

A new 5.56mm generation or a changing of the guard?

A combination of new weapons and upgrade programmes will ensure the dominant position of the NATO 5.56mm calibre for decades to come although as events in the US show, it is entirely not without competition.

by Ian Kemp



Developed to meet the needs of the German Army the Heckler & Koch 5.56mm G36 has proven an export success; (from left to right) standard G36 with AG36 40mm underbarrel grenade launcher, the compact G36C, G36V export variant with bipod) and the G36K carbine. (HK)

Procurement decisions in the US ripple across the world and inevitably influence other competitions. This continues to be true with small arms. The US Army's Project Manager Soldier Weapons issued a Sources Sought notice on 22 August 2008 for, 'enhanced carbine and subcompact small arms technologies as well as production capacity of the US small arms industrial base'. Interested manufacturers were asked to detail potential improvements in individual weapon performance in the areas of accuracy and dispersion out to 600m, reliability and durability in all environments, modularity, and terminal performance on a variety of target mediums. The request was not limited to weapons firing standard 5.56 x 45mm NATO ammunition although other ammunition must meet International Convention standards. The 19 manufacturers which responded to the notice attended an industry day in November to discuss their products and proposals with Service representatives. Army officials said they hoped to have a requirements document approved by mid-2009 which could lead to a competitive request for proposals being issued as early as September 2009.

Candidate weapons must offer a significant improvement over the 5.56mm M4 carbine which is one of the four standard issue individual weapons in US Army and US Marine Corps service along with the 9mm M9



The Israel Defence Force is now being equipped with the Israel Weapon Industries 5.56mm Tavor family. (IMI)

pistol, M16 (A2 and A4) assault rifle and 5.56mm M249 Minimi light machine gun. The M4/M4A1 carbines and the M16A4 rifle are the fourth generation of the M16 series following the original M16 and improved M16A1, both fielded during the Vietnam War, and the M16A2 fielded in the 1980s. M16A4s/M4s are 'flat-top' weapons that incorporate the MIL-STD-1913 'Picatinny' rail on top and can be fitted with additional rails at the 3, 6 and 9 o'clock positions. The M4 is 838mm in length with the stock extended (757mm retracted) and weighs 2.52Kg with-

out magazine fitted, while the M16A4 measures 990mm in length and weighs 3.987 kg with a loaded 30-round magazine.

Existing US small arms are still going strong. In June 2006, Colt Defense received a \$242,468,789 firm-fixed-price multiyear contract from the US Army's TACOM Life Cycle Management Command for M4 carbines. In November 2008, it awarded a \$45.2 million delivery order to Colt for 37,415 M4 carbines for use by the USMC and US Army. The M16 family is the most widely used 5.56 mm weapon, in service with more than 50 countries. In addition to DoD orders, Colt received US Foreign Military Sales (FMS) contracts in 2008 to produce the M4 for 13 countries including Afghanistan, Iraq and India while FN Manufacturing received an FMS contract to supply more than 23,000 M16A4s to Iraq.

Many existing M16 users are either making the transition to the M4 carbine or modifying M16 rifles to incorporate collapsing buttstocks, Picatinny rails and other improvements. In January, the Netherlands Ministry of Defence announced that Colt Canada would receive a contract to upgrade 25,000 C7 rifles and C8 carbines (license produced variants of the M16 rifle and Colt carbine originally developed for the Canadian Forces) which it had supplied in the 1990s. The project will include railed forearms, vertical pistol grips, adjustable buttstocks, and

Heckler & Koch developed the 5.56 mm HK416 carbine for the US Special Operations Command. The Norwegian Army is the first army to select the HK416 as its standard assault rifle. (HK)





FN Herstal's modular 5.56mm/7.62mm Special Operations Forces Combat Assault Rifle (SCAR) was designed to meet the needs of the US Special Operations Command. The operator on the left is armed with the 5.56 mm Mk 16 Mod 0 SCAR-Light while the operator on the right carries a 7.62 mm Mk 17 Mod 0 SCAR-Heavy and has a Mk 13 Mod 0 40 mm Enhanced Grenade Launcher Module strapped on his rucksack. (FNH)

modified selectors and magazine releases, and Aimpoint sights. The project leverages work done by Colt Canada upgrading the Canadian Army's weapons to the C7A2 and C8A3 configurations.

Experience in the Global War on Terrorism (GWOT) in Afghanistan and Iraq is the dominant factor influencing small arms acquisition. Compact carbines, such as the M4, are the weapon of choice in urban areas. New day and night sights, pointers and other accessories are being fielded to improve observation, target acquisition and engagement. In the US, British and other armies these are being augmented by a more generous allocation of 5.56mm and 7.62mm marksman/sniper rifles to achieve precision engagements at ranges out to 800m. Most forces now typically equip one in four carbines/assault rifle with 40mm underbarrel grenade launchers (UGLs). Efforts are underway improve the fire control systems for UGLs and field new ammunition including airbursting rounds to defeat targets in defilade.

USSOCOM leads the way

It is the US Special Operations Command (USSOCOM), frustrated by the US Army's decades-long search for an M16/M4 replacement, which has fielded new individual weapons for use in the GWOT. Since 2005, some US special operations forces (SOF) have been using the Heckler & Koch (H&K) 5.56mm HK416 carbine, which was developed under a USSOCOM contract. The company capitalised on experience gained developing the Germany Army's 5.56mm G36 assault rifle, the 5.56mm XM8 rifle for the US Army (in a project cancelled in 2005) and the modernisation of the UK's 5.56mm SA80 small arms family. Customers have the option of purchasing a new upper receiver, buffer and

drive spring to refurbish M4s or buying a completely new build HK416. The weapon is used by SOF units in France, Germany, Indonesia, Italy, the Netherlands, Poland and Turkey and in April 2007 the Norwegian Army selected the HK416 to replace its 7.62mm H&K G3s as the Army's standard assault rifle even though the weapon was not one of the original shortlisted contenders.

In January 2004, the USSOCOM launched the Special Operations Forces Combat Assault Rifle (SCAR) project and only 11 months later selected FN Herstal's candidate from numerous worldwide competitors. The requirement was influenced by the experience of US SOF operators in Afghanistan who appreciated the advantages of the M4A1 carbine when operating in caves and other close terrain but also identified the need for a more powerful cartridge than the 5.56mm NATO SS109/US M855 round in certain situations.

The SCAR family comprises the 5.56mm Mk 16 Mod 0 SCAR-Light and the NATO 7.62 x 51mm Mk 17 Mod SCAR-Heavy, which share 90 percent 'ergonomic compatibility' and 60 percent parts commonality, and the 40mm Mk 13 Mod 0 Enhanced Grenade Launcher Module (EGLM) which can be used as a stand alone weapon or fitted to either SCAR variant. Each SCAR rifle can be fitted with three different barrels - a close quarter combat (CQC) barrel designed for use at combat ranges up to 200m, a standard barrel for combat at 300 to 500m and a long barrel variant optimised to engage targets between 500 and 800m - thus allowing the soldier to select

In May 2008 FN Herstal launched the SCAR rifles and the EGLM on the export market

the appropriate barrel length for a specific mission. The Mk 16's barrels are 254mm, 355.6mm and 457.2mm in length while the Mk 17 has 330.2, 406.4 and 508mm barrels. Both weapons are fitted with Picatinny rails at the 3, 6, 9 and 12 o'clock positions that are compatible with 'nearly' all of the components of the M4 carbine Special Operations Modification (SOPMOD) kit and the 12-gauge M26 Modular Accessory Shotgun System. Development was expedited by bringing USSOCOM project managers, budget officials and SOF operators together at FN Herstal's facilities in Liege, Belgium ensuring that users could provide immediate feedback to weapons engineers.

FN Herstal has delivered more than 8,000 Mk 16 and 4,000 Mk 17s; USSOCOM has indicated the project could total 84,000 5.56mm and 15,000 7.62mm weapons. USSOCOM's FY09 budget request describes the Mk 16 and Mk 17 as 'threshold' weapons and states that 'spiral development within the program seeks the objective of a single weapon capable of complete caliber modularity'. In May 2008 FN Herstal launched the SCAR rifles and the EGLM (as the FN40GL) on the export market.

A new 5.56mm generation

The EGLM leverages the work done by FN Herstal developing the 5.56mm F2000 Modular Assault Weapon System. Modularity is a primary design feature of the F2000 bullpup design; the weapon is fitted with an x1.6 optical sight which can be removed to expose a Picatinny rail while the forward handguard can be removed so that attachments such as a 40mm grenade launcher, laser aiming modules and a 12 gauge shotgun can be mounted. When the grenade launcher is fitted a computerised fire control system replaces the standard sight unit which enables the user to fire both the 5.56mm and 40mm weapons. The F2000 is 694mm long and weighs 3.6 Kg with an empty magazine. FN Herstal received the first major order for its F2000 through the US FMS programme in 2005 when the Saudi Arabian National Guard ordered 55,000 weapons, including 3,600 fitted with the grenade launcher. The following year Slovenia became the first NATO country to adopt the F2000 as its standard assault rifle with the purchase of 6,500 weapons.

Heckler & Koch's G36 rifle, which entered service with the Germany Army in 1995, has become one of the most popular new generation 5.56mm weapon. Although the G36 is

conventional in layout, H&K has made extensive use of polymer-based plastics to reduce weight and emphasised modularity in the design. The standard rifle measures 998mm with the butt extended, 758mm with the butt-stock folded and weighs 3.6 kg without magazine. German special forces use the G36K carbine which measures 860mm in length (615mm folded). The G36's integral carrying handle incorporates a x3 optical sight with x1 red dot sight mounted above. The rifle's semi-transparent 30 round, plastic magazines can be clipped together on the rifle to facilitate rapid magazine changes. The G36E export version features a x1.5 optical sight in place of the standard sight. A light support weapon is available with a heavier barrel and bipod. The G36 is also in service with the Spanish Army, the Portuguese marines, the Norwegian Coastal Ranger Command, the Latvian Army and various SOF units. The AG36 40 mm underbarrel grenade launcher used with the G36 was bought by the British Army and was further developed to become the US Army's new M320 replacement for the M203 grenade launcher.

In recent years the Israel Defence Force (IDF) has begun fielding the Israel Weapon Industries (IWI) the 5.56 mm Tavor TAR-21 (Tavor Assault Rifle - 21st Century) bullpup assault rifles selected by the IDF in 2003, following an evaluation against the M4 carbine. The company IWI worked closely with the IDF Ground Forces Command since 1993 to develop a replacement for the IDF's M16s and M4s, and IWI 5.56 mm Galil assault rifles. Great emphasis was given to ergonomic design, ease of maintenance and growth potential. Extensive use is made of polymer materials. A red dot reflex sight, which incorporates a red dot laser target designator, is fitted to the standard weapon. This version is 720 mm long, with a 460 mm long barrel, and weighs 3.635 kg with a loaded 30 round magazine. Other versions include the 640 mm long CTAR-21 Commander Tavor, the 520 mm long MTAR-21 Micro Tavor and the STAR-21 Sharpshooter Tavor which is basically essentially the standard rifle fitted with a bipod, a rail to accommodate a variety of sights and a butt pad. In 2004, the Indian Army ordered more than 3,000 rifles to equip SOF units and is considering the local production of the Tavor. The Republic of Georgia has received an undisclosed quantity for its special forces with additional orders expected.

Singapore Technologies Kinetics (STK)

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developed its 5.56mm SAR 21 bullpup design in the late 1990s for the Singapore Armed Forces. In the standard model a 1.5 x optical sight is integrated in the carrying handle and an infrared dot or visible red dot can be mounted in the handguard. Variants include the SAR 21 sharpshooter with a x 3 sight, SAR 21 P-rail with the standard sight mount replaced by a MIL-STD-1913 rail, the SAR 21 Modular which features rails in 3, 6, 9 and 12 o'clock positions in place of the standard forestock, SAR 21 GL which can mount STK's single-shot CIS 40GL 40mm grenade launcher or the M203, and an LSW with a heavier barrel and bipod.

The sale of M16 rifles and M4 carbines to Afghanistan and Iraq have begun the transition away from the Soviet-era 7.62mm AK small arms series. The 7.62 x 39mm AK series, and its many licensed-produced and pirate copies, remains the most widely used rifle globally although the Russian Army fielded the interim 5.45 x 39mm AK-74 from the mid-1970s as a replacement. A new 5.45mm design was classified as the AN-94 in 1994. This features a two-round burst capability with a cyclic rate of 1,800 rds/min, as a means to minimise dispersion thus ensuring the incapacitation of soldiers wearing combat body armour. On fully automatic the rifle has a rate of fire of 600 rds/min. The AN-94 has yet to go into series production presumably because of budget constraints. The Izhevsk Arms Factory, was selected to produce the AN-94, offers the Kalashnikov Hundred series to export customers: 5.56 mm NATO calibre AK-101 and NATO 7.62 mm AK103 assault rifles; and the 5.56 mm NATO AK102, Russian 7.62 mm AK104 and the 5.45 mm AK105 'short assault rifles'.

Mid-life updates

Heckler & Koch completed a five-year, £112 million upgrade of the UK's 5.56mm SA80 bullpup small arms family in 2006 when it returned the last of 178,000 L85A2 rifles and 12,000 L86A2 Light Support Weapons (LSWs) to the Ministry of Defence. The upgraded weapons are expected to remain in service until about 2020 and will conse-



The Australian Army's F88S Austeyr features a Picatinny rail which allows the original x 1.5 sight/carrying handle to be replaced with various day and night optical sights. (Australian DoD)



The standard version of FN Herstal's 5.56mm F2000 Modular Assault Weapon System is being carried by the soldier on the left while the weapon on the right is fitted with the 40mm grenade launcher. (FN)





The US Army soldiers in this patrol are armed with both the 5.56mm M4 carbine (left) and the M16A4 rifle (right) with rigid stock and longer barrel. (US Army)



quently be incorporated in the Future Integrated Soldier Technology system. Although the only significant external difference on the A2 weapons is a larger cocking handle, all weapons have been extensively rebuilt with many of the internal working parts replaced with redesigned components of superior quality material. Following requests from units on operations, the foregrip of the L85A2 is being replaced with a Picatinny quad rail and a down grip which incorporates a bipod. The Sight Unit Small Arms Trilux, which is fitted to most rifles and all LSWs, is being replaced with the Advanced Combat Optical Gun Sight (ACOG) which incorporates a red dot close quarter battle sight.

Nexter is upgrading the French Army's 5.56mm FAMAS F1 bullpup rifles as part of the Fantassin à Équipement et Liaisons Intégrées (FELIN) soldier system project. The company produced approximately 400,000 weapons for the army and export customers Djibouti, Gabon, Senegal, and the United Arab Emirates. Production was superseded in the mid-1990s by the FAMAS G2 (for second generation) which uses 30 round NATO standard magazines instead of the 25 round magazine developed for the F1. The FAMAS is one of the few bullpup rifle designs which does not incorporate an optical sight as a standard feature. In the first stage of the FELIN project Nexter is converting 19,000 rifles to the low-profile configuration while the full FELIN configuration incorporates a man-machine interface, a second grip and a new day and night sight.

The Australian Defence Force has used the F88 Austeyr, a license produced Steyr-Mannlicher 5.56 mm AUG-A1 assault rifle, since 1989 and the weapon is also in New Zealand service. The AUG became the first bullpup design to enter military service when it was fielded by the Austrian Army in 1978. The modular design allows the AUG to be converted to four variants by changing the barrel: a 626mm long compact weapon featuring a 350mm barrel, a 714mm long carbine with 407mm barrel, the 805mm long standard assault rifle with 508mm and a 915mm long light support weapon which features a 621 mm heavy

barrel with bipod. A x 1.5 optical sight is integrated into the carrying handle. An A2 model was introduced in 1997 which allows the standard sight to be replaced with a rail to accommodate more powerful day sights and night sights. Export customers include Malaysia, Oman, Saudi Arabia and Taiwan.

In September 2008, Australia's Defence Materiel Organisation awarded Thales Australia, which produced the F88, an A\$11.3 million contract to produce the F88SA2 from March 2009; this incorporates a longer top rail with a side mount for a torch, a lighter optical sight and a 'reduced visibility' colour scheme. This will be followed in 2010 by the F88SA3 will feature an improved trigger assembly and modifications to enable the F88 to fire a wider variety of 5.56mm ammunition.

Concurrently, the project office for LAND 125 Soldier Combat System has awarded Thales Australia a A\$6.5m development contract for the Enhanced F88 (EF88) that will address weight and power usage, as well as improvements in surveillance and targeting technology. "If early design iterations are anything to go by, the enhanced Steyr will be a very different looking and highly capable weapon," said Project Director LAND 125 Lieutenant Colonel Anthony Heath. "It will have an 'open architecture' that will allow soldiers to configure their weapon for specific tasks in a way not previously possible." In addition to the standard EF88, specialist variants with be produced for commanders, marksmen and grenadiers. Full production is scheduled to begin in 2011.

The Australian Army's Land Development Branch has defined a small arms replacement project, LAND 159, which is intended to replace current weapons, including the F89 Minimi LMG, with an infantry combat weapon, personal defence weapon and support weapon based on new technology from 2020.

The New Zealand Defence Force announced in February that approximately 3,000 F88s will be modified with accessory rails and will consider rechambering to a more powerful cartridge. The NZDF believes the weapons have another 10 years of service life.

Whatever the service life of individual weapons, modernisation programmes for existing weapons, such as the M16/M4 and AUG/Austeyr, and new generation weapons, such as the SCAR and Tavor, will ensure that 5.56mm remains the dominant calibre for decades to come. ■

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