

# Enhancing lethality: assault rifle technology developments

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**Armed forces continue to seek improvements to small arms armouries in order to equip warfighters with the most suitable weapon system for operating across a multitude of environments. *Andrew White* considers the latest trends in assault rifle technology**

The international assault rifle market has become increasingly active as armed forces seek to upgrade or replace legacy weapon systems with more suitable options for use across a rapidly evolving contemporary operating environment (COE).

Ongoing coalition counter-terrorism and counter-insurgency (COIN) operations against Islamic State insurgents illustrate how special operations forces (SOF) and dismounted infantry require a personal weapon system that can engage targets at longer ranges across the front line but also be operated in confined spaces and, in particular, in built-up areas.



*The assault rifle remains the primary weapon system for dismounted and special forces conducting military operations in urban terrain. (Norwegian MoD)*

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According to industry sources, it is extremely difficult - if not impossible - to identify a single weapon system capable of satisfying these vastly different mission requirements, although the market continues to design more modular and scalable solutions that can be up- or downgraded, depending on operational parameters.

Colt Manufacturing's company director of international sales, US Marine Corps (USMC) Lieutenant Colonel Matt Fehmel (retd), told *Jane's* that required technical specifications for assault rifles had completed a developmental "full circle" in recent years.

"A few years ago the primary demand was for maximum rail space, which was required to attach the myriad of new and emerging technologies that provided tactical advantages in aiming, sighting, and speed of target acquisition," Fehmel explained.

"The problem that resulted was a 6 lb [2.73 kg] rifle with 6 lb of accessories mounted on it. This has forced the demand back to weight reduction and improvements to the weapon platform that assist in the improved accuracy."

Fehmel highlighted an emerging demand for a more modular and extended rail adaptor system (RAS) space on board the weapon through introducing lower-profile gas blocks, ambidextrous lower receivers for left- or right-handed and disadvantaged shooters, and fully floating and suppressed barrels integrated on board monolithic upper receivers.

However, Fehmel also noted demand remains strong for designated marksman or sharpshooter weapon systems with "semi-automatic and medium-range" capabilities that are more reliant on larger calibres than standard NATO 5.56x45 mm ammunition.

"Although using larger calibres, these design features are very similar and show an opportunity for Colt to move into new markets with weapons that still fit our core capabilities," he said.

Debates continue across NATO and non-NATO entity state actors over switching from 5.56 mm calibres for standard assault rifles, Fehmel said, although the "vast majority of our customer base is still deeply invested" in this widely available and standard ammunition type.

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## **European drivers**

Despite such moves across the niche special forces community, many conventional armed forces appear happy to continue with NATO-standard 5.56x45 mm assault rifle types.



*H&K's HK417 continues to be adopted by special operations units and infantry seeking range and stopping power beyond the capabilities of 5.56 mm calibres. (Heckler & Koch)*

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In January German manufacturer H&K unveiled its latest assault rifle, the HK433, which is being used to target a requirement from the German Army, or Bundeswehr, to replace its legacy

inventory of 5.56x45 mm G36 weapons. The HK433 joins the G36, HK416, and HK417 in the company's assault rifle family of weapon systems. The news follow a ruling in September 2016 by Germany's Koblenz Regional Court, which rejected German Ministry of Defence (MoD) criticisms of H&K's G36 over alleged overheating and accuracy issues. The court's decision followed an evaluation of the G36 by the Fraunhofer Research Institute in 2015.

The gas-operated HK433 features a short-stroke gas piston with locked rotating bolt head. A monolithic upper receiver can also be swapped out, enabling an operator to switch between calibre options, including 300 BLK, 7.62x51 mm, and 7.62x39 mm variations.

Rifle options include barrel lengths ranging from short-barrelled 11-inch (27.9 cm) models through to 12.5, 14.5, 16.5, and 18.9 inches, up to the longest option of 20 inches for designated marksman operations.

H&K was unable to provide *Jane's* with further information on the HK433. However, according to industry sources, additional features include a collapsible buttstock, RAS in the 12 and 6 o'clock positions for adding accessories such as tactical torches, optical gunsights, and handgrips, and the capability to house a suppressor to reduce muzzle flash, dust signature, and noise.

The 'Storm Warrior' HK433 has been designed with ambidextrous functions, including a magazine release catch, fire selector switch, and cocking handle. The weapon has a cyclical rate of fire of 700 rounds per minute and can be adjusted to fire in semi-automatic and automatic modes.

H&K's decision to launch a new assault rifle follows discussions between the Bundeswehr and French MoD on the joint acquisition of a next-generation assault rifle towards the end of 2016. Discussions were restarted in December 2016 following the French MoD's selection of the HK416 as its preferred option for the Arme Individuelle Future (AIF) programme. However, the French Army is considering a joint acquisition programme in the future, which could see the German Army following suit.

On 22 September 2016 the French Direction Générale de l'Armement (DGA) signed a EUR168 million (USD177 million) contract with H&K for the supply of the HK416F to replace legacy Famas F1 weapon systems. The HK416F beat off competition from FN Herstal's SCAR-L, Sig Sauer's MCX, Beretta's ARX160, and HS Produkt's VHS-2.

Another option for the Bundeswehr includes the new RS556 weapon system, jointly developed by Rheinmetall and Steyr Mannlicher and released to the international small arms market on 11 January. The companies confirmed to *Jane's* that they are planning to offer the 5.56x45 mm weapon specifically for the Bundeswehr requirement.

Based around a short-stroke gas piston operating system, the RS556 has a collapsible buttstock and capacity to be offered in barrel lengths including 14.5-, 16-, 18-, and 20-inch options, extending the rifle's utility from a personal defence weapon and close-quarter battle (CQB) variant through to conventional and designated marksman weapon.

The RS556 also allows operators to switch between calibres, with additional options including 300 BLK ammunition. The rifle weighs 9 lb in unladen configuration, according to company officials.

Confirming Rheinmetall's interest in the German tender, a company spokesperson said, "Rheinmetall and Steyr Mannlicher are offering the RS556 assault rifle as a jointly produced

product, made in Germany, with a German value-added share of 60%. Among other things, the two partners thus have their sights set on the German market."

Another option for Germany's Federal Office of Bundeswehr Equipment, Information Technology, and In-Service Support (BAAINBw) could be selecting the HK416F for service into the army, perhaps under the designation HK416G. The BAAINBw is planning to equip the army with a next-generation assault rifle in 2019 and beyond. A total of 124,000 weapon systems are being sought in a contract worth up to EUR630 million.

Concurrently, German special forces have also initiated a search to replace legacy 5.56x45 mm G36 carbines, with the BAAINB, unveiling a solicitation in January for the procurement of up to 1,750 weapon systems.



*Germany's army and special forces are considering alternative weapon systems to replace the H&K G36, although the wider army requirement appears unlikely to abandon 5.56 mm ammunition. (US DoD)*

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According to defence sources associated with the German Army's Special Operations Command (Kommando Spezialkräfte: KSK) and the navy's Special Operations Maritime Command (Kommando Spezialkräfte Marine: KSM), force elements are considering alternative-calibre weapons capable of providing enhanced flexibility across the COE.

Up to EUR11 million has been set aside for the SOF component commands to acquire a new weapon system. Requirements call for a maximum unladen weight of 3.8 kg and a maximum weapon length of no more than 90 cm (without attached suppressor).

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### **Suppressed technology trends**



*The US Special Operations Command continues to consider Suppressed Upper Receiver Group (SURG) technology following the revival of a solicitation in January. (USASOC)*

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A recent trend towards fully integrated suppressor technology on board the upper receivers of assault rifle carbines continues. On 13 February US Special Operations Command (USSOCOM) revived a solicitation for Suppressed Upper Receiver Group (SURG) technology.

Suppressed carbines have become signature equipment for the special operations community, providing operators with reduced recoil and noise during operations in confined spaces in particular. SURG technology provides an integrated suppressor and upper receiver, reducing requirements to detach and attach working parts. Such an offering has been provided by Sig

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Sauer's MCX, with significant interest from the international SOF community as already mentioned.

Tests have also been conducted at the Naval Surface Warfare Center (NSWC) in Crane, Indiana, into its ability to fire in-service M855A1 and MK318 Mod 0 ammunition. Life expectancy of SURG barrels could be up to 20,000 rounds, according to industry sources.

SURG technology must also be integrated on board USSOCOM's MK18 Mod 1 CQB Receiver (CQBR), which has a 10.3-inch barrel with a 0.0705-inch-diameter gas port. This barrel can be fitted with Surefire's FMBS-C suppressor, which is mounted on the company's flash suppressor at the end of the muzzle.

However, there are still technological issues to be overcome with regard to the mirage testing of associated heat hazing. The USSOCOM SURG requirement was initially shelved during 2016 over overheating concerns.

"The MK18 Mod 1 will be fired for 50 rounds at a rate of 1 round every 2 seconds," a USSOCOM spokesperson said. "At completion, a target will be viewed through the magnified day optic and the smallest individual bars that can be seen will be recorded. The process will be repeated using the SURG-equipped M4A1. Comparison of the target resolution will be used to verify threshold requirement. The process will be repeated three times with two different shooters and the average resolution will be recorded for evaluation of the requirements."

Tests will be conducted in a climate-controlled range complex, with the engagement of targets out to 100 m, designed to simulate CQB and military operations in urban terrain (MOUT).

A downselection of preferred partners for USSOCOM's SURG programme is expected to be announced in August ahead of a second phase of Verification Testing Procedures. Sources have told *Jane's* that a final partner could receive a five-year indefinite delivery/indefinite quantity (IDIQ)-type contract. According to USSOCOM sources, the command could end up procuring nearly 70,000 SURG kits, each with a lifespan of 125,000 rounds.

Additional requirements call for a "large advancement of the assault rifle platform" in the addition of a folding buttstock on board SURG weapon systems, although this is not a threshold requirement.

Elsewhere in the United States, the Marine Corps Systems Command (MARCORSYSCOM), based out of Quantico, Virginia, has published a request for information (RFI) regarding the future of its Infantry Automatic Rifle (IAR).

The USMC is considering re-rolling the IAR, previously used as a sharpshooter option for squads, as the new service rifle for its infantry battalions. The news follows the Integrated Training Exercise (ITX) at the Marine Corps Air-Ground Combat Center in 29 Palms, California, in November 2016, which assessed the future of the IAR in place of Colt's 5.56x45 mm M4 carbine.



*The USMC used November's Infantry Training Exercise (ITX) as part of its analysis of whether to assign the M27 IAR as the standard infantry rifle for battalions. (USMC)*

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Participating force elements were tasked with assessing multiple concepts of operation and tactics, techniques, and procedures (TTPs) associated with both weapon platforms, as well as reliability, accuracy, and lethality.

With similar weapon-handling features to the M4, the IAR benefits from an extended effective range of 550 m, compared with 500 m, with a free-floating barrel minimising vibration during firing. The weapon's gas-piston operating system also enhances the IAR's capability to withstand wear and tear.

Published on 17 January, the RFI is designed to provide the command with market research to consider extended procurement of IAR weapon systems in service across the USMC since 2010.

"MARCORSYSCOM plans to procure approximately 11,000 new Infantry Automatic Rifles and ancillary equipment, which includes sling, bipod, blank firing adapter (BFA), front sight, rail cover kit, rear sight, training, and manuals at a future date," the solicitation stated.

A derivation of H&K's HK416, the 5.56x45 mm M27 was introduced to provide longer-range and more manoeuvrable support weapon systems to USMC squads operating at reach, while also replacing some elements of M249 5.56x45 mm Squad Automatic Weapon (SAW) light machine guns.

The USMC is seeking an IAR fitted with bipod and iron sights weighing no more than 12.5 lb and measuring less than 40 inches in total length with buttstock extended.

According to the solicitation, "The IAR should be capable of a rate of fire of 36 rounds per minute for 16 minutes and 40 seconds without a barrel change or risk of cook-off and the system should

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demonstrate less than four minutes of angle [MOA] dispersion in semi-automatic fire with MK318 ammunition for the life of the barrel. The system should demonstrate less than eight MOA dispersion in automatic fire when firing a 5-round burst with M855 ammunition."

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