



FN Herstal M249 Squad Automatic Weapon with optic sight

# Lightweight, but Heavy Oomph

Combat experience in Afghanistan, Iraq and other asymmetric conflicts is influencing the development of compact light machine guns that can dominate the 'mid-range battlespace'.

## Ian Kemp

In the early 1970s the engineers of Belgium's FN Herstal developed the Minimi, the world's first 5.56 mm light machine gun (LMG), in anticipation that Nato would adopt the 5.56 x 45 mm cartridge as a standard small arms calibre. Several Nato armies were planning to follow the example of the US Army and replace their 7.62 x 51 mm assault rifles with a smaller calibre weapon that would be lighter, thus enabling soldiers to carry more ammunition for the same basic load. Seeking to maintain ammunition commonality within the infantry section or squad, most armies also decided to acquire a magazine-fed light support weapon (LSW) or belt-fed LMG to replace 7.62 mm LSWs or belt-fed general-purpose machine guns (GPMG) such as the FN Herstal Mag 58, Saco Defense M60 and Rheinmetall MG3. The general-purpose machine gun was a compromise weapon that was intended to be light enough to be carried by a single infantryman in the assault and heavy enough to be used in the sustained-fire role mounted on a tripod. Although extremely lethal in the sustained role these designs were too heavy and bulky to be used effectively in the assault.

The US Army selected the Minimi to meet its Squad Automatic Rifle (Saw) requirement and on 1 February 1982 type classified the weapon as the M249 Saw. The US Marine Corps also adopted the M249 to replace the M60 in the light role. The standard M249 weighs 7.1 kg unloaded and measures 1.04 metres in length. With a cyclic rate-of-fire of about

850 rounds/min the M249 is usually belt-fed from 200-round plastic boxes, although the weapon can also be fed from 30-round Nato standard magazines without modification. The army designates the M249's effective ranges as 600 metres against point targets, 800 metres against areas targets and 1000 metres in the suppressive-fire role. More than 100,000 Minimis have been built for the US Army alone. The Minimi has now been acquired by some 45 countries and is license-produced by Beretta for the Italian forces, by Thales Australia for the Australian and New Zealand defence forces and by Sumi-

tomo Heavy Industries for the Japanese Ground Self-Defence Force.

Since 1996 FN Herstal has produced the Minimi New Standard weapon, which offers improved reliability and better ergonomics. It also produces variants for users willing to sacrifice range in order to save weight. The first to be introduced was the Para Mini, which replaces the standard 465-mm barrel with a 349-mm barrel and the standard fixed stock with a sliding buttstock which reduces the weapon's length to 766 mm when the butt is retracted and 914 mm when extended. The shorter barrel reduces the weapon's maximum effective range to 800 metres.

Most recent customers for the Minimi, including the British Army and Royal Marines, have selected the Para Minimi model, and some earlier customers are refurbishing weapons to this standard. In



Armed with the Canadian C9A1 variant of the FN Herstal 5.56 mm LMG a Canadian soldier provides security during a patrol in Afghanistan. The C9A1 features a Picatinny rail on the feed cover enabling optics such as the Elcan C79 3.4x optical sight to be fitted. (Canadian Department of National Defence)



Many new customers for FN Herstal's 5.56 mm Minimi LMG, such as the British Ministry of Defence, have selected the Para model with short barrel and extending buttstock. Although there is a loss of range compared with the standard Minimi the Para model is lighter and easier to handle, especially in confined spaces. (FN Herstal)

British service one Para Minimi, designated the L110A1, is issued to every four-man infantry fire team to provide suppressive fire at ranges of 600 metres, while one BAE Systems Royal Ordnance L86A2 LSW, which proved unsatisfactory as a light machine gun, is retained in each fire team for use by a designated marksman to engage targets at 800 metres.

Extensive analysis of the use of small arms in Afghanistan and Iraq have been conducted by the Joint Services Small Arms Program, which was established by the US Department of Defense to define and harmonise small arms requirements across the armed services. The service developed a model of 'Battlespace Depth' which defines the 'close quarter battle space' as 0 to 50 metres, the 'close battle' as 0 to 100 metres, the 'mid-range battle' as 50 to 600 metres and the far range battle as '300 to 3000 metres'. The study found that about 80% of the use of small arms by US forces in the Global War on Terror has taken place at ranges within 300 metres. Much of this combat has also taken place within urban environments. These findings and comparable analysis of experience by American and other forces in other recent operations explain why some users have sacrificed range in order to save weight.

The US Army has taken several measures under its Rapid Fielding Initiative to modify its M249s to better suit the weapon for the contemporary operating environment. These include issuing short barrels, collapsible buttstocks and 100- and 200-round 'soft pack' magazines, and incorporating Mil-Std-1913 'Picatinny' rails on the feed cover and handguard to allow the use of combat optics and other accessories. Further enhancements include the Magnified Combat Optic sight. A report prepared by the US Army Infantry Center after interviewing thousands of soldiers about the effectiveness of small arms used in Iraq stated that the age of the M249 Saw has created reliability, durability and maintainability issues. It noted that soldiers' ratings of the M249 were "moderately positive and increasing" as a result of RFI enhancements. The service announced in the fiscal year 2008 (FY08) defence budget that it plans to buy a further 32,000 M249s. In parallel the army's Anniston Depot in Alabama is undertaking a 'reset' which will restore

weapons to 'as new' condition and introduce the various enhancements. The M249 is thus set to remain the army's standard light machine gun for another 20 years with combat experience driving a continuous enhancement programme.

At the request of the US Special Operations Command FN Herstal developed the Mk 46 Mod 0, a lighter model of the M249 which entered service with US

developed both 5.56 mm and 7.62 mm Minimi designs in the early 1970s in case Nato rejected the smaller cartridge as an official calibre. The Mk 48 weighs about 34% less than the US Army's standard FN Herstal M240B 7.62 mm medium machine gun and has 70% parts commonality with the M249. The Command has bought 703 Mk 48 Mod 0s to date and in March 2007 awarded FN Herstal a



The German Army has begun fielding Heckler & Koch's new 5.56 mm MG4 under the designation MG4 as a replacement to its 7.62-mm MG3 GPMGs. The company is confident the new weapon will be as successful as the widely deployed MG3 (not shown). (Heckler & Koch)

Navy Seal teams in 2001. Although it retains 80% parts commonality with the M249, the Mk 46 weighs 27% less. It features the short barrel of the Para model, the fixed stock of the standard M249 and has Picatinny rails mounted on the feed cover and handguard. The Stanag magazine port and the tripod-mounting lug of the Standard and Para Minimi models are eliminated to reduce weight. In August 2006 the Belgian company's American subsidiary, FNH USA, received a \$ 9.83 million contract from the Special Operations Command for 1100 Mk 46 Mod 0s and related spare parts.

In 2006 FN Herstal introduced into the market the 7.62 mm Minimi, a variant of the Mk 48 Mod 0 which was developed in response to a 2001 Special Ops Command requirement for a weapon that combines 'the power of 7.62 mm ammunition with the weight of a 5.56 mm machine gun'. The company's response was rapid, as FN Herstal engineers had

maximum \$ 11 million contract to deliver Mk 48 Mod 1s through 2012.

Customers for the 7.62 mm Minimi can select either a standard Minimi handguard or one with three integrated Picatinny rails. They can also replace the fixed buttstock with a sliding buttstock. The unloaded weapon weighs eight kg with fixed buttstock and measures 1015 mm in length. With extending buttstock the weapon weighs 8.2 kg and measures 1000 mm with stock extended and 865 mm with stock retracted.

Unveiled in September 2001 the Heckler & Koch (HK) MG43 is the newest 5.56 mm light machine gun on the market and could prove to be a serious rival to the Minimi. The German Army has begun fielding the weapon - type-classified as the MG4 - to replace the successful 7.62 mm MG3 machine gun, a derivative of the Second World War 7.92 x 51 mm MG42. Since early 2006 the German contingent serving with the Nato-led



The 5.56 mm Negev LMG was developed by Israel Weapon Industries to meet the demands of the Israel Defense Force. The standard Negev with 200-round 'soft assault drum' is shown here. (IWI)

International Security Assistance Force in Afghanistan has been equipped with the weapon. As part of its *Infanterist der Zukunft* (infantryman of the future) project the army plans to equip each infantry squad with two MG4s, and the weapon has been selected as the secondary armament for the army's new PSM Puma infantry fighting vehicle. Although definitive figures have not been made public the German requirement should total several thousand.

HK engineers designed the MG4 to function reliably under adverse conditions using ammunition from various sources without the need to adjust the gas system. The standard MG4 E measures 1030 mm with extended butt, 830 mm with folded butt and weighs 7.9 kg without ammunition. The MG4 KE features a 402-mm barrel instead of the standard 482-mm barrel, thus reducing the weapon's overall length to 950 mm with butt extended and 750 mm folded. Shortening the barrel reduces the weapon's maximum effective range from 1000 to 900 metres. The iron sights are graduated in 100-metre increments up to 1000 metres and various optical and night sights can be fitted on a Mil-Std-1913 rail. For sustained fire the MG4 can be mounted on the US M2 tripod or similar mounts and the operator can change hot barrels without need of a protective glove.

The Ameli, developed by what is now General Dynamics Santa Barbara Sistemas, appeared in 1982 as the first belt-fed rival to the 5.56 mm Minimi and was

acquired by the Spanish armed forces. The Ameli weighs 5.3 kg empty, 6.85 kg with a 100-round belt in a 'combat box' and measures 900 mm in length. Its iron sights are graduated from 300 to 1000 metres. The weapon can be supplied with a one-turn-in-178 mm barrel enabling it to fire M193 ammunition or a one-turn-in-305 mm bar-



Vektor produces a conversion kit which enables its 7.62 mm SS 77 GPMG (top) to be easily converted into the 5.56 mm SS Mini LMG (bottom). The SS Mini LMG is also marketed as complete weapon. (Denel)

rel for Nato standard SS109 ammunition types. To enable sustained fire the barrel is of quick change design.

The Israel Weapon Industries Negev 5.56 mm was designed to fulfil the Israel Defense Force (IDF) requirement for a multi-purpose weapon that could be fed from belts and magazines in the light role

drums'. According to the manufacturer 'thousands' of Negevs have been produced since the type was accepted by the IDF in 1997. Export customers include Colombia, Costa Rica and Estonia.

South Africa, like Israel, developed its small arms requirements on the basis of extensive combat experience. Vektor, a division of Denel, began development of the SS 77 7.62 mm GPMG in 1997 and the weapon entered South African service in 1986. It weighs 9.6 kg (including a 2.5-kg barrel) and is 1155 mm long with the butt extended and 940 mm folded. In 1994 the company introduced a kit to convert the SS 77 into the Mini SS kits 5.56 mm light machine gun. The kits consist of a new barrel weighing 1.5 kg, feed cover assembly, breech assembly, locking shoulder and gas piston. The Mini SS weighs 8.26 kg unloaded and measures 1000 mm in length, although a folding buttstock is available as an option. According to Denel the weapon has an effective range of 500 metres when fired on its integral bipod and 800 mm when mounted on a tripod. A quick-attack combat optical sight can be mounted on the weapon. □



The Israel Weapon Industries 5.56 mm Negev SF variant is optimised for special forces and other users who require a compact weapon for use at short ranges. (IWI)