBTs: 37 LEOPARD 2A6s, 72 M-60A3s, 4 M-48A5s Armoured cars: 13 V-150 CHAIMITEs, 31 Panhard M-11s APCs: 180 M-113A1s, 34 M-113A2s, 47 M-577A2s, 31 V-200s, 158 PANDUR IIs, 29 HMWVs	
Romania	MBTs: 249 T-55s, 42 TR-580s, 54 TR-85MIs AIFVs and APCs: 20 MLI-84s, 69 B33 TAB ZIMBRUs, 374 TAB-71s, 150 TAB-77s, 364 TAB-79s, 31 PIRANHA IIICs, 60 MRAPs	Additional 8x8 vehicles are planned
Serbia	MBTs: 199 M-84s, 13 T-72s AIFVs and APCs: 320 M-80s, 49 M86 CAV-VPs	
Slovakia	MBTs: 17 T-72s AIFVs and APCs: 103 BVP-1s, 90 BVP-2s, 24 OT-90s, 7 TATRAPAN 6x6	
Slovenia	MBTs: 45 M-84 and 30 M-55S1 (upgraded T-55s) APCs: 30 SVARUNs, 85 VALUKs, 41 M1114 HMMWVs, 10 COBRA NBC Recce Vehicles	135 Patria 8x8 AMVs are being procured in 6 variants by 2013
Spain	MBTs: 216 LEOPARD 2Es, 108 LEOPARD 2A4s Armoured cars: 84 CENTAURO B1s, 95 VEC-M1s AIFVs and APCs: 345 PIZARROs, 682 BMR-600s, 575 LINCes, 180 RG-31s	575 LINCes are being delivered in several batches. Spain has abandoned its programme to buy a new AIFV
Sweden	MBTs: 120 Strv-122 (LEOPARD 2Ss) AIFVs and APCs: 549 CV-90s, 490 Pbv-302s, 170 Patria XA-200 6x6, 93 Bv-206S, 280 RGM-32s	113 Patria 8x8 AMVs are on order for delivery from 2012-2014, with an option on a second batch (of 113) Requirement for 100 light tracked vehicles  6 KODIAK armoured engineer vehicles are being delivered.  48 BvS 10 MkII all terrain vehicles are on order - delivery from 2012-2013. Option on further 127
Switzerland	MBTs: 212 Pz87 LEOPARD 2s  AIFVs and APCs: 186 CV930s, 535 PIRANHA 8x8, 250 M-63/73s (M-113) Other AFVs: 40 PIRANHA 6x6 protected am- bulances, 154 EAGLE I, 175 EAGLE II and 120 EAGLE III recce vehicles, 220+70 DUROIIIP protected carriers	12 Surplus Pz87 MBTs are being con- verted into KODIAK armoured engi- neer vehicles.  An additional 70 DURO IIIPs and 12 Piranha IIIs are on order for delivery by 2013.

COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Turkey	<p>MBTs: 298 LEOPARD 2A4s, 923 M-60A1/A3s and M-60Ts, 394 LEOPARD 1A1/1A3/1A4s, 1,980 M-48A5T1/-T2s</p> <p>AIFVs and APCs: 1,698 AIFV series, 3,000+ M-113A1/A2, 170 BTR-80, 300+ KOBRA</p>	<p>ALTAY MBT planned for production by 2015.</p> <p>468 BMC KIRPI/Hedgehog MRAPS on order for army, gendarmerie (300 delivered so far)</p> <p>100 KIRPI planned by police</p> <p>Amphibious Assault Vehicle (AAV) planned, also System Carrier Vehicle (tracked), 4x4 crowd/riot control vehicle for the police</p> <p>12 Amphibious Armoured Combat Engineering Earthmover (AACEE) procured in 2012.</p> <p>Requirement for 336 FIRTINAs and 138 PANTERS</p> <p>Up to 2,700 tactical wheeled vehicles required</p>
UK	<p>MBTs: 345 CHALLENGER IIs (reducing to approx. 270)</p> <p>Armoured reconnaissance: 318 SCIMITARs, 138 SABRES</p> <p>AIFVs and APCs: 786 WARRIORS, 1,150 FV-432s/ FV-432 Mk3 BULLDOGS, 535 MASTIFFs, 157 RIDGBACKs, WOLFHOUD, HUSKY, 400+ JACKALS/JACKAL 2s, 401 PANTHER command and liaison vehicles</p>	<p>Warrior upgrade programme- 786 vehicles.</p> <p>400 Foxhounds/Ocelots on order.</p> <p>ASCOD SV selected as Scout SV for service entry in 2015 or 2016- - up to 580 vehicles</p> <p>102 Mastiff on order</p> <p>30 Terrier armoured combat engineer vehicles are on order for 2013 delivery</p> <p>99 Royal Marines Vikings are to be updated by BAE Systems, subject to financial approval</p>



# SPOTLIGHT PROGRAMME: BRITAIN'S WARRIOR UPGRADE PROGRAMME



*The success of the Warrior warrants large-scale investment*

## *Equipping the old guard with new lethality*

**Type** Armoured Infantry Fighting Vehicle

**Crew** 3 + 7

**Manufacturer** BAE Systems

**Length** 6.34m

**Height** 2.79m

**Width** 3.03m

**First in service** 1988

**Wheels** Tracked

**Upgrade cost (estimate)** \$1.6 billion

The £1 billion Warrior Capability Sustainment Programme (WCSP) is one of the largest and most significant projects being pushed through the UK MoD as it seeks to upgrade and refit the Warrior Infantry Fighting Vehicle with improved lethality systems and an electronic architecture that will future-proof it until 2040.

"Effectively this is about improvements to lethality that will really transform our military capability," Lt Col Howard Pritchard, Senior Requirements Manager for the DE&S Combat Tracks Group, told Defence IQ. "Warrior CSP is the Army's key priority."

The UK government awarded Lockheed Martin the contract last year with Defence Secretary Philip Hammond saying that the new fleet will "give commanders and their soldiers greater flexibility and firepower."

Peter Pietralski, Business Area Chief Engineer Vehicles, explained that the firm is working towards future-proofing the Warrior out to 2040.

"The key area is in the ability to provide more power generation on the platform itself," Pietralski explained. "The main engine generator has the ability to provide much more electrical power than is currently required, which provides a good growth path for the future should more equipment be added to the platform."

In addition, Pietralski also said that the electronic architecture will allow for a certain degree of future-proofing while the new 40mm cannon is a "new generation technology" that "has the potential for significant enhancements to its ammunition system to enable it to meet future threats."

To make sure armoured vehicles are always future-proofed going forward, they need to be thought of as like "clothes hangers" according to Pritchard – they must be designed from the outset to be interchangeable and modular.

The principal upgrades Warrior is receiving with this £1 billion facelift are improvements to its lethality, electronic architecture and modular armour systems.

Of the three, biggest priority is lethality as the vehicle is now incorporating a 40mm cannon that will enable the crew to have a previously unobtainable fire and move capability.

On the commercial side Lockheed Martin was keen to stress the importance of its supply chain in delivering this contract and announced that it had opened a dedicated new facility at Nuneaton with its engineering partner, MIRA. programme manager, who said that "reliability is a big part of this programme ... it permeates every decision we make."



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Pietralski agrees: "The key challenge for WCSP is to provide a reliable platform ... [to] ensure it's capable, not only for tomorrow but well into 2040." He explained that Lockheed is implementing rigorous testing procedures at every stage and is looking all the way down to the sub-system level to achieve the reliability required.

"We are integrating a number of new technologies into the existing platform around space, weight, height and power and we are making good progress on these fronts," said Gilding. "Our focus is to ensure that the technology is mature by the time we reach Critical Design Review, which will be followed by firing trials with men in the loop in 2014."

The most recent milestone saw Lockheed Martin conduct a System Architecture Design Review this month and it said design work will now continue to further reduce risk.

Lockheed is currently working towards completion of the demonstration phase and the subsequent start of production in 2016. The anticipated in-service date for WCSP is 2018, with the government likely to procure at least 381 vehicles.

With budgets tight, some may question the obligation to spend £1 billion on upgrading an armoured vehicle considering today's predominantly COIN threat landscape.

Despite this apparent deviation, Warrior is in fact being described as "a central pillar for the Army's future ground manoeuvre capability" because under the new Army 2020 structure, the armoured infantry is viewed as pivotal.

The UK is now in the process of winding up a second counter-insurgency campaign in the space of ten years and lessons of how armoured vehicles have needed to perform under these challenging conditions are being keenly preserved.

"What we must not lose sight of is that armoured vehicles warfare is still out there and we've got to build our requirements around a wider set of scenarios than just being able to do counter-insurgency operations in Afghanistan," said Lt Col Howard Pritchard, Senior Requirements Manager at the DE&S Integrated Soldier Systems Executive.

"AFV design will change – it already has changed as a result of our operations – but the armoured battlefield I think is certainly here to stay."



COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Armenia	MBTs: 110 T-72s and T 54/55s AIFVs and APCs: 104 BMP-1/2s, BMP 1Ks, BRM-1Ks, 36 BTR 60/70/80s	
Azerbaijan	MBTs: 283 T-72s, 98 T-55s AIFVs and APCs: 42 BMP-1s, 39 BMP-2s, 1 BMP-3, 20 BMD-1s and 58 BTR-60/70/80s, plus 196 MT-LBs, 45 MATADOR and 45 MARAUDER mine protected vehicles	An additional 30 MATADOR and as many MARAUDER mine protected vehicles are on order, with deliveries to be made by late 2012.
Belarus	MBTs: 75 T-80s, 1400 T-72s AIFVs and APCs: 1,163 BMP-2s, 96 BMP-1s, 153 BMD-1s, 161 BRM-1s, 57 BTR-60s, 433 BTR-70s, 191 BTR-80s, 9 BTR-Ds, 61 MT-LBs	
Georgia	MBTs: 200 T-72s, a few T-54/55s AIFVs and APCs: 100 BMP-2s, 80 BMP-1s, some 100+EJDERs, a few remaining BTR-70s and 80s, 300 Otokar COBRAs, some 40 WOLFs, 30+ DIDGORIs	
Kazakhstan	MBTs: 650 T-72s, 280 T-62s AIFVs and APCs: some 800 in total- 508 BMP-1/2, BTR 60/70/80s	12 BTR-82 8x8 wheeled APCs, 2 BURATINO heavy flame thrower tracked vehicles, and 3 BMP-T TERMINATOR tank support fighting vehicles are being received from Russia.
Moldova	AFVs: 44 BMD-1s, 11 BTR-80s, 91 TAB-71, 55 MT-LBs, and 44 BMD-1s	
Russia	MBTs: 3,500 T-80s, 9,000 T-72s, 100+ T-90s. Many T-62s, T-64s and T-54/55s are still being stored. Armoured cars: 2,000 BRDMs AIFVs and APCs: 25,000 BMP-1/2s, some 700 BMP-3s, some 25,000 BTR-50/60/70/80-152s, 2,000 BMDs, 4,000 MT-LBs	Procurement of the T-90 MBT continues in small numbers (some 15-20 per year). The development programme of the new T-95 MBT has been cancelled in favour of further improvements to the T-90 series. 358 IVECO MLV 4x4 protected carriers are on order and a programme has been approved for the local construction of up to 1,750 additional vehicles.  Will be proceeding with a delivery of BMP 3 infantry fighting vehicles Airborne forces reportedly considering new BTR-82s and Tigr armoured cars.



## RUSSIA AND CIS

COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Tajikistan	20-30 T-72 MBTs, 100 BMP 1/2 AIFVs	
Turkmenistan	MBTs: 10+ T-90s, 700 T-72s AIFVs and APCs: 500-600 BMP 1/2/3s. 700 BTR 60/70/80s	Two repeat orders for 10 T-90 MBTs each are expected in the future to complete re-equipment of a tank battalion
Ukraine	MBTs: Official figure of 768- T-64B and T-64M BULATs, T-72s, T-84 OPLOTs AIFVs and APCs: official figure of 2,304- BMP-2s, BMP 1s, BTR 60/70/80s, BTR 3/4s, a few BRDM-2s	The new T-84 OPLOT has been formally declared as the standard MBT of the Ukrainian army through a Government Act, and deliveries are underway at a slow pace.  An eventual total of 400 T-64Bs are being upgraded to the T-64M BULAT configuration, at the rate of some 20 tanks per year.
Uzbekistan	Some 300 MBTs, 700 APCs and other AFVs	



## RUSSIA AND CIS



COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Angola	MBTs: 22 T-72s, 18 T-62s, 50 T-55s, 66 T-54s, and 12 PT-76s APCs: 100 BMP-2s, 80 BRDM-1/-2s, 62 BTR-60/152s and OT-62s, 60 BMP-60s	
Benin	Tanks: 20 PT-76 light Armoured cars: 7 M-8s, 12 BRDM-2s, 8 VBL M-11	
Botswana	Tanks: 52 SK-105 KURASSIER, 24 SCORPIONS	
Burkina Faso	Armoured cars: 22 FERRETS, 8 M-8s, 15 AML-60/-90s, 22 EE-9 CASCAVELs	
Cameroon	Armoured cars: 40 COMMANDO- V-150s	
Central African Republic	MBTs: 4 T-55s Armoured cars: 8 FERRETS, 4 BRDM-2s, and 8 VAB air defence vehicles, 28 ACMATs	
Chad	MBTs: T-55s (numbers unknown) AIFVs: BMP-1s, BMD-2s (numbers unknown) Armoured cars: 45 AML-60s and AML-90s, 4 ERC-90s, 8 COMMANDO V-150s	
Congo	MBTs: 26 T-54/55s, 14 T-59s, 3 PT-76s light, 8 Type-62s Armoured cars: 24 BRDM-1/-2s, some Panhard M3s APCs: 20 BTR-152s, 18 BTR-50s, 28 BTR-60s	
DRC	MBTs: 20 T-72s, 48 Type 62s light, 16 Type 59s Armoured cars: 40 AML-90s, 65 AML-30/-60s APCs: 12 M-113s, 70 M-3s, 12 YW-531s	
Cote D'Ivoire	Tanks: 5 AMX-13 light Armoured cars: 14 M-3s, 7 ERC-90s, 8 AML-60s, 6 AML-90s APCs: 10 VABs	
Djibouti	Armoured cars: 4 AML-60s, 16 AML-90s, 18 AML-245s, 10 M-11 VBLs APCs: 10 BTR-60s, 9 CASSPIR MkIIIs	
Equatorial Guinea	AIFVs and APCs: 15 PANDUR Is, 8 BTR-152s Armoured cars: 6 BRDM-2s	
Ethiopia	MBTs: 75 T-62s, 240 T-54/55s Armoured cars: 70 BRDM-1/-2s AIFVs and APCs: 20 BMP-1s, 90 BTR-40/-60/-152s	200 T-72/E1 MBTs are on order from Ukraine, to replace the T-54/55 fleet



COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Gabon	Armoured cars: 8 COMMANDO V-150s, 12 ERC-90s, 14 EE-9 CASCAVELs, 10 EE-3 JARACAs, 8 M-11 VBLs APCs: 10 VXB-170s, 12 EE-11 URUTUs	
Ghana	APCs: 50 PIRANHAs, some TACTICAs and 39 RATELs (including armoured cars with 90mm gun), some SISU XA-185s	
Guinea	MBTs: 6 T-54/55s, 18 PT-76 light Armoured cars: 22 BRDM-1/2s, 2 AML-90s, APCs: 36 BTR-40/50/60s	
Guinea Bissau	Armoured cars: 12 BRDM-2s APCs: 30 BTR-50/60s, 18 Type-56s	
Kenya	MBTs: T-72s, 80 Vickers Mk3s Armoured cars: 3 SALADIN, 16 FERRET, 30 AML-90s, 20 AML-60s, 8 SHORLANDs, 5 SARACENs APCs: 38 UR-416s, 8 Panhard M3s, 85 BRMs	OTT Technologies has been awarded a contract for the supply of up to 150 armoured vehicles. Further procurement almost certain, including replacements to Vickers Mk3s
Madagascar	AFVs: 4 BRDM-2s and 3 AMFs	
Malawi	Armoured cars: 8 FERRETs, 12 FOXs, 12 ELANDs	
Mali	MBTs: 18 Type 62s Armoured cars: 20 BRDM-2s APCs: 8 BTR-152s, 20 BTR-40/60s	
Mauritania	MBTs: 30 T-54s/55s Armoured cars: 39 AML-60s, 14 AML-90s, 35 SALADINs, 4 SARACENs	
Mozambique	MBTs: 62 T-54/55s, 16 PT-76 light Armoured cars: 28 BRDM-1/-2s APCs: 80 BTR-60s, 60 BTR-152s	
Namibia	AIFVs and APCs: WZ523s (number unknown), 18 CASSPIRs, 6 BTR-152s Armoured cars: some BRDMs	
Niger	Armoured cars: 12 AML-60s, 88 AML-90s APCs: 14 M-3	
Nigeria	MBTs: 108 Vickers Mk3s, 24 T-55s, 5 SCIMITARs light Armoured cars: 118 AML-60/90, 16 SALADINs, 50 FOXs, 75 EE-9 CASCAVELs APCs: 12 SARACENs, 70 PIRANHAs, 250 4K7FAs, 67 MT-LBs, 154 COBRAS	Local industry currently developing an indigenous APC

# SPOTLIGHT PROGRAMME: NIGERIA'S PF1

## *A rare indigenous African APC programme*

Like its geography, the prevalence of African-born armoured vehicle programmes above the South African border could be described as 'Saharan'.

However, over the past year, word has arrived that the Nigerian industry is chipping away at a solution of transporting soldiers and officers during this time of national unrest.

Security forces, as well as civilian vigilante groups reportedly encouraged by the Nigerian Army, continue to try to combat the wave of violence led by Boko Haram, which has struck with both conventional small arms and with IEDs over the past 12 months.

The Pf1 is a wheeled Tactical Armoured Personnel Carrier currently under "advanced development" by Nigeria's Proforce Defence Ltd and expected to be aimed at local police and military markets, including the national army.

For that reason, the core benefit of the programme is intended to be its versatility, with variants including APC, police transport, combat surveillance, missile weapon carrier and ambulance.

The company has criticised the import of armoured vehicles when local production is possible and has hailed President Goodluck Jonathan's planned automotive policy aiming to turn Nigeria into a vehicle manufacturing giant.

Work is being undertaken at the plant in Ode-Remo, Ogun State, with the intention for all Nigerian personnel to be fully equipped with the necessary manufacturing skills by mid-2014 and producing at a capacity of 40 vehicles per month.

At 5.1m long and 2.49 metres wide, the military version of the Pf1 will have a slightly smaller profile than the police variant but offer a ground clearance of over 3.5 metres.

According to the manufacturers, the vehicle will be capable of travelling across rough terrain and over difficult obstacles up to 500mm, fording water up to 800mm depth, and will be able to climb a gradient of 60 per cent.

The Pf1 is designed with a seating capacity of ten personnel including driver and commander and evaluation tests are being carried out this year on the resiliency of the transparent and opaque ballistic armour, consisting of an all-welded steel monocoque hull at a basic level of STANAG 4569 Level 2 (but could be upgraded to Level 4) and mine protection is to STANAG 4569 Level 2b with Level 3a an option.

The vehicle will run on a MTU 4R 106 Td21 Euro 3 compliant diesel turbocharged intercooled engine, allowing the APC to reach 0-80 km in 26 seconds and topping off at a maximum 100 km/h.

Armament will include a 7.62mm GPMG on a Pintle Mount, two banks with a 3 x 76mm Grenade Launcher.

Proforce Armoured Patrol and Combat Vehicles, applying COTS technologies, have been successfully deployed on operations to Mali and north east Nigeria.



*The Pf1 could prove to be the first of many new indigenous armoured vehicles from Africa*

COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Rwanda	Armoured cars: 10 AML-60s, 12 VBL M11s APCs: 12 M-3	
Senegal	Armoured cars: 10 M-8s, 28 AML-60s, 24 AML-90s, 4 M-20s, 12 VXB-170 APC: 12 Panhard M-3s, 10 M-3 half tracks	
Sierra Leone	MBTs: 2 T-72s Armoured cars: 4 SALADIN AIFVs and APCs: A few BMP-2s, a dozen BRT-80s, 10 PIRANHAs	
South Africa	MBTs: 172 OLIPHANT 1A/1Bs Armoured cars: 114 ROIKAATs, 53 RATEL ZT3 tank destroyers APCs: 931 RATEL III, 428 CASSPIR: 538 MAMBA	264 BADGER 8x8 AFVs on order in five versions (Command, Mortar, Missile, Infantry Section, Fire Support) to progressively replace RATELs. Deliveries started in 2012.
South Sudan	100 T-72 and several dozen T-55 MBTs	
Sudan	MBTs: T-85 IIIs (numbers unknown), 20 M-60A3s, 24 T-62s, 54 T-54/55s, 50 T-59s, 65 Type 62s light Armoured cars: 14 SALADINs, 30 V-150 COMMANDOs, 40 FERRETs, 6 AML-90s, 30 BRDM—2s	
Tanzania	MBTs: 26 Type-59s, 24 T-62s, 36 SCORPIONs light Armoured cars: 24 BRDM-2s APCs: 50 BTR-40/-152, 28 Type 56s	
Togo	MBTs: 4 T-54/55s, 8 SCORPION light Armoured cars: 9 M-8/20s, 10 AML-60/90s, 36 EE-9 CASCAVELs, 2 M-11 VBLs APCs: 30 UR-416s, 4 M-3s	
Uganda	MBTs: 90 T-55s, 10 PT-76s light APCs: 20 BMP-2s, 20 BTR-40/-152s	
Zambia	MBTs: 16 Type 59s, 8 T-54/55s, 20 PT-76s light Armoured cars: 24 FERRETs, 76 BRDM-1s/2s APCs: 10 BTR-60s	Light- and medium-vehicles required, as well as upgrades and sustainment measures across the fleet
Zimbabwe	MBTs: 35 Type 59s, 8 Type 69s Armoured cars: 20 AML-90s, a few ELANDs, 90 EE-9 CASCAVELs, 36 UR-416s	

## SPOTLIGHT PROGRAMME: SOUTH AFRICA'S HUSKY VMMD



*The Husky and other mine detection systems will be much in demand for years to come [Photo DCD Protected Mobility]*

Considered the birthplace of the mine-resistant ambush protected (MRAP) vehicle, South Africa has long been an innovator of designs and technology geared towards countering the improvised explosive device, including the ubiquitous V-hull.

Now, the nation's Vehicle Mounted Mine Detector (VMMD) system – previously known as 'Chubby' – from DCD Protected Mobility is becoming the preferred option for many other countries with an urgent need for mine detection and route clearance.

The system itself is integrated onto the Husky vehicle, which boasts optimal blast protection and rapid maintenance, offering in-field repairability that can allow it to resume operational capabilities within two hours of an explosion.

Under the VMMD, two separate vehicles are employed – one to detect the IED and the other to detonate it with a towed trailer, meaning combat engineers do not have to dismount to confront the device.

With its V-Hull, frangible design, appliqué armour and advanced detection suite, including ground penetrating radar (GPR) and pulse induction (PI) detectors, the vehicle has not suffered any recorded fatalities to date.

*Where African ingenuity has become a life-saving export*

Husky Vehicle Mounted Mine Detector (VMMD)

**Type** Mine detection and route clearance system

**Manufacturer** DCD Protected Mobility

**Crew** 2

**Length** 7.34m

**Width** 2.53m

**Height** 3.54m

**First in service date** 2005 (modern)

**Wheels** 4

Aside to being a combat proven system since the early 1980s, over 400 Huskies have been sold since January 2012.

The United States announced its intention to purchase the Husky Mk3 in 1998, which have since seen use in Bosnia and the Middle East, and in 2010 was listed by Army officials as one of the "greatest inventions" in its arsenal.

A two-seat variant (2G) was designed in more recent years in order to spread the tasks of the human operator inside the cab and enhance overall situational awareness while driving.

To date, over 500 Huskies have deployed to both Iraq and Afghanistan, while aside to the South African Armed Forces, other long-term export nations include Canada, France, Australia, Uganda and the UK.

Spain ordered the Husky 2G in 2012 and has so far taken ownership of 6 units on a contract worth over \$20 million.

Turkey began to take delivery of the 2G in June 2013, seeing a need to protect its conflict-ridden borders with Syria, Iran and Iraq, particularly in light of the government's ongoing dispute with Kurdish rebels.



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It is rumoured that Turkey intends to purchase up to 50 Husky vehicles at an estimated cost of \$116 million.

Given the Afghanistan drawdown, DCD is now shifting its commercial focus back to Africa, commissioning the establishment of a \$10 million plant to manufacture armoured cars at Isando outside Johannesburg and pledging to continue to support the burgeoning African economy through local manufacturing deals.

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COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Canada	<p>MBTs: 20 LEOPARD 2A6M CANs on loan from Germany (plus two ARVs until September 2012), 20+ LEOPARD 2A4M CANs, 66 LEOPARD C-2s (plus 9 AVLBs, 8 ARVs, 9 AEVs)</p> <p>Recce vehicles: 203 COYOTES</p> <p>Armoured cars: 100 COUGARs</p> <p>AIFVs and APCs: 341 M113AW/MTVLs, 274 GRIZZLYs, 651 KODIAKs (LAV III), 27 HUSKY AVGP, 191 BISONs</p>	<p>Close Combat vehicle programme: 108 vehicles with option on a further 30. Contract award expected in 2013 - first deliveries in 2015</p> <p>Tactical Armoured Patrol Vehicle (TAPV): 500 vehicles with an option on up to 100 more, for delivery 2014-2016 - Textron selected, testing underway</p> <p>LAV-UP upgrade programme: 550 vehicles with an option on 80 more</p> <p>FME programme: 4 LEOPARD MBTs to be converted into Buffalo ARVs, delivery 2013-2014</p>
USA	<p>MBTs: 7,900 M1A1/M1A1 AIM/M1A2 ABRAMS. Numbers of older M60A1s, M60A3s and M551 SHERIDANs remain in storage.</p> <p>AIFVs and CFVs: 6,500 M2A2/M2A3 and M3A2 BRADLEYs</p>	<p>Upgrade programmes are aimed at standardising the ABRAMS fleet to the M1A2 SEP V2 and M1A1 AIM SA configuration by 2014</p> <p>The M2A2s are being progressively converted into the A3 configuration. A development programme is underway for the Ground Combat Vehicle to eventually replace the BRADLEY</p>

## SPOTLIGHT PROGRAMME: JOINT LIGHT TACTICAL VEHICLE (JLTV)



**Country** USA

**Cost** \$14 billion (approx. \$23 billion including development)

**For** U.S. Army, USSOCOM, and U.S. Marine Corps

**No. vehicles** 54,500

**Unit cost** \$400,000 (approx.)

**Programme stage** Engineering, Manufacturing and Development (EMD) phase

**Potential contractors** Lockheed Martin, AM General, Oshkosh Defense

**Variants** 2 (a four-passenger Combat Tactical Vehicle (CTV) and a two-passenger Combat Support Vehicle (CSV))

**Decision due** 2015

**Replacing** Humvee

**Secondary armament** 4x M7 smoke grenade dischargers

**Operational range** 300 miles

**Speed** 70 mph



# NORTH AMERICA



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## SPOTLIGHT PROGRAMME: AMPHIBIOUS COMBAT VEHICLE (ACV)

Andrew Feickert of the Congressional Research Service outlines the following requirements for ACV as laid out in a Marine Corps Request for Information:

- The proposed vehicle must be able to self-deploy from amphibious shipping and deliver a reinforced Marine infantry squad (17 Marines) from a launch distance at or beyond 12 miles with a speed of not less than 8 knots in seas with 1-foot significant wave height and must be able to operate in seas up to 3-foot significant wave height.
- The vehicle must be able to manoeuvre with the mechanized task force for sustained operations ashore in all types of terrain. The vehicle's road and cross-country speed as well as its range should be greater than or equal to the M-1A1 Tank.
- The vehicle's protection characteristics should be able to protect against direct and indirect fire and mines and improvised explosive device (IED) threats.
- The vehicle should be able to accommodate command and control (C2) systems that permit it to operate both at sea and on land. The vehicle, at a minimum, should have a stabilised machine gun in order to engage enemy infantry and light vehicles.

**Country** USA

**Cost** \$6.8 billion

**RFP** due 2014

**For** U.S. Marine Corps

**No. vehicles** 573 (expected)

**Contractors** General Dynamics

**Replacing** Assault Amphibious Vehicle

**Decision due** 2020

**Key requirements** Speed



COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Algeria	MBTs: 180+ T-90s, 285 T-72s, 300 T-62s, 275 T-54/55s, 50 AMX-13 light Armoured cars: 54 Panhard AML-60, 115 BRDMs AIFVs and APCs: 684 BMP-1s, 230 BMP-2s, 100 FAHD, 445 BTR-50/60s, 48 BVP-2s	The UAE's Tawazun Holdings signed an agreement in 2012 to establish a joint company producing NIMR armoured vehicles in Algeria
Bahrain	MBTs: 180 M-60A3s AIFVs and APCs: 25 YPR-765s, 110 M-113A2s, 100 M-3s, AT-105 SAXONS Armoured cars: 22 AML-90s	
Egypt	MBTs: 2,040 M-1A1s, some 500 T-54/55s, 500 T-62s, 1,450 M-60A3s AIFVs and APCs: a few remaining BMP-1s, 1,042 YPR-765s, about 2,300 M-113s, about 200 BMR-600s, 800+FAHDs Other AFVs: 112 COMMANDO SCOUT armoured cars, 159 M-106A2/M-125A2 mortar carriers, 50 M577A2 command posts, a few remaining BRDM-1/-2s, about 40 M-901 ITV tank destroyers, 210 YPR-765 PRAT tank destroyers, 26 M-981 FISTVs	
Iran	MBTs: 150+ ZULFIQAR 1/2/3s, 50 M-60A1s, 100 CHIEFTAINS, 100 T-62s, some 200+ T-72S, 350 T-72Z, 50 SCORPIONS Armoured cars: EE-9 CASCAVEL, FERRET, GREYHOUND, FOX AIFVs and APCs: some 200 BMP-1s, BORAGHS, 200 M-113A1, 320 BTR-40/50/60/152s	Is working on modernised Scorpion APCs and reactive armour upgrades to all vehicles in its stock
Iraq	MBTs: 140 M1A1 ABRAMS, 77 T-72s and 50 T-55s AFVs and APCs: Some 150 BMP-1s, BTMLs, 115 BTR-80s, 20 FUCHS, 88+BTR-4s	16 M548A1 tracked logistic vehicles, 8 M113A2 armoured ambulances and 8 MMWWVs requested/ordered/procured, but not yet delivered. 420 BTR-4s are being delivered from the Ukraine. 1,050 COUGAR light armoured vehicles have been authorised  440 M113A2 APCs are being refurbished in the U.S. for delivery to Iraq
Israel	MBTs: 1,400+ MERKAVA Mk/Mk2/Mk3/Mk4s, some 1,400 M-60s, 100 M-48s APCs: Some 5,500 M-113s, 50+ NAMERS, 300+ ACHZARITs, NAGMACHONs and NAK-PADONs, 150 ZE'EVs, some DAVIDs	600 NAMER APCs are being delivered  ACHZARITs are being upgraded



## MIDDLE EAST AND NORTH AFRICA



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## SPOTLIGHT PROGRAMME: MOBILE STRIKE FORCE VEHICLE (MSFV)

**Country** Afghanistan

**No. vehicles** 634 (over numerous contracts)

**No. wheels** 4x4

**Based on** M1117 armoured security vehicle (ASV)

**Variants** 3 (APC with .50 calibre machine-gun turret, an APC with OGPK and an ambulance variant)

**Crew** Up to 10m, depending on variant

**Unit cost** \$0.84 million - \$1.15 million

**Weight** 14,000 kg

**Transmission** Automatic

**Hull type** V-shaped

**Engine** Cummins diesel engine



General Sher Mohammad Karimi, chief of general staff of the ANA, speaking at the International Armoured Vehicles Conference 2013 in Farnborough, UK, said high-end armoured capabilities are "critical to the survival of the state to develop capabilities to fight insurgents."

General Karimi also commented that the MSFV has been "significantly upgraded from the original design to make it more survivable in the IED environment."

COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Jordan	MBTs: 288 AL HUSSEINs (CHALLENGER 1s), 350 KHALIDs, 268 M-60/A1/A3s, 80 SCORPIONs AFVs/APCs: 100 ACV, 126+ M113A2 Mk.1, 340+ RATEL, 100 SPARTANS, 120 SARACENS, 130 SALADINS, 140 FERRETS	
Kuwait	MBTs: 236 M1A2 ABRAMS, some 150 M-84s, 45 CHIEFTAINs are in storage AIFVs and APCs: 254 DESERT WARRIORs, 40 BMP-2s, 55 BMP-3, 60 M-113s and 80 FERRET armoured cars are stored	
Lebanon	MBTs: 180 T-54s/T-55s, 60 M-48A5s, 10 M60A3s APCs: 16 AIFV B-C25s, some 1,100 M113s, some 80 VABs	Awaiting German approval of sale of ex-Belgian LEOPARD 1/A5 MBTs. Plans for up to 100 NIMR II protected carriers on hold



# MIDDLE EAST AND NORTH AFRICA



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COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Morocco	MBTs: 48 T-72s, 320 M-60s, 184 M-48A5s, 105 KURASSIER tank destroyers AIFVs and APCs: 54 AMX-13s, some 400 M-113s, 55 UR-416s, 290 VAB/VTs, 60 RATELS Armoured cars: 16 EBR-75s, 110 AMX-10RCs, 10 AMX-10Ps, 140 AML-90s, 35 AML-60s, 20 ERC-90 LYNXs	Has been taking delivery of 88 BearCat 4x4 APCs for its Auxiliary Forces Planned upgrade and refurbishment of 200 M1A1 Abrams tanks to M1A1-SA
Oman	MBTs: 38 CHALLENGER 2s, 43 M-60A3s, 60 SCORPIONS Armoured cars: 38 SALADINs, V-150 COMMANDOs, 9 CENTAURO 120mm, AHDs, Some VABs, 15 AT-105 SAXON, 9 STORMER, 160 PIRANHA, 50+ WZ 551	
Qatar	MBTs: 32 AMX-30s Armoured cars: 20 EE-9 CASCAVELs, 12 AMX-10RC, 36 PIRANHA AIFVs and APCs: 30 AMX-10Ps, 14 AMX-VTT, 160 VABs, 8 COMMANDOs, RATELS (numbers unknown)	Has ordered 180 LEOPARD 2A7 MBTs for delivery from late 2014 or early 2015. These will replace obsolete AMX- 30s. 16 tank howitzers, 22 Higuard MRAPs and 5 SHERPAs on order for 2012-2013 delivery
Saudi Arabia	MBTs: 366 M1A2 ABRAMS, 406 M60A3s (stored), 300 AMX-30s (stored) Tank destroyers: 200 OTO VCC-1s with TUA turret, some AMX10P/HOT Armoured cars: 140 PIRANHAs, 350 AML-60/90s AIFVs and APCs: 400 M2 BRADLEYs, 1,600 M-113s, 500 AMX-10Ps, EE-11 URUTUs, 160 PIRANHA 8x8, 50 AL FAHD OF-40-8 8x8 Marines – 140 BMR-600 National Guard – 417 LAV-25, 113 LAV Anti-Tank, 73 AMS	Package being negotiated for 655 HM- MWVs. Further batch of 724 LAV II 8x8 being delivered- 84 more requested.  New LAV procurement approved for Mountain Brigade
Syria	MBTs: 1,400 T-72s, 1,000 T-62s, 200 T-55MVs, 2000 T-54/55s (mostly stored) Armoured cars: 400 BRDM-1s, 600 BRDM-2s AIFVs and APCs: 2,300 BMP-1s, 1,500 BTR- 50/60/152 and OT-64s	
Tunisia	MBTs: 24 M-60A1s, 52 M-60A3s, 54 KURASSIER tank destroyers Armoured cars: 22 SALADINs, 20 AML-90s, 10 AML-60s, 18 EE-9 CASCAVELs APCs: 120 M-113A2s, 18 EE-11 URUTUs	600 NAMER APCs are being delivered  ACHZARITs are being upgraded



## MIDDLE EAST AND NORTH AFRICA



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COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
UAE	MBTs: 390 LECLERCs (plus 46 LECLERC ARVs), 80 SCORPION light Armoured cars: 60 AML-90s AIFVs and APCs: 450 BMP-3s, 133 ACVs, 28+ RG-31s, 32 FUCHS NBC reconnaissance vehicles	Upgrade programmes for BMP-3s and Leclerc MBTs Requirement for 600 8x8 wheeled combat vehicles 5 Patria AMV 8x8s on order. 135 BMP- 3s being upgraded. RG-31 protected carriers on order
Yemen	MBTs: 39 T-72s, some 1,000 T-62s and T-54/55s, 140 M-60A1s Armoured cars: 60 SALADINs, 100 BRDM-2s, 125 AML-90s, 10+FERRETS AIFVs and APCs: 150 BMP-1s, BMP-2s, BMD-1s, 76 M-113A1s, 650 BTR-40/60/152s, 6 M-577A1s, 6 M-578s, WALIDs	

## SPOTLIGHT PROGRAMME: ALTAY MBT



**Country** Turkey  
**Programme cost** TBC (initial \$500 million prototype funding)  
**No. vehicles** TBC  
**In-service date** 2015 (expected)  
**Contractors** Otokar and Hyundai Rotem  
**Unit Cost** \$5.5 million (estimate)  
**Weight** approx.. 65 tonnes  
**Length** 7.5 m (hull), 10.3 m (gun forward)  
**Width** 3.6 m  
**Height** 2.4 m  
**Crew** 4 (commander, gunner, loader, driver)  
**Armour Composite** Armour  
**Main armament** MKEK 120 mm 55 caliber smoothbore  
gun[4]  
**Secondary armament** 1 x Aselsan STAMP/II stabilized re-  
mote controlled turret  
1 x 12.7 mm heavy machine gun  
**Engine** Multi-fuel 1500 hp (MTU) or 1800 hp (local design)  
**Suspension** Hydropneumatic  
**Operational range** 430 km  
**Speed** 70 km/hr (43 mph) max.



# MIDDLE EAST AND NORTH AFRICA



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COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Australia	MBTs: 59 M1A11M ABRAMS APCs: 431 M113AS4s, 257 ASLAVs (PIRANHA 8x8) in 7 variants, 838 BUSHMASTERS in 5 versions	Project LAND 121 is for 7,500 protected and unprotected vehicles in various phases Project NINGAUI will provide an Australian Protected Route Clearance Capability Project LAND 400 is for a family of vehicles to replace the M113s and Light Armoured Vehicles from 2025. M113s recently upgraded
Bangladesh	MBTs: 232 T-59s/T-69s/T-69Gs, 8 T-62s APCs: 19 MT-LBs, 108 BTR-80s and BTR-70s, 60 FAHDs, some RN-64s	44 Chinese MBT 2000s are on order
Brunei	APCs: 45 VABs, 2 SULTANS, 1 SAMSON, 1 STORMER, 2 SAMARITANS, 6 AL THA'LAB long range patrol vehicles	
Cambodia	MBTs and light tanks: 103 T-54s, T-55s and PT-76s AIFVs and APCs: 74 BMP-1s, OT-64s, BTR-60s, BRDM-2s	
China	MBTs: 7500 in total- T54s, T-59s, T-62s, T-69s, T-88s, T-96s, T-99s, 800 T-62/63 APCs: 5,000 K-63s, Type 55/56s, Type 501s, W-531s, W-701s	A new generation of tracked AIFVs is being introduced in small numbers
India	MBTs: 124+ ARJUNS, 310+347+T-90S BHISH-MAs, 1700 T-72/T-72M1 AJEYAs AIFVs and APCs: 800+ BMP-1s and BMP-2s, 100 CASSIPR MK2s	Future Infantry Combat Vehicle- 2,600 vehicles to replace BMP-2s 1,657 T-90S MBTs are planned by 2020-25, with 1,000 built locally under license
Indonesia	APCs: 200 AMX-VCI MICVs, 50 AMX-10Ps, 20 STORMERS, 60 SARACENS, 58 V-150 COMMANDOs, 130 BTR-40s, 50 VABs, 18 VBLs, 154 APS-3 ANOAs, P2 protected carriers	A decision was announced in December 2011 for the purchase of 100 LEOPARD 2A6 MBTs from German and/or Dutch surplus
Japan	MBTs: 400 16+Type 10s, 280 Type 90s, Type 74s MICVs and APCs: 70+ Type 89s, 30 Type 60s, 340 Type 73s, 100 Type 87 scout cars, 260 Type 82s, 160 Type 96s	The mid-term Defence Programme calls for the procurement of 68 MBTs and 75 other AFVs
North Korea	MBTs: 3600 T-54/55s, 175 Type 59s, 300 PT-76s, 50 Type 62 light Armoured Cars: 140 BA-64s  APCs: 2,500 in total- 200+BMP-1s, 1600 BTR-40/-50/-60/-152s	



## ASIA-PACIFIC



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## SPOTLIGHT PROGRAMME: PROJECT LAND 121 (OVERLANDER)



Project LAND 121 will deliver a networked and integrated capability as a significant contribution to the modernisation of the land forces. The new vehicles represent a significant increase in capability, replacing multiple vehicle fleets that have been in service since the early 1980s.

**Country** Australia

**No. vehicles** 7500 protected and unprotected vehicles

### Phase 3A

**AKA** Lightweight and Light Capability (LLC)

**For** Army and Air Force unit.

**Vehicles** 2146 unprotected Mercedes-Benz G-Wagons and 1799 Haulmark trailers.

**Variants** G-Wagon will consist of 8 variants with

**Delivery** Through to mid-2016

### Phase 3B

**Vehicles** 2700 medium and heavy vehicles and 1700 trailers

**Contractors** Rheinmetall MAN Military Vehicles Australia (for vehicles) and Haulmark Trailers (for trailers)

**Type** Protected vehicles (for operational deployment and tactical training) and unprotected vehicles (primarily for tactical training)

**Replacing** Unimog, Mack and S-Liner trucks

### Phase 4

**Vehicles** 1300 vehicles with companion trailers

**Roles** Command, liaison, utility and reconnaissance roles.

**Contractor** Thales Australia

**Platform** Hawkei

**Status** Testing ongoing



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COUNTRY	CURRENT ARMOURED FIGHTING VEHICLES	FUTURE PLANS
South Korea	MBTs: 1550 Type 88 K-1/K-1A1Es, over 950 M-48A2Cs, M-48A3s and M-48A5Ks, 250 M-47s, 36 T-80Us MIFVs and APCs: K-21 NIFVs (deliveries under-way), some 1,400 KIFVs, 110 BMP-3s, 500 M-113s and M-577s, 400 KM-900s, 61 LVTP-7s, 45 M-8s, 93 BV-206s	K2 Black Panther MBT- to replace K1 MBT. Service entry delayed to March 2014
Malaysia	MBTs: 48 PT-91M PENDEKARs, 30 SCORPIONS Armoured cars: 140 AML-60/90s, 92 FERRETS, 150 SIBMAS 6x6 FSVs AIFVs and APCs: 267 ACV-300 ADNANs, 111 KIFVs, 190 V-100/-150 COMMANDOs, 460 CONDORs, 180 SIBMAS, 45 STORMERs, 85 URO VAMTACs	Deftech AV-8 8x8 indigenous AFV family (257 vehicles, 12 variants, prototype in 2012) Up to 36 6x6 AFVs required for operations with Malaysia UNIFIL forces in Lebanon
Mongolia	MBTs: 350 T-54/55s MICVs and APCs: 400 BMP-1s, 130 BRDM-2s, 200 BTR-40s, BTR-60s	
Myanmar	MBTs: Type 8511s, 50 T-72s, 100 Type 69IIs, 100 Type 63s APCs and AIFVs: 300+ Type 90s and Type 85s, BTR-3Us	
Nepal	Armoured Cars: 40 FERRETS APCs: 35 BTR-70s, 90 CASSPIRs, 150 Indian derivative vehicles, VABs, NORINCO WZ551Bs	
Pakistan	MBTs: 350+ AL KHALIDs, 320 T-80UDs, 200 T-85IAPs, 250 Type 69s, 500 Type 59s/AL-ZARAR, 100 T-60/63 light AIFVs and APCs: 800 M-113s, HAMZAs, 140 AL FAHDs, 500+ TALHAs, 120 BTR-70s	Production of AL KHALID MBTs continues towards a stated goal of 600 tanks
Philippines	Tanks: 20 SCORPION APCs: 6 FNSS AIFVs, 80 M113s, 80 V150 COMMANDOs, 40 AIFVs, 150 GKN SIMBAs	Modernisation plans call for the procurement of an additional 110 tracked AIFVs
Singapore	MBTs: 96 LEOPARD 2A4SGPs AIFVs and APCs: 180+ BIONIXs and BIONIX IIs, TERREX 8x8, 250 M-113 ULTRAS	
Sri Lanka	MBTs: some 60 ex-Czech T-55M2s AIFVs: 40 BMP-1s and BMP2s, 10 Type 85s APCs: at least 300 of various types, including South African BUFFELs, BTRs, 80 Type 63s, 80 WMZ 551 A/Bs, Type 89 VPs and 12 Type 86s	



## ASIA-PACIFIC



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COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Taiwan	MBTs: 460 M-60A3s, 450 CM11/CM12s, 650 Type 64s APCs: 1,100 M-113s, 300 V-150 COMMANDOs, 15+CM-32s	K2 Black Panther MBT- to replace K1 MBT. Service entry delayed to March 2014
Thailand	MBTs: 125 M-60A3s, 53 M-60A1s, 75 M-48A5s, 100-110 T-69s, 24 T-59s, 106 STINGRAYS, 144 SCORPIONS, 150 M-41s APCs: 340 M-113s, 150 V-150 COMMANDO's, 1,400 Type 85, 96+121 BTR-3E1 8x8, 97 WMZ-55B1 6x6, 96 REVA protected carriers	223 BTR-3E1 APCs being delivered from Ukraine Up to 100 T-84-120 OPLOT MBTs to replace M41s Scorpion light tanks to be overhauled 21 WIN 4x4 armoured multi-purpose vehicles ordered Up to 200 MBTs required by 2016-2017
Vietnam	MBTs: 250 T-62s, 600 T-54/55s, 200-T-34/85s, 100 Type 59s, a few M-48s, 600 PT-76 and Type 62 light Armoured cars: 80 BRDM APCs: 1,500 BTR-40/-50/-60/-152, Type 56, K63, some M-113s and a few V-100 COMMANDOs	

## SPOTLIGHT PROGRAMME: BRONCO (WARTHOG)

**Country** Singapore  
**Manufacturer** ST Kinetics  
**Exported to** UK (where it is known as the Warthog), Thailand  
**Length** 8.6m  
**Height** 2.2m  
**Width** over track 2.3m  
**No. Crew** 16  
**Max speed** 60 km/h  
**Gradient** 60%  
**Side slope** 30%  
**Trench crossing** 2m  
**Engine** Caterpillar 3126B  
**Engine horsepower** 350 bhp  
**Transmission** Fully automatic  
**Steering** Hydraulic, automated  
**Unladen weight** 11200 kg  
**Combat payload** 4800 kg  
**Gross vehicle weight** 16000 kg  
**Main armament** FN MAG 7.62 mm General Purpose Machine Gun (ATTC); or Ultimax 100 5.56 mm Light Machine Gun  
**Secondary armament** Smoke grenade launchers  
**Deployment** Designed for C-130  
**Amphibious** Yes  
**Unit cost** \$1.7 million (approx.)



# ASIA-PACIFIC



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COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Argentina	MBTs: 230 TAMs (medium), 5 PATAGONS light, 56 AMX-13s, 118 SK105 tank destroyers Recce: 47 Mowag, 48 AML-90s, 9 GLOVERs AIFVs and APCs: 120 TAMs, 450 M-113A1s and M-113A2s, 22 M-577A1s, 28 M-548s, 36 AMX VCIs Marines: 12 ERC-90, 11 LVTP-7, 13 LARC-5, 24 PANHARD VCR/TT, 24 HMMWVs	240 M113A1S are being upgraded to A2 standard  More than 320 tanks and IFVs are expected to be modernised in the imminent future.
Bolivia	Tank Destroyers: 34 SK-105 KURASSIERs Armoured cars: 24 EE-9 CASCAVELs APCs: 15 V-100 COMMANDOs, 60 M-113s, 12 EE-11 URUTUs, 24 Mowag ROLANDs	
Brazil	MBTs: 128 LEOPARD 1A1s, 220 LEOPARD 1A5s, 287 M41s (stored) Armoured cars: 409 EE-9 CASCAVELs APCs: 224 EE-11 URUTUs, 22 M-59s, 584 M113s Marines: 18 SK-105A2 KURASSIERs, 30 M113s, 12 LVTP-7A1s, 14 AAV-7A1s, 30 PIRANHA IIIs	350 small armoured 4x4 vehicles required for reconnaissance and police operations.  2,044 VBTP-MTs ordered to replace Urutus (and eventually CASCAVELs). 376 M-113s to be modernised to M-113A2Mk.1- rest of fleet to be cannibalised
Chile	MBTs: 140 LEOPARD 2A4s, 122 LEOPARD 1Vs AIFVs: 173 MARDERS APCs: 139 YPR-765s, 252 M-113A1/A2s, 184 PIRANHAs (6x6 and 8x8)	
Colombia	AFVs: 127 EE-9 CASCAVELs, 80 EE-11 URUTUs, 30 M-8 GREYHOUNDS, 60 M-113s, 39 M1117s	Further 39 M1117s are on order
Cuba	MBTs: 400 T-62s, 600 T-54/55s, 400 T-34s (stored) AIFVs and APCs: 250 BRDM-1s, 400 BMP-1s, BMDs, 500 BTR-40/60/152s	
Dominican Republic	Tanks: 2 AMX-13 light, 12 M-41A1 light Armoured and scout cars: 20 AMLs, 8 V-150 COMMANDOs, 35 M3A1s APCs: 30 half-tracks	
Ecuador	Tanks: 104 AMX-13s (light) Armoured cars: 35 AML 60/90s, 10 EE-9 CASCAVELs, 3 ERC-90 SAGAIEs APCs: 20 M113s, 60 AMX-VCIs, 10 UR-416s, 15 M3 halftracks, 18 EE-11s, 18 Agrale MARRUA' 4x4 recce vehicles	
El Salvador	Armoured cars: 8 AML-H90s APCs: 8 UR416s, 30 M-37B1s	



## LATIN AMERICA

## SPOTLIGHT PROGRAMME: BRAZIL'S VBTP-MR GUARANI



*The Guarani will be in production until at least 2030  
[Photo Andre Gustavo Stumpf Filho]*

*The vehicle that has helped to spark a national industry renaissance*

**Manufactured by** IVECO

**First in service** 2012

**Type** Armoured Personnel Carrier

**Troops** 2+9

**Wheels** 6

**Estimated unit cost** \$1,384,000

**Variants** Command Post, Anti-tank, Recon, Anti-riot, Anti-air, Comms

**Length** 6.9m

**Width** 2.7m

Originally known as the URUTU-III modernisation programme, the Guarani Viatura Blindada Transporte de Pessoal, Media de Rodas (VBTP-MR) is a 6 x 6 armoured personnel carrier that began life in the 1990s.

Deliveries began in December 2012 with a production cycle scheduled to last through to 2030 for the full order of 2,044 vehicles.

It was in 2009 when Brazilian Defence Minister, Nelson Jobim, first announced the beginning of the \$6 billion contract and according to IVECO's Latin American president Marco Mazzu, the Guarani is one of many programmes lending to the "renaissance of the defence industry in Brazil."

After years of discussions the Brazilian Army finally signed a \$118.6 million four years later with IVECO for the initial build and delivery of the first 86 Guarani units, with large scale production beginning in 2013.

The Guarani platform will effectively be a modular template which will allow it to be manufactured in many variants including that of a communications station and an ambulance. An 8x8 version is also on the agenda.

It will play a support role with heavy armaments, such as the Mk44 Bushmaster II 30mm gun and an ELBIT Systems UT30. The tower will allow 360 degrees of anti-tank capability, including a laser rangefinder, thermal night vision, and the ability to fire accurately on the move.

At fighting weight, the standard, non-amphibious variant will meet the recommended 18 tonnes, and will carry up to 10 crew members, plus driver. This will allow it to ride comfortably in the under-development Embraer KC-390 transport aircraft, which Brazil has also commissioned for introduction by 2014.

Although the contract could be seen as another example of Brazil's burgeoning defence budgets, there are concerns that all allocations are not being met. At the International Armoured Vehicles conference in March 2013, Fleet Admiral Marco Antonio Guimaraes, General Commandant of the Brazilian Marine Corps, said that "we are always answering questions about the budget" with regards to the Guarani. He couldn't provide a concrete answer on final numbers, budget or delivery.



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Guimaraes did indicate that partnerships were vital however to “sustain our fleet,” suggesting that IVECO got it right during the proposal phase when it trumped other potential providers by offering to establish a base in Brazil to manufacture the vehicles and by handing over the vehicle IP to the Brazilian Army as well.

With Brazil ensuring that Guarani will be mostly built through COTS technology and be delivered with a Brazilian content proportion of 60%, it is understood that full manufacturing capacity will see a supply chain in Brazil of approximately 110 direct and 600 indirect suppliers.

In December 2012, Brigadier General Philip Linhares Luiz Gomes, the head of the research department for the Brazilian Army, confirmed that Argentina had acquired 14 VBTP-MR Guarani 6x6 Army vehicles in efforts to augment a joint peace-keeping force with Chile, marking the first export sale of the vehicle.

Following the announcement, IVECO declared South America to be a booming market and has eyed opportunities to refit armoured vehicle fleets in Chile, Ecuador and Colombia.



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COUNTRY	CURRENT ARMoured FIGHTING VEHICLES	FUTURE PLANS
Guatemala	APCs: 10 M113s, 18 ARMADILLOs, 7 V100s	
Guyana	APCs: 4 SHORLANDs	
Honduras	Tanks: 12 SCORPION light, 3 ACID/SCIMITARs APCs: 10 RBY Mk-1, some 70 SALADINs	
Jamaica	APC: 15 V-150 COMMANDOs (only 2 reported operational)	Further 39 M1117s are on order
Mexico	Armoured cars: 40 M-8s, 41 MAC-1s, 123 ERC-90F LYNXs APCs and other AFVs: 406 AMX-VCI, 34 M2A1s, 22 BUFFALO, 95 BDXs, 40 VBL M-11s, 40 HWK-11, 40 VCR/TTs, 25 Mowag ROLANDs Marines: 25 VAP-3550s, some BTR-70s, some VAP-3560/1s	Investing \$6m into doubling manufacturing and engineering capabilities. Requires delivery of 1,000 DN-XI armoured tactical trucks by 2018
Nicaragua	MBTs: 31 T-55s Armoured cars: 22 BRDMs APCs: 31 BTR-60s, 100 BTR-152s	
Paraguay	APCs: 3 M-3A1, 3 M-8, some 20 EE-9 CASCAVELs, 10 EE-11 URUTUs	
Peru	MBTs: 50 T-55M1 LEONs, 325 T-55Ns (stored), 96 AMX-13s APCs and other AFVs: 60 M-8 armoured cars, 300 M-113A1s, 225 UR-416s, 300 M325s, 20 Fiat/OTO 6616s, 30 BRDM-2s, 12 BTR-60s, 20 CASSPIRs, 40 V-100 COMMANDOs	Reportedly undertaking trials of T-90S MBTs for potential acquisition of 170
Suriname	AFVs: 15 EE-11 URUTUs, some modified EE-9 CASCAVELs, 12 VP-408s	
Uruguay	Tanks: 15 T-55, 17 M-24, 22 M-41 A1 Armoured cars: 15 EE-9 CASCAVELs, 16 EE-3 JARARACAs APCs: 15 BMP-1s, 24 M-113s, 55 CONDOR, 48 GAZ 3971 VODNIKs, 53 OT M-64 SKOTs, 47 OT M-93, 3 MT-LBs, 140 Mowag PIRANHA 6x6 derivatives	
Venezuela	MBTs: 92 T-72B1Vs, 82 AMX-30s (being withdrawn), 66 SCORPION-90, 31 AMX-13C90s Armoured cars: 42 DRAGON ASVs APCs: 13+ BMP-3s, 70 AMX-13 VTTs, 10 TPz-1 FUCHs, 115 V-100/V-150 DRAGONs, 32+ BTR-80As	309 TIUNA all terrain vehicles on order



## LATIN AMERICA

## SPOTLIGHT PROGRAMME: VENEZUELA'S TIUNA UR-53AR50



*The Venezuelan TIUNA is an alternative to the Humvee for several Latin American countries*

### *The 'Latin Humvee' still proving a popular choice*

**Manufactured by** Centro Nacional De Repotenciacion Cenareca, C A

**First in service** 2004

**Type** Auxiliary Vehicle

**Troops** 9

**Wheels** 4

**Estimated unit cost** \$70,000

**Variants** Command Post, Anti-tank, Recon, Anti-riot, Anti-air, Commss

**Length** 4.92m

**Width** 2m

Since the turn of the century, Venezuela has been on a peacetime military build-up, defying critics in Colombia and the United States who have seen the stockpile as a liability if elements begin to seep into the hands of drug-trafficking cartel groups.

While the American AMG-HMMWV Humvee has become an iconic symbol of military mobility over the past 30 years – despite now falling out of favour in many armed forces due to the advent of the modern IED – Venezuelan strategists wanted a similar transport vehicle to both appeal to the need for versatility and to present the same imposing profile on its national roads.

Manufactured by CENARACA and unveiled in June 2004, the 4x4 is being domestically built to replace ageing inventory and provide an added boost to local industry, though components and parts are largely imported.

Venezuela is believed to have around 400 in operation across its armed services, and is now understood to have ordered an additional 300.

Elsewhere, Bolivia has at least five, Ecuador two, and approximately 106 were donated to Cuba.

Among the variants on offer, the TIUNA can be configured for Reconnaissance, Anti-Tank, Command Post, Anti-Air, Communications and Anti-Riot specifications, as well as being open for fitting cranes and fuel or water tankers.

Armament options are flexible. For one example, the Reconnaissance variant offers four mounts, one for a Browning M-2HB-QCB 12.7 x 99 machine gun and two for FN-Mag 7.62 x 39 mm, along with room for two Dynamics Saab Bofors AT-4 anti-tank rocket launchers. This model is defined as strong, fast and agile, and armed enough to give crew firepower and fast response, as well as the ability to quickly traverse hostile environments.

The Tiuna runs on a 5.3 litre GMC Vortec engine with automatic transmission or a Ford Triton V8 engine with a synchronous gearbox. This vehicle weighs about a ton and a quarter, and can support a load of up to 2,000 kilograms. Its chassis, suspension system and brakes are all reinforced and the vehicle boasts a centre of gravity lower than that of the Humvee.



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# IN FOCUS

## ESSAYS EXAMINING ARMoured VEHICLE TRENDS AND TECHNOLOGIES



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# DO WE NEED THE MBT?

**As the 21st Century rolls on, the anticipation of mass tank battles between NATO nations and the Warsaw Pact across Northern Europe has faded into the pages of our history books. Counterinsurgency is now the pervasive concern for the coming years, and with it comes a question that is making politicians and generals squirm. Is there still a need for the Main Battle Tank? **George B Duckworth** (Southampton University) believes there to be a case...**

Consider, if you will, the British Challenger.

It has seen action in theatres from Bosnia to Kosovo and more recently in both Iraq campaigns. These later conflicts in the Gulf can be said to represent two of the most iconic conflicts following the collapse of the USSR, and more importantly, can ably illustrate the move from conventional warfare to modern irregular warfare.

The Challenger proved itself throughout Operation Granby, the British part in the liberation of Kuwait in August 1990 involving 180 Challenger I MBTs and 53,462 troops. It was credited with the longest tank kill in history at a range of 5,110m against a static T-62<sup>1</sup> and destroyed over 300 Iraqi vehicles<sup>2</sup> with no losses. The advanced ammunition, night sights and range finding equipment meant the Challenger could engage its targets at close and long range, with equally effective results. Such a close quarters battle was the 14th/20th Hussars advance toward Objective COPPER SOUTH; the engagement became known as the Battle of Al Haniyah. Major General Patrick Cordingley noted after the war that he "outranged his [the Iraqi General] tanks by at least 1500m"<sup>3</sup>

Eighteen years later, at the battle of Basrah, the Challenger II demonstrated its capability in hit and run raids to incredible effect with most defenders fleeing in favour of engaging even a single tank. In the interest of counterinsurgency (COIN) capturing key targets intact can be far more pivotal than the destruction of the immediate threat. Despite the intense enemy fire from all directions the Challenger II was not penetrated despite claims of over 70 RPGs hitting its exposed and weakened underside.<sup>4,5</sup>

After the end of the conventional campaign, the tank in Iraq had no choice but to move to COIN operations, but as coalition forces struggled to control the population, the Challenger II proved to be a boon simply because of its sheer presence. The image of a 65 tonne impenetrable vehicle has serious effect on morale - for the enemy, it cripples; for friendly troops it boosts. The presence of tanks on the street does a great deal to deter enemy action.<sup>6</sup> Equally the Challenger II was deemed impervious to all but the most massive of IEDs and proved excellent in the role of a minesweeper. Similarly, the US found the Abrams suitable in the urban COIN environment. Using HESH rounds, they were capable of demolishing entire buildings. A similar tactic was used during the opening phases of the war.

While the British eventually decided not to send Challenger II to Afghanistan, deeming it unsuitable to both the terrain and the strategy of engaging with the local population, the USMC, Canadians and Danes have all deployed their MBTs there.

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**"As coalition forces struggled to control the population, Challenger II proved to be a boon simply because of its sheer presence."**

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1 <http://www.military-quotes.com/forum/world-record-longest-tank-shoot-t75592.html>

2 [http://en.wikipedia.org/wiki/Operation\\_Granby](http://en.wikipedia.org/wiki/Operation_Granby)

3 <http://www.iss.co.za/pubs/monographs/no2/cordingley.html>

4 <http://news.bbc.co.uk/1/hi/scotland/2908679.stm>

5 <http://news.bbc.co.uk/1/hi/uk/2905817.stm>

6 <http://www.benning.army.mil/armor/content/pdf/IDR%2010%20Sept%202012.pdf>



The USMC has had one company (14 tanks) in Afghanistan's Regional Command – Southwest since 2011, with commanders praising its off-road tactical mobility as a huge advantage amid IED-ridden routes.

The USMC decision to deploy tanks was based on the success of Danish and Canadian armoured units. Those that oppose the use of tanks in this environment have cited the rusting remains of Soviet tanks, reminding Afghan civilians of previous conflicts. However, Brigadier Frederick Hodges said "I personally had never made the connections that [the Afghans] would see the tanks and it would remind them of the battle days of the Soviet Union.

The same would be true then of helicopters or any other weapon system". Hodges also went on to say that the presence of the Abrams in Afghanistan should have come sooner: "It sure would have been nice to have an M1A2 Abrams tank at the Battle of Wanat or Keating".

Colonel Ken Adgie gave the opinion that "there's something very reassuring to people about having a tank parked outside a marketplace. However what you just cannot do with a tank platoon is clear a village". The use of these the Abrams has therefore been viewed as largely positive from the American viewpoint.

In October 2003, Canada was set to replace its tank fleet with the purchase of the Stryker. However, the operational experience of Afghanistan convinced the Canadian military otherwise. Indeed, Canada's use of the tank has been exemplary. The Leopard II remained completely untested in this operating environment and as a Canadian officer put it in a letter to German defence officials, "My crew stumbled upon an IED and made history as the first to test the [Leopard 2A6] M-packet. It worked as it should ... The Taliban have been engaged with some of the new Leopard II tanks in several ambushes [the result was that the Taliban] learned some very harsh lessons, very quickly and very violently."

Once Canadian tanks had arrived in Afghanistan, they featured prominently, and not just in Canadian engagements and operations. In particular the report on Operation MEDUSA (a large multi-national operation to drive the Taliban out of Panjwayi) maintains that the tank is an integral part of a balanced force.

"The Battle Squadron was initially responsible for establishing attack-by-fire positions in support of infantry companies and in forming the nucleus of a Battle Group counter-moves capable for responding throughout the entire Canadian area of operations."

Canadians were the first to deploy their tanks – Leopard I & II MBTs – to Afghanistan in October 2006. In 2008, Lt Col Trevor Cadieu, who commanded these first tanks in Afghanistan said this: "Canadian tanks and armoured engineers have better protected our dismounted infantry soldiers in southern Afghanistan, allowing them to close with and destroy a fanatical and determined enemy in extremely complex terrain... We now have a system that allows us to manoeuvre through this complex terrain, and get up close and personal with the enemy so the infantry and the tanks working with them can positively identify there are no innocent civilians in the area and we can engage enemy combatants<sup>7</sup> ... It's a direct fire system, not a 500-pound bomb – something that hits with precision"<sup>8</sup>

<sup>7</sup> [http://www.army.forces.gc.ca/caj/documents/vol\\_10/iss\\_4/CAJ\\_vol10.4\\_03\\_e.pdf](http://www.army.forces.gc.ca/caj/documents/vol_10/iss_4/CAJ_vol10.4_03_e.pdf)

<sup>8</sup> [http://www.army.forces.gc.ca/caj/documents/vol\\_10/iss\\_4/CAJ\\_vol10.4\\_03\\_e.pdf](http://www.army.forces.gc.ca/caj/documents/vol_10/iss_4/CAJ_vol10.4_03_e.pdf)



*Challenger has been a game changer during British operations*



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Leopard IIs were some of the last Canadian units withdrawn from Afghanistan,<sup>9</sup> having proven themselves a valuable asset to the ISAF mission.

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## **“Canadian Leopard IIs withdrew from Afghanistan having proven themselves a valuable asset to the ISAF mission.”**

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The Danish followed suit, deploying one squadron (14) Leopard II tanks in October 2007. The Danish tanks were used in much the same way as the Canadian tanks: to provide a physical and psychological presence.

During one particular engagement on January 5th 2008, with British and Danish troops, the Taliban tried their proven tactic of disengaging (being that coalition forces were not permitted to engage), then flanking, leaving coalition forces in a particularly vulnerable position. Fortunately, three Danish Leopard IIs on high ground provided overwatch. As the Taliban moved into their new fire position against the Danish mechanised infantry, the Leopards were able to engage the targets, both in the open and inside the cover of compounds. On the other side of the river British infantry had also come under intense Taliban attack and the Leopards were able to conduct themselves through two simultaneous engagements. The Leopards fired 20 main rounds against the Taliban. The tanks were able to engage both sets of targets and remove the need for close air support (which can take up to 20 minutes to arrive). The tank fire, which was highly accurate, was more than capable of penetrating the thick walls of the compounds, without levelling them entirely, as air support tends to do. Following the engagement, hostile activity in the area significantly decreased.<sup>10</sup>

Since the beginning of their deployment the Danish government have made their role in Afghanistan crystal clear: “the tanks are to ... push the Taliban out of the area. Until that happens, it isn’t possible to rebuild these areas”. The tanks are there to actively engage the Taliban, and are not tasked with the “hearts and minds campaign”. Again, ISAF owes much to the Danish tanks.

Aside to offensive capabilities, tanks also offer advanced target acquisition and sights, proving invaluable in the Intelligence, Surveillance, Target Acquisition, and Reconnaissance (ISTAR) role. Canadian tanks have picked up Taliban teams moving over 2km away ready to attack US bases.<sup>11</sup>

Equally their main guns provided local heavy support. Capable of demolishing entire compounds, or simply breaching their walls for dismounted infantry to storm. The presence of a 60 tonne tank smashing into an insurgent occupied compound can be no less than terrifying to the enemy.

Lessons need also be learnt from theatres beyond Afghanistan or Iraq. The Israeli Defense Force (IDF) presents itself as the forefront of counter-insurgency fighting forces. As the 21st century dawned, the IDF deemed the tank a bygone relic of the 1967 and 1973 wars, where Israeli armour smashed into Syria and

Egypt inflicting a 10:3 kill-ratio against Arab armour. As such, the Israelis began cutting their armour training and enacting many of the steps now being followed by the UK, in an effort to focus on what it calls Low-Intensity-Conflict (LIC) or what we would probably define today as COIN.<sup>12</sup>

During the 2006 Lebanon war, the IDF’s monotonous training programme for LIC did the army no favours. When tanks came up against regular infantry they simply did not know how to engage – or more importantly, how to withdraw. One such incident is as follows: “On 12th August 2006 24 tanks from the 401st Armoured Brigade moved to link up with paratroopers and secure a key route. Reassured from the infantry that the high ground was covered,

9 <http://www.bbc.co.uk/news/world-us-canada-14042786>

10 <http://www.casr.ca/ft-leopard-2a5-denmark-2.htm>

11 <http://www.defenseindustrydaily.com/tanks-for-the-lesson-leopards-too-for-canada-03208/>

12 The British Army Review 153: Winter 2012 pg. 21





the tanks moved across Wadi al Saluki. Hezbollah detonated a mine under the lead tank killing it and its crew. The remaining tanks were suddenly overwhelmed by ATGMs [Anti-Tank-Guided Missile], small arms and mortars. Not one of the tanks thought to fire their smoke grenades to allow a withdrawal, or use them to screen the enemy and allow infantry support to manoeuvre.”<sup>13 14</sup>

This is one of countless tactical examples where armour and mechanised infantry simply had no idea how to operate against a semi-regular force. The Israelis responded with a complete acquisition policy reversal, placing a focus on ground forces and land equipment. A far greater emphasis was also placed on readiness and training, as well as an increase in the purchase of Merkava IV MBTs. This showed through during the 2012 Gaza conflict where Israel mobilised 30,000 troops with all their associate equipment, including armour, in under 24 hours in preparation for ground operations within Gaza.<sup>15</sup>

Whilst it is highly unlikely that Britain will ever have to face a counter-insurgency on its own soil as Israel must, there are still important lessons to be learned from the Israeli experience of concentrating solely on LIC.

The future of the Challenger II is now open to debate. The 2010 Strategic Defence and Security Review made it clear that the tank is deemed no longer essential and the fleet is to be cut by 40%, to around 200 tanks.<sup>16</sup> The old tanks will be placed into long term storage where, in a humidity controlled environment, they will remain ready but unused.<sup>17</sup>

British Forces now operate a variety of different armoured vehicles purchased under UORs, including the Mastiff (and variants), Husky, Foxhound, Jackal (and variants), Panther, Viking and Warthog.<sup>18</sup> Such a large variety of vehicles may be counter-productive and could lead to higher maintenance costs.

At International Armoured Vehicles 2013, Brigadier (Retd) Ben Barry of the International Institute for Strategic Studies (IISS) gave his opinion in a lecture entitled “Strategic Trends in Land Warfare since 9/11.” He argued that the role of the MBT as a battle tank was drawing to a close. Claiming that “since 9/11, infantry has been the dominant force during COIN”, which is entirely true. However he admitted that as the character of conflict continues to change there will be an increase of “tank like fighting, but not from tanks”. Looking at the Danish and Canadian deployment of the Leopard II to Afghanistan he concurred with the opinion of the tank being used for “precision indirect fire”. He also called into question the Active Protection systems increasingly used (for example, ERA). He cited instances of the Merkava IV MBT of the IDF, in which an incoming round detected by the TROPHY countermeasures system has activated and harmed civilians standing near to the MBT, which in the context of war amongst the people is an unacceptable risk. While the advanced equipment required to operate systems such as TROPHY – or even just the advanced optics used on all MBTs – is vulnerable to indirect fire such as artillery, which, if knocked out, can leave a tank very vulnerable.

Barry also offered a solution to these problems that will allow the MBTs of the future to be a worthwhile investment. He raised the question of why it is that Unmanned Aerial Vehicles (UAVs) have taken to the floor over the last five to ten years whilst Unmanned Ground Vehicles (UGVs) remain permanently stuck on the drawing board. He also stressed the need for Rapid Deployment. The deployment of Canadian Tanks to Afghanistan required the purchase of new tanks that were already in Europe and the invoking of the NATO Strategic Lift programme using Russian Antonov strategic lift aircraft, all at great cost.

<sup>13</sup><https://www.arrse.co.uk/attachment.php?attachmentid=74571&d...>

<sup>14</sup> <http://www.carl.army.mil/download/csipubs/matthewsOP26.pdf>

<sup>15</sup> <http://www.thetimes.co.uk/tto/news/world/middleeast/article3602102.ece>

<sup>16</sup> [http://en.wikipedia.org/wiki/Strategic\\_Defence\\_and\\_Security\\_Review](http://en.wikipedia.org/wiki/Strategic_Defence_and_Security_Review)

<sup>17</sup> <http://www.guardian.co.uk/uk/2012/feb/16/british-tanks-sent-germany-storage>

<sup>18</sup> [http://en.wikipedia.org/wiki/Modern\\_equipment\\_of\\_the\\_British\\_Army](http://en.wikipedia.org/wiki/Modern_equipment_of_the_British_Army)



The MBTs of the future “need to be strategic lift capable”. Finally, he stressed the importance of vehicle families, allowing inter-reliability and compatibility and lower maintenance costs. This need is not being followed by the British in Afghanistan, with the purchase of a variety of different UOR vehicles. However, many of these vehicles shall not be returning from Afghanistan; they will be sold/donated to the Afghan National Army (ANA) and the UK will be moving onto the Warrior and FRES Scout SV which will be sharing increasingly common components. So perhaps, as the UK moves away from the war in Afghanistan, a rational and common sense approach will emerge for UK defence procurement.<sup>19</sup>

From all the deployments and engagements in which the Challenger II has been deployed, it has yet to fail to rise to the occasion. This is due to the versatility of the kit; as a system it has risen to any challenge thrown its way. That aside – and above all – it is the human that operates and maintains these machines. As such, I believe the Challenger II has a key place in the future of the British Army and that the MBT does indeed have a significant role to play in future conflict.

*[This article is significantly abridged and edited from George B Duckworth's academic paper entitled 'The Role of the Main Battle Tank in the Modern Battlefield: Do we need our Challengers?' and all opinions are his own. The full paper can be found at [www.internationalarmouredvehicles.com](http://www.internationalarmouredvehicles.com). Other opinions on the topic are welcome to [haveyoursay@defenceiq.com](mailto:haveyoursay@defenceiq.com)]*

19 Taken from Brig (retd.) Ben Barry's address at the International Armoured Vehicles Exhibition 08/02/13



# TRAINING AND SIMULATION

It almost goes without saying that realistic training is essential for modern forces, but it is also scientifically proven (according to a 2010 DARPA study that analysed the publicly available databases of US and UK figures over a three year period) that during a sustained campaign, 40 per cent of infantry fatalities occur in the first 100 days of operation. A great many factors may contribute to this figure but there is a strong case that effectively orienting the soldier to the realities of the battlefield before placing them in the danger zone can help to lower these figures and decrease the overall fatality rate throughout the entire campaign.

Although the theatres of Iraq and Afghanistan have presented fresh challenges and forced new demands for equipment, they have also provided forces with an opportunity in which to “train as they fight” and experience previously unknown scenarios. These lessons are now being exported back to homeland training centres to integrate with future counterinsurgency operations but the window in which to practice in a live, non-orchestrated environment is swiftly closing. The onus will therefore be placed much more heavily in the years ahead on the innovation and imagination of training programme managers and solution providers from the private sector, especially as sustained land-based campaigns are less likely to occur than naval- or air-based operations.

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**“The onus in the years ahead will be placed much more heavily on the innovation and imagination of solution providers.”**

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Where training for armoured vehicle operation is specifically concerned, there is much that is promising about the technology, methodology and investment being offered to fulfil this requirement. Both software and hardware have evolved a great deal in the past ten years, primarily on the back of those Middle East conflicts.

Serious gaming software has seen a rapid rise in global usage for integration with vehicle exercises, owing to its relatively low cost and the improvements of computer graphics and artificial intelligence, as well as its capacity to integrate training across multinational forces and locations. Virtual Battlespace 2 (VBS2), as an example of one of the most well known of these platforms, is employed by Australia, Finland and across many NATO member nations and incorporates physics engines common to modern consumer video games but tailors individual vehicle platforms to the very specifics of individual real-life models. Integration of this type of software into a force can take as little as three months to implement but further integration can be offered to include the likes of heads up displays and hardware synchronicity. Other companies, including Lockheed Martin, have been merging simulation platforms to create large-formation networks for training in which land, sea and air force units can all train together on one session and retaining a high level of visual fidelity.

Hardware training that incorporate the actual vehicle or a trainer version can include the use of training ammunition and barrel inserts attached to the vehicle, or are Part-Task Trainers (PTTs) that may host some or all of the crew. Like software solutions, these trainers are still cost-effective and offer a hands-on familiarisation of all aspects including avionics, weapons and refuelling systems, not to mention a first-hand experience of the situational and environmental pressures that may impact levels of awareness and psychology in the battlefield.

Training devices can also be attached to static vehicles, using either mains power or a generator so that the vehicle engine does not have to be started. Sensors can also be simulated and Computer-Generated Imagery (CGI) can display scenes to the crew through the vehicle sights, or, for the tank commander, on external screens. Standard PCs and low-cost visual displays do not move with the vehicle and thus do not have to be modified, tested



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and certified other than for general safety while the vehicle is static. Simulated weapon and other visual effects in a battle scenario can be added to natural scenes of real terrain, which are often improved through military funding and intelligence. Should accurate satellite data be available for a specific region, programmers can now ably recreate the location before a single wheel has touched its real world soil. A large choice of non-vehicle training aids and systems are also increasingly available, including trainers with a full-size replica turret linked to a driver trainer and cubicle-mounted systems with replica crew stations.

Motion sensor systems on land vehicle simulators are important given the level of decision-making that a driver may make based on the “feel” of the vehicle, particularly in comparison to that of an aircraft pilot. High fidelity subsystems such as this are complex and often more expensive to acquire than the primary system alone, even with cost-saving developments from hydraulic to electronic systems. Specialised capabilities related to the mission environment are also being demanded by today's forces with one notable example being the increasing popularity of (MET) Egress Trainers now designed to mimic an MRAP rollover when turned – but not destroyed – by an undercarriage IED blast.



*USMC Egress Trainer in action*

For moving vehicle training, devices can also be attached and may include the likes of GPS-based recording devices that continuously log a unit's position and feeds this information back to strategists. The Tactical Engagement Simulation (TES) system, where lasers are fired rather than live rounds, is also now widely in use. TES is usually combined with Weapons Effects Simulations (WES) that includes pyrotechnics or flash-bangs initiated by laser or radio.

Of course, training ammunition can instead use blank rounds which have an explosive charge but do not fire a projectile and thus have a very small danger zone are used as training ammunition. Alternatively, reduced-range projectiles permit the use of smaller live-firing ranges, and sub-calibre devices – barrel inserts – work on a normal round but have a firing unit in the middle that fires a small bullet or blank cartridge.

At times, using a vehicle cabin or replica may be considered a constraint. As such, there are equally a number of desktop training aids, which are PC-based and relatively inexpensive compared to custom-built higher-level simulation devices. These are essentially Part-Task-Trainers (PTT), used for basic training before advancing on to higher-level training devices and often therefore form a key part of a phased training programme.

Such is the importance of training in the armoured vehicles domain that an influx of simulator training centres have sprung up across the world, preventing forces at peacetime from skill degradation and fine-tuning nations at war while on rotation.

Major simulation centres today include the French Army's CENTAUR system, used for combined arms training, and simulators for the LECLERC tank located at Canjuers and Saumur; the German Army's Gefechts Übung Zentrum (GUZ) system located at Altmark and the Gefechts Simulation (GESI) system at Stolberg (similar systems are operated in Austria, Finland, France, Ireland, Italy, and Norway); the UK's Combined Arms Tactical Trainer (UK-CATT) system based at Warminster, with a duplicate system at Sennelager in Germany; and the US Army's Close Combat Tactical Trainer (CCTT), Reconfigurable Vehicle Tactical Trainers (RVTT) and Dismounted Soldier trainers (DS), covering thirty five sites in total.



There are several major manufacturers of vehicle trainers in today's market. Included in these are KMW (now delivering its Egress Trainer to Swedish Armed Forces that can mock-up to the size of a CV90), Meggitt Training Systems (with a Light Armoured Vehicle Trainer [LATV] that supports Driver as well as Crew Gunnery and Tactical training), Saab (with scalable IFV and MBT Crew Trainers), Elbit (with a range of Tank Trainers allowing for the likes of driving, gunnery and multi-participant combat exercises), Oshkosh (delivering the Heavy Expanded Mobility Tactical Truck [HEMTT] and unveiling a new LATV in September 2013), Lockheed Martin (providing a range of MBT and LAV trainers, including the Advanced Gunnery Training System), Cubic (working with Thales to produce the Reconfigurable MRAP Vehicle Trainer [RMVT]) and Rheinmetall (integrating vehicle systems as part of its ELTAM Combined Arms Tactical Trainer used by the Swiss Army).

Christie and EDM Ltd are also deeply involved in the provision of maintenance vehicle trainers, the former supplying its 'Holostage Mini' to offer 3D interactive viewing of M-ATVs akin to an Augmented Reality experience, and the latter providing its Electrical/Electronic Diagnostic Trainers (EDTs) for British Titan and Trojan tanks.

International Armoured Vehicles 2014 will be running a dedicated session on Conference Day One (February 4th) on employing simulation and training technologies for AV operator. Presentations will be made by senior programme managers from the Royal Netherlands Army, German Army and Australian Department of Defence. Colonel John Ogden, Commanding Officer of the British Army's Headquarters Armour Centre, will also be showcasing how British Forces are delivering training and support for the UoR fleet through to 2020.



*Heavy vehicle simulation at Dexheim, Germany*



## **Interview:** **Brigadier General Marlow** **Commandant MUNSTER Training Centre**

Equipment may be improving but technology is only as ever as good as the human operating it. As such, the MUNSTER Training Centre is tasked with training commanders and leaders of the German Army's armoured and reconnaissance units, to conduct demonstrations and to provide information for national and international visitors involved in the Bundeswehr's operations.

To conduct these missions the Training Centre is based on three pillars. First, the Central Division coordinates training and exercise planning and provides administrative and logistics support. Second, the Armoured Forces Training Division, which itself comprises three branches – training and education of commissioned and non-commissioned officers of Armour and mechanised infantry, planning doctrine and organising courses (including simulation training), and company level training for field units, including live firing provided by the Armour Firing Simulation Centre. Finally, the Army ISR Training Division also provides doctrine and planning but its main effort focuses on training and education of commissioned and non-commissioned officers of reconnaissance units, long range patrols, UAV units and HUMINT units.

Additionally, two specialised units are attached, involving tan Officer Candidate Battalion in which fifty percent of all future German Army officers receive basic training, and a Non-Commissioned Officer Candidate Battalion in which one third of all future NCOs receive basic training.

**Brigadier General Andreas Marlow** is the Centre's Commandant and will be addressing the floor at the International Armoured Vehicles (IAV) event (03 – 06 February, 2014). Before the big day, he joined Defence IQ to field the fundamentals.

**Sir, can you please provide a brief overview of the current training methodology for the German Army's armoured combat and reconnaissance forces?**

Our current training methodology is mainly influenced by the changes caused by the abolition of conscription in 2011, increasing professionalization – especially at the level of enlisted soldiers – and the cycle for employment in missions abroad.

In general, the units receive basic trained soldiers and improve their individual skills, depending on the unit type and equipment in their own responsibility. The company commanders make sure that all individual qualifications up to platoon level training will be achieved in line with the respective doctrine. Company level training lies within the responsibility of the battalion commander. He conducts tactical training by using CPX or CAX based exercises. Live training is mainly conducted at central installations such as the Armour Firing Simulation Centre in MUNSTER or, for infantry units, the Infantry Training Centre in HAMMELBURG.

Both training centres are using simulation technologies for duel simulation as well as final live firing exercises at company level. Ideally, these phases last up to ten months. Battalion level training is within the responsibility of the brigade commander and he uses MapEx as well as CPX and CAX based exercises with support of the SIRA simulation centres in MUNSTER and HAMMELBURG or the German Army Warfighting Simulation Centre in WILDFLECKEN.

The highest level of training is conducted at the German Army Combat Training Centre in LETZLINGEN (GÜZ) where Battalion level FTX can be conducted by means of integrated simulation technology. These phases last ideally two months. This methodology is comparably applied to the German Army's reconnaissance battalions.

After these training phases all units run through a six month pre-deployment training, specifically tailored to their mission. The deployment phase can last up to another six months, followed by a two month post-deployment and recovering phase.

**What have been the key developments in this system of training over the past ten years, and how do you envision the future methodology changing, considering the move to a peacetime situation?**



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Currently, the training cycle is mainly influenced by the sequence of missions for the German Army's units. Another key development is that the training system is constantly developing towards a more simulation-based training.

Three factors seem to be responsible for this. First, the most important reason for the development of training is the influence of combat experiences from our missions abroad. Meanwhile, there have been significant improvements of simulation technology and, at the same time, increasing costs for live training.

Provided the requirement of missions abroad will decrease at least for a limited period of time, a main factor for the development of training will be the growing professionalization caused by long time serving enlisted personnel. This will lead to even more skilled units, high cohesion, and a constant development of training towards more complex scenarios and greater challenges.

At the end of the reorganisation process of the German Army we will see a well-balanced and trained force. The use of simulation technology at all levels will further increase, while the availability of complex equipment for live training will decrease. Long term planning and demanding training schedules will be required to direct and manage the flow of material and equipment to the units at their respective training level.

**Simulation is widely lauded as the golden key to overcoming many of the training budget limitations, but how much of a sacrifice is a limitation on live training? What else could developers of this technology provide to better instil the skills needed in theatre?**

Well, simulation systems are providing high training quality at comparably low costs. To train a soldier and to take him to expert level, simulation should be used as one important step of training.

To train tank crews by using simulation technology is a good example. You can try any kind of scenario. You even have the possibility to train with any type of ammunition in any kind of climate and weather

A real step forward would be a system of simulation technology which would be fully integrated and fully interoperable. Even C4I systems should be incorporated. The future could be a whole battalion being trained by simultaneously conducting a CPX, CAX and FTX.

**What will you be hoping to achieve from your participation at this year's IAV event? Why is it important for you and your peers to meet at this forum and what extent can multinational collaboration be enhanced?**

All of our allies are facing similar challenges. Therefore, to learn how other armies deal with these challenges and to see what their preferred solutions are is of great interest. I'm also keen to see what industry is capable of offering "off the shelf".

As a participant of this forum I am hoping to exchange views with professionals on training and their approaches. In addition, we should take the chance to identify opportunities to improve our training concepts and to develop our skills on conducting training even more effectively. As a result, I am expecting insights which might lead to recommendations for the military leadership of the German Army where opportunities for international cooperation or technical innovation can be identified and further developed.



# REVEALING FUTURE SURVIVABILITY TECHNOLOGIES

## Advanced materials

DARPA is experimenting with new designs to create a new generation of “IED-proof” armoured vehicles. In conjunction with the U.S. Army’s Research Laboratory and Alcoa, a leading producer of aluminium and fabricated parts, crew protection is hoped to be significantly improved by designing a single-piece aluminium hull. No welds, no weak points, just one single fabricated piece of formed aluminium.

In addition to the performance benefits, it’s thought an aluminium hull would be lighter and thinner than traditional steel hulls used for armoured vehicles.

However, composites are stronger, lighter and thinner than most metals, shouldn’t that be the focus of the DARPA’s efforts for future armoured vehicle design?

The UK has already mass produced an armoured vehicle with an innovative hull design – the Foxhound. Rather than aluminium, a combination of advanced, lightweight composites are used to provide structural integrity, protection and lightweight performance. The composite pod has a V-shaped hull to help deflect the blast wave in the event of an IED explosion. The UK MoD has high hopes for the export potential of Foxhound, indicating that composite and, presumably, single-piece hull designs are both achievable and desirable.

Other vehicles, such as Supacat’s SPV400, also have ‘pods’ manufactured with a composite moulding.

The benefits of composites over conventional armour materials are noteworthy, with weight-saving being the most critical. Not only does it allow for better fuel efficiency, using lightweight materials would allow current vehicle platforms to carry greater payloads. More weapons and personnel can be transported in theatre, increasing productivity and efficiency. Through-life costs should also be lower than with metal equivalents due to the absence of rusting and, to a lesser extent, wear and tear.

“We just cannot keep on adding tons and tons onto already heavy tanks,” said Brigadier General C.P. Mohanty, North Kivu Brigade Commander, MONUSCO Mission to the DRC, United Nations. “This is why we need to go in for composite armour, reactive armour, or whatever we can have to offset this.”

Ceramics can also provide superior ballistic protection at a significant weight-saving over conventional armour. However, a significant problem with using ceramics in a composite solution has always been one of adhesion and creating a system that is robust enough to withstand multiple burst-fire hits. The surface of ceramic materials is incredibly smooth; for ceramic ornaments or medical components (where the material is used to make hip joints for example) this is an essential property – for armour it is the opposite as it means nothing sticks to it. If there is no friction on the surface then adhesives have nothing to grab hold of and stick to. Ensuring a strong bond between ceramic armour and any other surface is like trying to stick two strips of Velcro loops together (or two strips of Velcro hooks, the analogy works either way). Last year Lockheed Martin proposed a solution to the adhesion issue, which if accurate would go a long way to improving the reliability and longevity of ceramic armour systems on operations.

Composites are the future, but don’t forget steel. While composites are becoming a staple material for armoured vehicle designers, the cost can be prohibitive. Steel will always be a reliable, robust option for armoured vehicles. The development of advanced composite armour is simply an addition to armoured vehicle manufacturers’ arsenal and should not be considered a replacement for steel.



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## Directed energy weapons

The idea of using lasers for military purposes has been around for a number of years now. In 2002 Newt Gingrich, former Speaker of the U.S. House of Representatives, advocated the use of directed energy weapons.

"In the next five or eight years you have directed energy weapons and laser pulsing systems that could actually do that (successfully implement boost phase rocket launches to the East) from space," Gingrich told FRONTLINE at the time.

It hasn't quite happened, but the idea of using lasers and directed energy weapons is no longer science fiction. They may still be in the early stages of R&D, but electronic weapons are a viable alternative in the future.

Boeing's 'Laser Avenger' system was the first to ever shoot down a UAV with directed energy and could be operational within a year. The technology has ground force capabilities too as it can be used to destroy IEDs.

## Electric armour

Much like directed energy weapons, a 'force-field' that repels incoming ballistic fire sounds like something out of Star Wars. But researchers at the Defence Science and Technology Laboratory (Dstl) are working on supercapacitors into armour that will effectively turn a vehicle into a giant battery.

Work on the system is classified but Professor Bryn James, head of Dstl's armour and protection science and technology centre, is speaking at the International Armoured Vehicles conference in February to discuss progress with the technology.

While only 12% of respondents in Defence IQ's survey identified electric armour as a technology likely to have a significant impact in the future, the use of electronic countermeasures and Active Protection Systems for applications on armoured vehicles has been debated for years. Should an Active Protection System ever entirely replace the armour component of an armoured vehicle? No, because you cannot prove that they would work 100% of the time, in all conditions, in any environment, against every threat. However, they would be an invaluable addition to a vehicle's overall system of protection.



# ARMOUR: THE SURPRISING TRUTH ABOUT HOW OLD IDEAS INSPIRE 'NEW' TECHNOLOGIES

*"Those who cannot remember the past are condemned to repeat it." George Santayana – philosopher, essayist, poet, and novelist.*

Santayana's often misquoted mantra can be found hanging above history department doors in schools and universities across the globe. Frequently used in the context of assessing the futility of war, perhaps it's fitting to consider its application pertaining to the development of armoured vehicle design over the last 100 years. And as we approach the centenary of the outbreak of World War I in 1914, there's probably never been a better time.

The words 'innovative', 'new', 'pioneering' together with phrases such as 'state-of-the-art' are bandied around the defence sector as one company seeks to gain an advantage over another. It happens in all industries, for every product and service. While it may be true – at least to some extent – in the vast majority of cases, the story of armoured vehicle design is an interesting case in point.

How many of the innovations we see today are truly 'new'? And how many of them are actually iterations of ideas that have been used in the past just repackaged or imaginatively recycled for new purposes? A recent trip to The Tank Museum in Bovington was eye-opening.

"Think about Tarian [the lightweight netting system to protect against RPGs]," said David Willey, The Tank Museum's curator. "In the 60s, the US used chain link fence in Vietnam on the side of their vehicles to do the same thing. It's an old idea that has come back.

"In the First World War, chicken wire was being used as an anti-grenade system because people were concerned a grenade was might land on the flat roof. More recently we've seen photographs of guys making chicken wire covers for their commander's cupola because they were worried going into an urban environment someone might lean out the window and drop something in the turret – a throwback to what was done by the crews on the very first Mark I tanks when they went into action in September 1916."

The chicken wire Willey refers to can be seen in the picture (below) in a wooden frame above the vehicle hull. The impromptu constructions didn't last long as they were cumbersome and fragile, but the idea of using a metallic mesh system to protect against specific threats endured.

The tracked vs. wheeled debate is not merely the subject of contemporary military deliberation either – it began a century ago. In 1915, Armoured Cars such as the Rolls Royce were found to be useless when confronted with battlefields lacking roads – such as the Western Front. The need for tracked variants to cross such ground led to Little Willie, the first tank. Wheeled technologies have improved over time but still the debate continues.



*A British Mark I tank fitted with wire mesh  
[Photo Ernest Brooks]*



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Denmark is the latest nation to rekindle the discussion with its armoured personnel carrier (APC) programme as it seeks to procure up to 360 vehicles to replace its ageing M113 fleet. But does it buy tracked or wheeled? The argument goes thus: "Tracked vehicles offer the best solution for a versatile platform that is required to operate over diverse terrain, including extremely difficult ground, because tracks inherently provide a greater surface area than wheels ... [while] wheeled vehicles inherently attain faster road speeds," according to early studies. Tracked vehicles have better overall mobility, turning circles and flexibility. Wheeled vehicles are easier to maintain and are better in urban environments. Much was the same in this regard in 1915 as it is today.

And there are countless other instances of where old ideas have inspired and underpinned new technologies. Take explosive reactive armour (ERA) for example. Prof (Dr) Manfred Held, the legendary German armour researcher, is credited with developing the modern version of a technology that had its roots years earlier when troops identified the benefit of storing diesel tanks in the belly of their armoured vehicle as a primitive form of countering mine explosions. Thanks to Prof Held's extraordinary capacity to develop this idea of counterexplosion in armour, the ERA and other reactive armour technologies we see on armoured vehicles today has been a critical component for improving protection and survivability against threats, new and old.

Moreover, arguably many of the threats armoured vehicles are designed to protect against are not new either, just variants of old ideas. The improvised explosive device (IED) is the most discerning example. During a decade of operations in Iraq and Afghanistan the buzzword has been "IED." But the IED – whether it's called a mine, roadside bomb or homemade explosive – is not a new phenomenon; it's been around for centuries. Colonel Gareth Bex, Head of Army EOD & Search at the UK MoD, recently said at a Counter-IED conference in London that the UK failed to continue the investment it made in this area after the conflict in Northern Ireland in the 1970s and lost the mainstay of its C-IED capabilities as a result. The UK forgot the lessons of history.

Perhaps, on occasion, it's better to look at how things have been done in the past and apply them to new challenges, rather than trying to blaze a trail with new ideas for the future.

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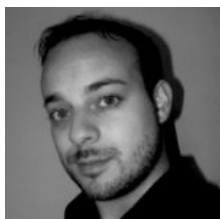


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# AUTHORS



Andrew Elwell, Editor  
[andrew.elwell@iqpc.co.uk](mailto:andrew.elwell@iqpc.co.uk)



Richard de Silva, Head of Online Content  
[richarddesilva@defenceiq.com](mailto:richarddesilva@defenceiq.com)



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