

Personal effects: Assault rifles and small-arms technology

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Responding to the requirements arising out of an increasingly complex operating environment, international armed forces are finally witnessing the gradual proliferation of alternative weapon and ammunition designs aimed at improving the mobility, precision, and lethality of soldiers on the battlefield. *Andrew White reports*

Recent developments in small arms technology include the introduction of shorter-barrelled rifles and carbines for close quarter battle (CQB) and personal defence weapon roles; alternative calibre cartridges designed to optimise weight and lethality ratios; the spread of suppressor technology for enhanced signature management; and the fielding of integrated fire control systems (FCSs) for improved accuracy at the lowest tactical level.

Operational requirements for such systems were considered at the Future Soldier Technology conference in London on 13 March, where senior service officials from across NATO warned of the emerging capabilities of peer and near-peer adversaries, particularly in areas relating to lethality and survivability.



IWI has designed the Tavor 7 in the heavier 7.62x52 mm calibre to respond to ongoing requirements from special mission units for increased stopping power. The weapon was designed with input from the IDF's special operations community. (IWI)

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Examples that sources highlighted to *Jane's* included the enhanced armour penetration and protection solutions now available to opponents in China, Iran, North Korea, and Russia, as well as similar but less well-advanced capabilities now available to non-state actors and violent extremist organisations.

Such capabilities include upgrades to personal protection equipment and vehicle protection kits, which are designed to increase the survivability of troops on the ground; and armour-piercing ammunition and assault rifle technology that provide special operations forces and dismounted close combat personnel with increasing levels of precision and lethality.

However, referring to these emerging requirements, Daryl Easlick, Deputy Director of the US Army Lethality Branch, explained how any increase in the penetration effects of existing small-arms solutions, achieved through higher levels in barrel pressure, must be delicately balanced with emerging demands to reduce the acoustic and physical signatures of weapon systems.

“If I pump the [barrel] pressure up, I’m killing myself with signature and recoil management. It’s going to be difficult,” Easlick warned while describing how acoustic and physical signatures of small arms could assist enemy forces in detecting, identifying, and neutralising threats.

This is one of the strongest arguments for increasing the use of suppressor technology across conventional armed forces, especially those operating in urban and subterranean environments where weapon signatures can be amplified in confined spaces.

Meanwhile, Easlick also described emerging requirements to more effectively engage peer and near-peer targets at extended ranges, describing ongoing efforts to design laser rangefinders and ballistic calculators that could ‘disturb’ the reticles of assault rifles and carbines at the lowest tactical edge to enhance lethality and precision.

Such a capability has traditionally remained the preserve of more specialist sniper rifles, where technology including laser rangefinders, ballistic calculators, and integrated FCSs can measure environmental effects to maximise the probability of a first-round hit.

Modern enhancements

As armed forces continue to identify and develop various next-generation upgrades, short- to medium-term improvements in assault rifle and carbine technology look set to focus on reduced form factors and alternative calibre types for more effective operation in confined areas, which is particularly relevant to urban environments.

This follows the ongoing focus on operations undertaken in subterranean environments and megacities by the likes of the US Army and Israel Defense Force (IDF), where special forces and dismounted close combat teams can be heavily engaged in CQB.

For example, the US Special Operations Command (USSOCOM) is considering multiple approaches to the calibre debate and evaluation of 6.5 mm and .260 Remington ammunition through to 6.8 mm and .270 Winchester rounds is continuing.

However, some of the most innovative small-arms solutions have been adopted by the Netherlands Maritime Special Operations Force (NL MARSOF), which became one of the first organisations to adopt .300 calibre Blackout (300 BLK) rounds. In November 2016 the NL MARSOF confirmed its decision to procure 195 MCX carbines from Sig Sauer in 300 BLK as part of its wider consideration

of a wholesale change in calibre from its in-service armoury of Heckler & Koch HK416 rifles in NATO standard 5.56x45 mm calibre.

Comprising a 7.62x35 mm projectile contained in the casing of legacy 5.56x45 mm ammunition, the 300 BLK calibre provides significant uplift in lethality, range, and precision levels over 5.56 mm rounds without any significant increase in weight carried by personnel.

However, on 7 February the Dutch Ministry of Defence (MoD) announced a EUR14 million (USD17.3 million) contract to acquire an undisclosed number of HK416 A5 carbines during a seven-year period, signalling the intention of the NL MARSOF and the army's Korps Commandotroepen (KCT) to continue operating 5.56x45 mm carbines as a primary weapon in the near-to-medium term.

Meanwhile, the international community is keeping a close eye on the United States regarding alternative weapon and ammunition designs. On 1 March the US Army unveiled a prototype opportunity notice for its Next-Generation Squad Automatic Rifle (NGSAR) programme, which could have significant implications for the small-arms inventory of the US armed forces and the international community.

The NGSAR programme is being undertaken to find a suitable alternative to the army's 5.56x45 mm M249 Squad Automatic Weapon (SAW) with an assault rifle form factor to "combine the firepower and range of a machine gun with the precision and ergonomics of a rifle, yielding capability improvements in accuracy, range, and lethality", according to an official solicitation document.

The prototype opportunity notice stipulated how the NGSAR weapon must comprise a "lightweight" platform capable of firing "lightweight ammunition" to improve soldier mobility, survivability, and precision.

According to the solicitation, the NGSAR programme aims to identify solutions at technology readiness level (TRL) 6 with a view to contracting up to three technology demonstrator prototypes. Following an evaluation programme this will be reduced to two competitors in a production and deployment phase, with the army highlighting its desire to procure more than 15,000 weapons, associated FCSs, and more than 30 million rounds of lightweight ammunition.

Programme requirements call for a weapon system weighing no more than 12 lb (5.44 kg), providing warfighters with 20% weight savings over legacy solutions. The NGSAR must also measure no more than 35 inches (889 mm) long with weapon stock fully extended, the solicitation explained.

Additionally, the NGSAR programme is seeking a dedicated FCS to support laser rangefinding and ballistic calculation in a single form factor weighing no more than 3 lb (1.36 kg). The NGSAR barrel must also retain the capacity to feature suppressor technology for acoustic and visual signature management.

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