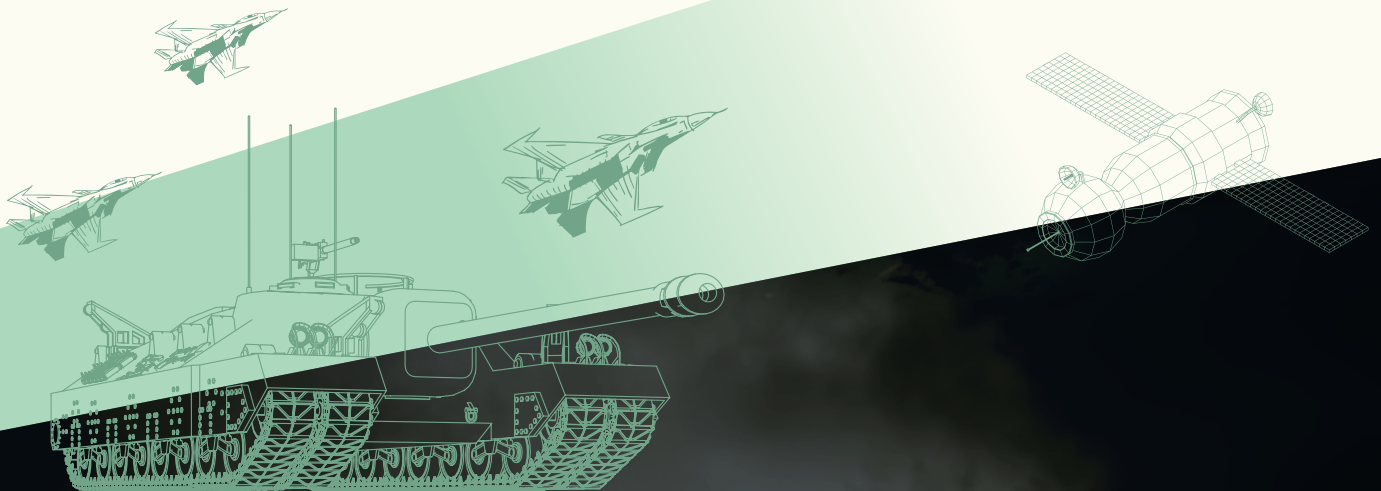


WHITE PAPER

LAND DEFENCE

**New Threats are Driving New Land
Equipment Arms Race—What Now for GCC
Land Equipment Investment?**

May 2023

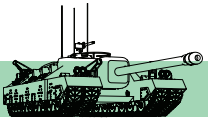


Paper by:

FROST & SULLIVAN

Organised By

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INTRODUCTION

IDEX “THINK TANK” is a brand-new concept, exclusively launched at IDEX and NAVDEX 2023, the world’s premier global defense and security event, attracting more than 130,000 professionals from the defence and security community to Abu Dhabi.

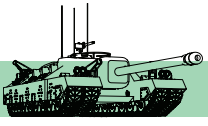
IDEX THINK TANK gathered groups of up to six leading defence and security experts from around the world for strategic, closed-door, curated conversations about critical topics spanning ‘Land, Maritime, Air, and Space Defense’.

‘Land Defense’ was the first THINK TANK on Day One, 21st February, 2023 at ADNEC,. It was attended by representatives from several companies, most notably Raymond Coia from BAE Systems.

The discussion was in the context of recent years which saw a major increase in geo-political instability, with contributing factors including general warfighting and the growth of paramilitary and criminal forces seeking to destabilize regimes for their own gain. So, whilst the Middle East continues to seek a neutral free-trading position, it cannot ignore the largest increase in global defense spending this century, boosting investment in both modernizing conventional warfighting equipment, and disruptive dual-use technologies (civil technology with military application); with both investments likely to bring some game-changing capabilities to both allies and adversaries.

The LAND THINK TANK discussion seeks to give some suggestions on how best GCC countries could invest in building, buying, or borrowing [Technical IP] the industrial capability and capacity needed to further advance their domestic defense industry.





TOP DEVELOPMENTS IN LAND DEFENSE

■ Modular and open in design

To quote an American term, modern land vehicles need to “walk, and chew bubble gum at the same time”; or do more than one thing at a time. There is little room for single-capability combat vehicles, instead, vehicles need to be modular in design with open architectures allowing them to be configured in the base and in the field to meet the tasks required for the changing operational and tactical situation on the ground.

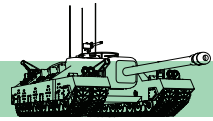
■ Land is the biggest capability gap

After decades of financing counter-insurgency operations by the top spending nations, the defense spending focus has been on air and maritime capability for power projection in support of land forces in peacekeeping roles. Whilst this continues to be the case for the Middle East domestic market, some military technologies could require countermeasures as they are deployed and evolved by combatants engaged in conventional land warfighting in Europe, the Sino-Indian border, and Nagorno-Karabakh. GCC manufacturers should consider developing domestic countermeasure systems, such as against ‘kamikaze drones’ operating individually or in swarms both in the air and on land.

■ Information is key

Knowledge is power, and information is seen as the most important capability in current and future land combat. Vehicles need to be connected, sharing information to enable precision in the delivery of effects, including reducing the sensor-to-shooter ‘kill chain’; the military command process for authorizing the use of lethal force. To do this, the land platforms and command nodes need to be able to collect, process, and disseminate information in near real-time. As part of this need, much attention is being paid to the ‘virtualization’ of the tactical communications space, which is essentially bringing broadband connectivity levels to the soldier, using technologies such as 5G and open radio access networks (RANs).





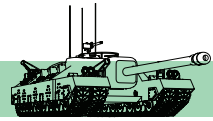
Export sales are the goal

A key factor for a domestic/regional defense industry is the need for international sales if it is to be able to manufacture the right system, in the right numbers, at the right time, and the right price. Good examples of this are to be found in Turkey, South Korea, and Singapore. Traditional Western original equipment manufacturers (OEMs) are already struggling to compete as their domestic cost to produce is undercut by the very same countries where they used to outsource to take advantage of cheaper labour costs.

Retro-fit or Purpose-built

As buying nations seek to maintain a viable military deterrence through modernization, they frequently face the dilemma of whether to upgrade or opt for a next-generation solution. There are many trade-offs when considering choices, and some countries such as the UK have shown how not to do both. For example, the failed next-generation programs like Future Rapid Effect System (FRES), and retrofits like the failed upgrade of their infantry fighting vehicle (IFV) WARRIOR. The THINK TANK believed that the highest value assets, such as main battle tanks (MBTs) will continue to be upgraded whilst more numerous light and medium platforms are more likely to be bought off-the-shelf from those OEMs taking the risk of developing next-generation systems. There is a point, however where upgrading is no longer viable because the gap from what is available to what is required is too great a size, weight, power, and cost (SWAP-C) challenge. The US Marine Corps (USMC) came to this realization with their selection of the BAE next-generation Advanced Amphibious Vehicle (AAV), and the defense industry watches with interest as the British try and upgrade their Challenger MBT. Both militaries will be seeking a 30–40-year gap until the next expensive replacement, and it was the groups' belief that only the new design AAV will achieve this.





Defence Energization

With information being the top priority, the percentage of digital electronic components in land systems has expanded considerably, bringing with it much increased demand for power generation and storage, and a reduction in the variety of power sources used for better support including logistic supply. Emerging markets relevant to this growing end-user requirement include:

■ Hybrid drives—These permit the combat advantage of ‘silent approach’—reducing a vehicle’s sound signature—which is considerable on current combat and reconnaissance vehicles. In the USA, the Optionally Manned Combat Vehicle (OMCV) project to replace the BRADLEY is the international lead in this space, as well as for autonomy in combat vehicles.

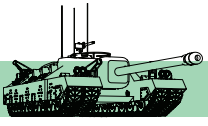
■ Solid state lithium-ion and other power storage and energy release solutions—These are essential to permit on-board electronics to function without requiring the engine to be running; or being tethered to external generators.

Signature Management

The capabilities of multi-spectrum sensors have increased as dramatically as their size, weight, and cost have reduced. Surveillance from low Earth orbit can be procured as-a-service commercially outside of the military for example, with thermal, optical, and radar imagery available, and with resolutions of less than a metre accuracy. It is equally important for the defense industry to anticipate the military realization that the increased adoption of Cloud-based technologies, including SATCOM increases traceable signatures as the platforms interact with the multiple Clouds. Related technologies, products, and services that GCC nations should examine for opportunity include:

■ Data catalogues of combat vehicle electronic signatures: These are generated by the GCC nations on-board systems, including communications, automated protection systems (APS), and engine frequencies.

■ Multispectral camouflage, concealment, and deception (CCD) panels and nets: These can not only mask vehicle and command node signatures, but also assist in vehicle heat management which is vital in the Middle East.

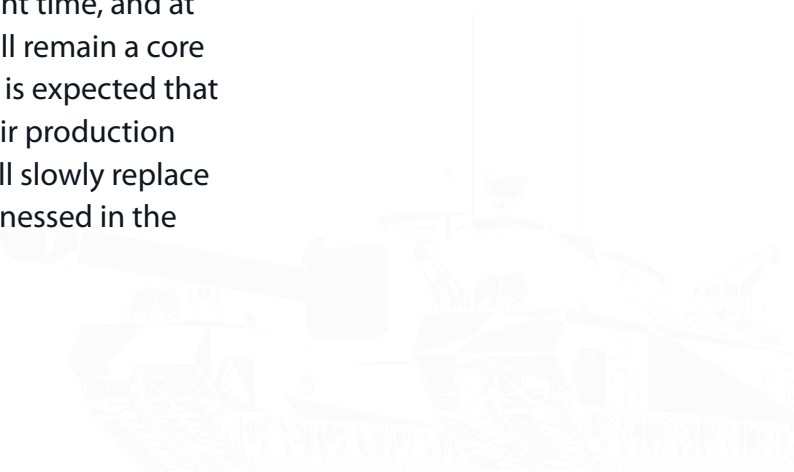


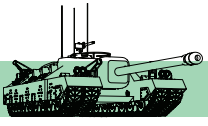
■ Robotics & Autonomy

There is a lot of media attention on the use of unmanned, autonomous vehicles which range in size from the size of a golf cart to a medium-sized tank. However, the ability for the vehicles to be used Beyond Line of Sight (BLOS) is many years away. Truly autonomous vehicles with lethal weapons capability are highly controversial, and so a human needs to be 'in-the command loop,' and a constant communication line is required to be in place. Many nations still struggle to communicate with their human soldiers in urban areas, and on the cluttered battlefield, and as with them, their radios have signatures that can be located and targeted. While humans can operate when imposing radio silence, or when being denied communications by radio jamming, weaponized robots cannot. Finally, most uncrewed ground vehicles (UGV) are small due to SWAP constraints. These offer an unstable and physically shaky platform for sensitive smart munitions.

■ Weapons & Drones

IDEX had many unmanned air vehicles on display including so-called kamikaze drones, which are also known as lethal miniature aerial munition systems (LMAMS) or loitering munitions (LM). When used at the combat platoon level, LMs offer a lightweight, highly precise alternative to heavier traditional weapons such as 60mm and 80mm mortars. They also require far less training and practice. However, LMs are much more expensive, and their supply chain is longer and more complicated. In comparison, mortar and artillery shells are less expensive as they can be mass-produced. Hence, keeping in mind the mandate that the military require "the right system, in the right numbers, at the right time, and at the right price," mortar and artillery shells will remain a core market for the defence industry. However, it is expected that LMs will continue to augment, and once their production becomes simple and less expensive, they will slowly replace mortars and artillery; but this will not be witnessed in the near future.



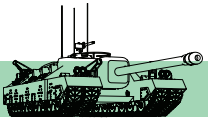


■ Building GCC Defense Industry Capability

It is important to consider the needs and actions required to build/boost the domestic defense technology industrial base (DTIB), and the needs of the potential buyer—both domestic and international. It is also important to understand that whilst large international OEMs are willing to facilitate aspects of project delivery in the buying country, they will be seeking to avoid close copies to be then be made that will compete with them on the international market; which goes against the main driver for GCC domestic DTIB investment, namely export sales.

The THINKTANK observed that given until recently, the Land Warfighting Domain has been heavily under-financed by all the top spending nations, with perhaps the exception of China, demand for systems, platforms, weapons, and ammunition exceeds the capability of the very same nations to supply. This has opened a window of opportunity that the DTIBs in some countries are seeking to exploit. For example, ground-based self-propelled artillery and semiconductors from South Korea. It was therefore felt that analysis of the supply chain required to produce these at scale and speed would offer a good return on investment (ROI) for GCC nations. The discussion believed that it would be beneficial if the GCC nations considered embracing a common standards approach—as is found in NATO—to boost a regional DTIB as well as that of individual nations.





Again, emphasizing that a DTIB needs to focus on getting the right system/weapon/platform/munition to the buyer in the right numbers, at the right time, and at the right price, while developing the Land Equipment DTIB, it should consider its:

Supply Chain—From raw materials such as gunpowder for ammunition initiation to the ammunition final product and packaging.

Maintenance—An essential component to ensure the equipment operates at its optimum for its expected life. For example, systems to record missile ‘trundle time’ (exposure to movement & vibration), and appropriate packaging.

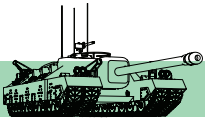
Assembly—Some companies such as BAE Systems, routinely promote the part, or whole assembly in the buying country; the latter seeing a simple transfer of technical data and licencing contracts. If such a country is buying modular equipment with an open electronic architecture, then this opens the route to market for domestic DTIB component integration. These can be essentially every aspect of customization, for example, sensors, protection systems, signature management, mobility augmentation, communication, command, and control systems.

Dual Use Technologies—Finally, the THINK TANK highlighted the importance to recognize and invest in those technologies that can meet demand both in defense and other markets such as automotive, communications, and information technology. Technologies such as 5G and materials such as gallium nitride are being developed faster in the automotive industry, and a smart DTIB will be seeking to exploit the reduced research, design, and test costs before developing a defense capability. Such analysis of other market supply chains to determine their dual-use potential in defense is a regular request for Frost & Sullivan.

The meeting closed with photographs and thanks to the organizers; plus best wishes for the GCC DTIB.

**Facilitated by: Michael Rowe, Vice President
Aerospace & Defense, Frost & Sullivan**





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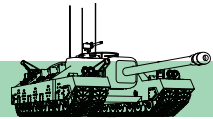
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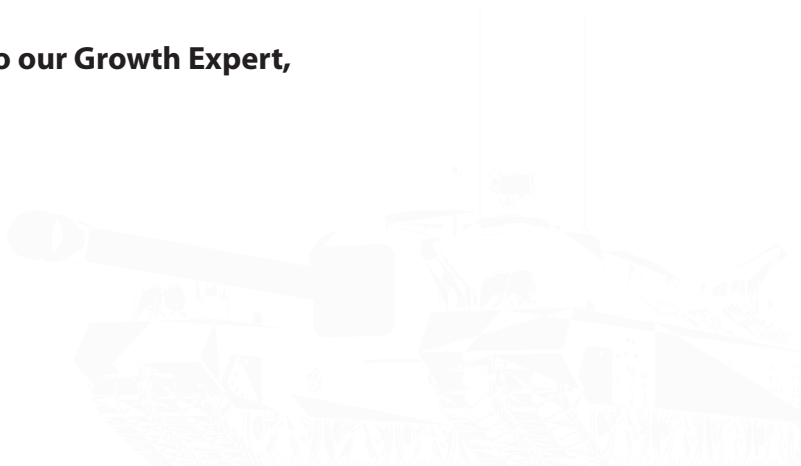


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