A PEEK INTO THE NEAR FUTURE OF LAND WARFARE

A WARGAMING LOOK AROUND THE CORNER. By Roger Gerrish

Following on from his overview article in the print magazine version of *WI324,* Roger presents a more detailed look at what could happen to ground forces over the next few decades.

THE INFANTRYMAN

If you were to compare a photograph of a World War One era infantryman with one showing a soldier dressed and equipped to fight the Cold War in the 1980s, you would see more similarities than differences. However, by the latter years of the 20th Century things have begun to change. Several years ago a number of countries saw the urgent need to enhance and upgrade the equipment carried by their infantrymen and undertook in parallel a number of so-called 'future soldier' programs. In the USA, the project is known as Land Warrior, in Russia as 'RATNIKS', IdZ in Germany and FIST in the UK. All the programmes sought to integrate the common infantryman with the latest advancements in technology. Special Forces were perhaps the first to reap the benefits of these developments and it's fair to say that when these shadowy individuals are seen in daylight they sport a very scary Sci-Fi look. These units though were really just the prototypes of things to come. Today's soldiers are issued with increasingly more lethal rifles which feature upgraded sights, targeting aids and modular enhancements such as integral grenade launchers. Similar improvements can be seen in the latest squad support weapons (SSW).

There have also been substantial enhancements to the protection of the infantryman. This is evidenced by the introduction of more effective body and limb armour and head protection, far cries from the flak jackets and tin hats introduced during the 20th Century. A soldier today now has a realistic chance of surviving or even shaking off direct small arms hits. Looking forward a few years then, we can be certain improved materials development and energy absorption technology will make the soldier of the Near Future even more difficult to kill or immobilise. However, parallel developments in small arms, including smart bullet technology and

improved armour piercing, will make this an ongoing close but deadly race.

Another area being addressed is meeting the requirement to provide soldiers with secure and clear voice communication essential in today's complex tactical environments. The pace of the future soldier projects continues to increase and with a bit of analysis we can begin to get an idea of how the trooper of 2034+ might look and perform.

One common trend in many of the projects is the introduction of highly effective protective headgear, jam packed with a mass of electronics and communication gear often featuring information displays similar to those used by modern fighter aircraft, the so called head-up displays (HUD). This gives a soldier much of the critical information he needs to fight easily accessible right in front of his or her eyes. This display will likely include real-time GPS positioning, thermal visual imaging, a direct interface to his personal weapon's sights with laser range finding and an embedded computer to deal with complex ballistic accuracy calculations, granting the soldier massively improved accuracy and effectiveness. Helmet and body mounted cameras will also give the future soldier the ability to share the viewpoint of his or her squad mates, and the ability to playback those images which will allow such tasks as sniper location to become

much easier. Communications systems that are networked and computer enabled will permit the secure and clear transmission of voice and data, tying the soldier into the wider data sphere, thereby vastly improving tactical coordination and command and control. The network will also give access to real-time satellite or drone derived imagery of the battlefield, providing an unparalleled level of situational awareness. Soldiers may also gain access to locally controlled battlefield micro drones, either ground or air based, providing completely new sources of reconnaissance information and perhaps even the capability to make direct fire attacks with on-board weapons.

We are also likely to start seeing more advanced light weight body armour protecting the soldier's entire body with future versions and uniform eventually becoming integrated to the point they become some form of 'hardsuit', giving advanced ballistic and trauma protection whilst still allowing total freedom of movement. The list of improvements and enhancements continues to grow with perhaps the most revolutionary being the prototyping of the first experimental exoskeletons. These systems would, if eventually perfected and deployed, vastly increase a soldier's endurance strength and carrying capacity. Such technology is certainly no longer just science fiction and a simple browse of the internet for HULC or HAL 5 will tell you the whole story.

VEHICLES

So how will the armoured vehicle evolve as we move towards the year 2040? Let's look at the tank first, the ubiquitous queen of the 20th Century battlefield. Well, some may even suggest that perhaps the era of the tank has passed. Certainly, today's combat actions take place in locations which are very different to those envisaged during the Cold War era – gone are the sweeping battlefields of the North German plains or the Iraqi desert where the tank was considered the decisive contributor. Today, the tank finds itself fighting more often than not in close urban terrain in an asymmetric war scenario. A situation where the main enemy is not another tank but rather a determined man with a Rocket Propelled Grenade (RPG) or portable Anti-Tank Guided Missile (ATGM). Modern examples of these weapons can penetrate the armour of even the most heavily armoured tank as the Israelis found out to their cost in 2006 when pitted against well-armed Hezbollah fighters in the Lebanon and this was also an experience shared by the Russians in Chechnya who lost between 200 and 250 armoured vehicles in the First Battle of Grozny in 1995. However tanks have been written off before, but through technical enhancements and tactical changes they have always come back. Despite their vulnerabilities, they have continued to prove useful even in the close combat urban environments, where their main guns and heavy rapid fire machine guns have provided very effective support for the infantry. The inherent toughness of the MBT has also proved a reasonable counter to all but the largest improvised explosive device (IED). So it may be that the tank will still have a role in 2034+ as the soldier's friend and protector.

Always significantly affected by the race between anti-tank firepower and protection, tank killing capability, with depleted uranium, hyper-velocity tank rounds and increasingly sophisticated shaped charge anti-tank missiles and rocket propelled grenades, has certainly seen a significant increase in the late 20th and early 21st Centuries. This has in turn been partially mitigated by the development of new and revolutionary ceramic composite armour materials such as 'Chobham' or the fitting of explosive reactive armour (ERA) designed specifically to defeat incoming ATGMs and RPGs. Many western tanks have also improved their survivability with 'wet' ammunition storage, crew compartmentalisation and halon fire extinguishers and crews can be expected to survive the effects of a penetrating hit that would have surely killed their tanker fathers. However, this is a race the tank appears to be losing simply because the amount of armour required to defeat improving anti-tank weapons will eventually become prohibitive due to weight constraints. Armoured Personnel Carriers (APC) or Infantry Fighting Vehicles (IFV), whilst also proving useful in the urban environment armed with an effective rapid fire auto cannon and possessing a mass great enough to drive through barricades, are even more vulnerable to infantry fired shaped charge weapons and so face the same challenges as the tank.

So let's now have a look atsome of the technologies that may be adopted over the next 20 or so years that will shape the tanks and other armoured fighting vehicles in the year 2034+. Most important will be the attempts to increase their survivability without having to rely on heavier and heavier armour. Currently this is following two complementary routes. Firstly, making the tank difficult to spot by today's modern sensors and secondly, providing active defences against incoming missile type weapons. Today and most likely for many years to come, the vast majority of anti-tank weapon sensors on the battlefield will rely on using the infra-red band of the spectrum for target acquisition, one in which modern armoured vehicles are unfortunately easy to spot due to their irregular hot spots and exhaust emissions. There are however a number of projects in progress to equip future AFVs with almost magical infrared signature reduction capabilities. This is being achieved through the installation of temperature-controlled panels covering the outside of the vehicle. Each of these panels will be capable of rapidly raising or lowering its temperature allowing the vehicle to match the ambient heat of the terrain it occupies making it effectively invisible to thermal sensors. In even more advanced versions, each panel would be capable of independent operation allowing a varied temperature camouflage to be created similar in concept to the way that disruptive pattern camouflage breaks up a target in visible light. Even more incredible are accounts I have read recently citing a revolutionary Polish design that takes this technology one step further by programming the panelling to simulate the heat signature of non-hostile targets such as cars or even cows! If achievable these incredible passive defences will potentially make detection by the enemy in lowlight or low visibility environments almost impossible for a large percentage of the enemy's anti-tank weapon systems. Even resorting to radar detection may not help the attacker as future AFV's may also have their exteriors coated in Radar Absorbent Materials (RAM) similar to some of today's advanced stealth aircraft and be designed with low radar cross sections.

However, these advanced technologies may not be 100% fool proof and in the end be vulnerable to the oldest of all sensors, the Mark 1 Eyeball. To address this, future AFVs will almost certainly be fitted with active defences against incoming missiles and RPGs. Certain advanced tanks such as those in Russian service already sport first generation versions of these systems such as the Shtora-1. These feature laser or visual sensors distributed around the tank whose job is to detect targeting laser beams and react by activating infra–red jammers and deploying laser defeating smoke clouds in an attempt to break visual or laser locks. Perhaps a more radical example of the shape of things to

come are ‘hard kill’ countermeasures such as the Trophy system currently mounted on the Israeli Merkava main battle tank and Arena deployed on some Russian vehicles. Small radars installed around the turret are tasked to detect incoming high-speed projectiles such as anti-tank missiles and rocket propelled grenades. The radars tracking the warhead feed data to a computerised gun which then hopefully shoots it down or significantly slows it with a shotgun like burst of projectiles. As we move towards 2040, these systems will only become more sophisticated, perhaps with the automatic guns being replaced by lasers or other directed energy weapons. Other revolutionary and innovative defences on the drawing board include electrically charged armour which will destroy incoming projectiles or warheads just before contact with an incredibly powerful electric arc.

In parallel with the infantryman, the AFV will feature more and more sophisticated communication and sensor systems networked with other elements on the battlefield and additional remote sensor platforms. Another revolutionary feature currently being developed is intended to increase the situational awareness of an AFV crew who, when traditionally ‘buttoned up’ under fire, have very restricted fields of view. To alleviate this, a large number of multi-spectral camera sensors could be fixed all over the vehicle with their visual input being meshed into a 360 degree coverage and projected onto the crew’s helmet mounted displays. This would, in essence, allow them to virtually ‘see through’ the walls of their AFV in any light condition. These same sensors could also detect movement and heat signatures providing early warning and targeting information for the crew.

New Hybrid electric power plants are currently being developed that will greatly enhance the mobility and endurance of these new vehicles. Such systems will strive to eliminate the easily detectable heat plumes of conventional engines or turbines. They will also provide the additional power required for the increasingly complex on-board technology. As we look even further ahead, such power may become even more important if new weapons technology such as high energy lasers or rail guns can be miniaturised enough to be mounted in AFVs to replace the conventional guns. This is, however, going beyond the boundaries of this peek into the future.