SCAR

You want details, you want facts, you want the most complete account ever published of the four-year development of the Special [Operations] Combat Assault Rifle? Here it is.

By David Crane
Photos courtesy FN USA

Depending on who you choose to believe, the Special Operations Forces Combat Assault Rifle (SCAR) program is either on the cusp of success or the precipice of failure. On the "Kumbaya" side, you've got FN Herstal, the Special Operations Forces (SOF) Weapons Team at the Naval Surface Warfare Center (NSWC), Crane Division, and the Program Executive Office for SOF Warrior Systems (PEO-SW) within USSOCOM. They're all touting the features, attributes and performance of the developmental FN MK 16 MOD 0 SCAR-Light (SCAR-L) and MK 17 MOD 0 SCAR-Heavy (SCAR-H) like they're the small arms equivalent of the second coming.

On the other side, there are active and retired Special Forces personnel and industry observers who are less than sanguine about SCAR's future.

As a journalist, it's my job to dig out the facts and report the truth fairly and impartially, to the best of my ability. So, with that in mind, I'm going to present both sides of the argument and let the chips fall where they may.

SCAR Program Origins

The SCAR program actually began in 2002, when combat developers from each of U.S. Special Operations Command (USSOCOM, better known as SOCOM) component commands drafted the Joint Operational Requirements Document (JORD) defining a weapon system to specifically meet their needs. This initial draft requirement was posted for industry (i.e., gun manufacturers) to review and comment on and became the baseline for the SCAR Industry Conference held in August 2003.

This conference with leading companies in the firearms industry led to the final JORD submission. The SCAR JORD was approved by SOCOM in September 2003, and an official "Program of Record" was established. In January 2004 they officially released the SCAR solicitation.

Currently, we're actually over four years into the effort. The immediate goal of the SCAR Program is to replace all current assault rifles, carbines, subcarbines, battle rifles and light sniper weapons with the SCAR weapons.

Specifically, the goal is to replace the Colt SOPMOD M4A1 Carbine, the MK12 SPR (Special Purpose Rifle), MK18 MOD O CQBR (Close Quarters Battle Rifle), the M14 battle rifle, the MK 11 MOD 0 Sniper Support Rifle (SSR) and the M203 underbarrel-mounted grenade launcher with three modular weapons: the MK 16 SCAR-L (5.56x45mm NATO), the MK 17 SCAR-H (7.62x51mm NATO), and the MK 13 Enhanced Grenade Launcher Module (EGLM).

(A quick note on nomenclature here: the "MK" in MK 16 or 17 is an Army designation; when it is written as "Mk," it's a Navy designation.)

However, the program's future and ultimate goal—and this is an FY08 initiative— is to develop and utilize one modular, common receiver platform for the MK 16 and MK 17 that can be configured to accept any current or future caliber ammunition, depending on the mission requirement. In other words, the ultimate goal is just one modular, open-architecture weapon with multi-caliber capability, what the SOF Weapons Team calls the "Objective SCAR System," instead of two separate weapons.

Six Versions

The SCAR's intrinsic modularity is the key to this capability. For even though there are two models, the Light and Heavy, there are actually six total variants because the extruded aluminum receivers (upper receivers) incorporate a quick-change barrel system and can accept different trigger modules.

Three barrel lengths are available, depending on the mission-specific requirement: CQC, Standard and Sniper Variant (SV), also known as the Long Barrel (LB). This allows the operator to field-modify the weapon to accommodate the mission. For the MK 16 MOD 0 SCAR-L, barrel lengths are 10" (CQC), 14" (standard) and 18" (LB). Barrel lengths for the MK 17 MOD 0 SCAR-H are 13" (CQC), 16" (standard), and 20" (LB).

The trigger module on the SCAR is essentially the lower receiver in that it contains the trigger assembly, magazine well and pistol grip. However, the reason it's called the trigger module and not the lower receiver is that, on the SCAR, the upper receiver is the serial-numbered part— the gun, as it were— unlike the AR-platform where the lower receiver is the gun and therefore the serial-numbered receiver component.

FN Herstal, Colt Defense, Knight's Armament Co. (KAC), Lewis Machine & Tool (LMT), Cobb Manufacturing, Robinson Armament (Robarm), and Diemaco all competed for the contract, but it was FN Herstal that was unanimously awarded the indefinite-delivery-indefinite-quantity (IDIQ) contract for SCAR in November 2004 by a Source Selection Board made up entirely of Special Forces operators for each of SOCOM's component commands.

There were rumors floating around at the time that SOCOM favored FN Herstal from the beginning and the smaller companies like Cobb and Robinson were bounced out of the competition as quickly as SOCOM could manage it, since these two companies in particular were small, new and didn't have products already in the procurement system. They lacked political connections and were deemed to be incapable of delivering such a large order anyway. However, according to Tucker Campion, PEO-SOF Warrior, retired SEAL and Project Manager SOF Small Arms and Ammunition, "There was no difference to the opportunities provided to one vendor over another. Each was provided ample opportunity to provide questions or concerns and get a PMO reply. All the submitting vendors were present at the Industry conference, where they presented their comments and concerns on the JORD, and what they were planning on submitting to the board of SOF operators and program personnel present in a Q&A scenario. The SOF panel was anxious to see all the weapons and pick the best, period."

Whither The XM8?

Before we move on, though, I should cover an interesting and perhaps lesser-known side note to the competition, involving a modified version of the HK XM8 5.56mm assault rifle. I was curious as to whether or not HK had submitted the gun for the SCAR competition,

SCAR was designed by Special Forces tier one operators and its features have been modified and improved based on real-world testing and feedback from the actual men who will use the rifle in the field.

so I asked a SOCOM rep, who told me they had not. This is, in fact, true.

No HK SCAR candidate was submitted in the SCAR competition, but, on a hunch, I decided to dig a little deeper and got in touch with an industry contact of mine who was involved at HK in the planned XM8-R submission for the SCAR competition. Here's a portion of the reply he sent me via e-mail: "PEO Soldier [Program Manager SW Individual Weapons Lt. Col. Matt Clarke] agreed to submit a Gov't-to-Gov't submission of XM8 with rails (called "XM8-R") to SOCOM for the SCAR solicitation. PEO SP [at SOCOM, Col. Tom Spellissy] agreed to accept it in the competition.

"HK GmbH prepared a full set of 5.56mm XM8s that were 100 percent compliant with the SCAR specs as well as a version of the HK 40x46mm GLM [XM320] for the EGLM portion. All of the rifles had Picatinny rails along the top of the receiver and on four sides of the handguard.

"The guns arrived at HKD [HK Defense] in time for submission, and we prepared the necessary support package, manuals and documents. Five days before the submission deadline I contacted Crane to arrange for delivery and was told by the PM there that SOCOM had changed their mind and decided not to accept a Gov't-to-Gov't submission after all, allegedly due to direction from legal counsel at SOCOM.

"I believe this was all BS because there have been many such G-to-G submissions in the past, like the Crane and USMC WTB submissions of modified M21s to the USMC DMR test in the 1990s and others.

"This is all fact. I was there and directly involved. The really ironic fact is that PEO S [Brig. Gen. Moran] and PEO-SP [Tom Spellissy] were classmates at the USMA. The two requirements for the 5.56mm XM8 and

SCAR L were 95 percent compatible, yet they made every effort not to work together on what should have been a joint effort.

"PM SW and HK even agreed to build the XM8 in 7.62x51mm and 6.8x43mm for the heavy portion, if required. $50 million spent on XM8 and $20 million thus far on SCAR since 2005, and not one is fielded. Zero U.S. Government dollars [have been] spent in its development or testing, and the HK416 is, and has been, fielded and killing bad guys across the globe since 2005 in the hands of our most elite units, and others like them, around the world. Ironic, isn't it?"

At roughly the same time the above situation was going on, I was pretty hard on the XM8 (possibly a bit too hard, based on recent discussions about it with respected professional contacts of mine who were involved in its development). That said, I haven't been a big fan of the way HK does business in general, and especially how they treat the U.S. civilian tactical shooting market. Frankly, I don't think they give the U.S. civilian tactical shooting market the proper amount of respect and priority due, so it's hard for me to have a lot of sympathy for them over their lack of success with Big Army and SOCOM small-arms procurement, respectively.

Understand that, to this day, the HK416 is still not commercially available in the U.S., and it's been around since 2004! Believe me when I tell you that this is not due to a lack of demand or enthusiasm for the HK416 in the U.S. commercial sector. But back to the SCAR…

SCAR Testing

There are two primary types of testing that the SCAR weapons have had to endure: developmental testing (DT) and operational testing (OT). "During developmental testing, that's when we get all the environmental type stuff out of the way— endurance, longevity of the weapon system, salt spray, sand, et cetera," explained Gabe Bailey, FNH USA Military Division Director.

"During initial operational testing, in the form of Early User Assessments and Evaluations (EUAs), that's when they really do mission-type profiles, so they're going out in [combat] environments and testing the weapon system out.

"The operators provide subjective data [in the form of operator feedback] as well as the objective data that's more in the form of numbers."

Bailey went on to describe how, prior to the operational test, they had a total of seven program management reviews, which consisted of approximately 40 people. These 40 people were comprised of engineers, FN reps, SOCOM reps, program management office reps out of NSWC Crane, and Special Forces operators basically sitting around a table and telling the designers, developers and program folks what they wanted changed, why they wanted it changed, and what that change would do for the end-user operationally.

According to FN, every change along the way was "purely democratic" and they were based on input from all the operators. So to anyone who says he doesn't like a particular change that was made in the system's evolutionary development, Bailey takes that criticism with a grain of salt, since he was involved in six out of the seven program reviews and all the changes and modifications that occurred were justified for the operational betterment of the weapons system.

After FN initially presented the weapons to SOCOM— and prior to the formal operational testing phase that the weapons are currently in— there were four user assessments (EUAs) by SOCOM operators to see how the weapons system functioned and operated, not just mechanically but also ergonomically, with regard to the layout of the controls, balance, handling and other "shootability" factors.

Operator Input

User assessments took place over the course of a year and a half, starting with the first user assessment in July 2004 and running through January 2006. Intermingled between the developmental testing and environmental testing, the user assessments were basically used as check points to make sure the designers at FN were doing what they needed to do, and that the weapons system was doing what it was supposed to do.

The user assessments were also designed to ensure that, if the operators had any changes that needed to be made before FN went to production guns, FN could make those changes.

To put it another way, the formal evaluations, along with the subsequent operational testing, were designed to make sure that the operators got the weapon that they wanted and needed, which is why FN and SOF Weapons at NSWC Crane describe SCAR as "an operator-envisioned, tested and chosen weapons system."

For SCAR weapons testing, program managers at SOF Weapons, NSWC Crane has typically run guns at NSWC Crane, while FN Manufacturing, down in Columbia, S.C., and FN Herstal personnel in Belgium simultaneously conduct the same testing.

SOF Weapons has lived by this firing schedule since they put out the initial solicitation for SCAR. It ensures that all the developmental partners and players are testing the weapons system in the same manner, to show up any problems or areas in need of improvement, which they can then communicate to the other partners.

So, it's not just one group testing the weapons, it's a multi-team effort of SOCOM and FN, both testing and exchanging information gleaned on "high-risk" aspects like weapon durability and endurance, high/low temperature testing, and other functionally crucial aspects. According to SOF Weapons, this multi-team testing aspect has worked out well.

Production Phase

Once these four user assessments were completed and a final design was agreed upon, the program moved into the Low Rate Initial Production (LRIP) phase. This "Milestone Decision" was made by the leadership of SOCOM and transitioned into the Initial Operational Test and Evaluation (IOT&E) phase. The purpose of IOT&E is to

MK 16 series

SCAR Light, CQC configuration

SCAR Light, standard configuration

SCAR Light, long barrel configuration

MK 17 series

SCAR Heavy, CQC configuration

SCAR Heavy, standard configuration

SCAR Heavy, long barrel configuration

allow for any required changes or adjustments to future deliveries to be made prior to full assembly.

This IOT&E period is designed to have operational elements from within each SOCOM component "run the weapon through the ringer" and test it out in real-world combat environments such as desert, jungle, alpine, arctic, ocean, riverine, airborne and others to find out if there are any deficiencies in the weapons system from an end-user's perspective.

An LRIP delivery order was made for 712 units of the Mk 16 MOD 0 5.56mm assault rifles, 593 units of the MK 17 MOD 0 7.62mm battle rifles, and 302 units of the MK 13 MOD 0 EGLM underbarrel-mounted 40mm grenade launchers. Of these quantities, 32 SCAR Lights and 32 SCAR Heavies, along with 16 grenade launchers, were fully assembled and delivered for IOT&E.

The first OT took place from August through December 2007 and was conducted in four phases, most of which were two and a half weeks long. Operational contingents of U.S. Army Rangers, USMC MARSOC, U.S. Navy SEALs, Air Force Special Operations, and U.S. Army Special Forces tested the weapons in their respective operational environments.

The Rangers went first in August, then MARSOC in September, then SEALs in October and November, and finally Army SF in December. Intermingled in these operational contingents were some Air Force Ravens personnel. Each of these phases and the planned conduct of them were developed by and agreed to by each respective SOCOM component command.

Operational testing is conducted by the SOF testers under the authority of an operational test project officer out of Marine Corps Operational Test and Evaluation Activity (MCOTEA). They have data collectors following along while the operators are doing mission-type profiles, i.e. real-world-type testing. These tests are conducted CONUS (inside the CONtinental United States).

The combined test and evaluation process conducted by FN, the SCAR program office, and SOCOM operators revealed a number of design, materials, and manufacturing aspects that needed to be modified or improved.

In general, if the operators wanted a change on the weapon, they had combat developers with whom they would work to implement the changes. These combat developers are force modernization representatives and are the subject-matter experts on weapons for their respective contingent.

So, as everyone is sitting around a table, there will be a representative (sometimes two representatives) from each contingent, and they'll bat around the various

changes that each feels are necessary. While there have been rumors flying that not everyone has been satisfied with all the changes and modifications that have been made along the way, FN maintains that every change has been fully vetted by every SOCOM contingent for the betterment of the weapons system.

"If a change is made, it has to be made for the right reasons, so that it enhances the combat capability of the weapons system," Bailey said.

Successful Development

Two points should be made here before we get into the specific design changes that were made or points of contention that were discussed. First, successful infantry small- arms design and development is much more difficult than people might think. The difficulty in creating a mechanically reliable, select-fire firearm lies in the fact that there's a rather complex interaction between the multiple weapon components (gun, magazine, and ammo), each of which utilizes multiple parts.

There are many things that can go wrong, some of them quite small yet totally arresting if they happen. You've got the main action or mechanism of the weapon and all related parts, the magazine and all related parts, and the ammunition and all related components. Any problems with the functioning of just one of these components can cause a malfunction, so you need to have a highly competent engineering team to develop the weapon intelligently and progressively to troubleshoot any and all problems that arise.

It also shouldn't be overlooked that most of the great military firearms throughout history have been created by one or two individuals. Think of John Browning, John Garand, Eugene Stoner, Mikhail Kalashnikov. Gun companies themselves are only as good as their engineers. If you don't have good talent in-house, you'd better find it outside and contract it.

If you want to achieve the best possible design and the most combat-effective small arm, the majority of interaction should be between the engineers and the operators who will be employing it in combat. It should be a direct and unrestricted relationship with as little outside interference as possible from management, program managers, bean counters and administrators.

That's not to say that company management and program managers can't also contribute their opinions and guidance during development, but the bulk of the communication regarding design and performance should be between the engineers and the operators, period.

When I communicated this opinion to Bailey, he readily agreed, adding, "I can tell you this: at most of our program reviews, that's where the interaction takes place. Obviously there's other folks that weigh in. But, for the most part, it's the operators talking to the engineers. That's where it really comes across."

SCAR Design Features

Let's get into the nitty-gritty. Let's start with the SCAR's operation. Both the MK 16 Light and MK 17 Heavy operate via short-stroke gas-piston systems and utilize a rotating bolt. This means that instead of relying on direct gas impingement to push the bolt carrier group rearward and cycle the gun, like with the M16, a gas piston instead utilizes an operating rod (op rod) to physically push the bolt carrier group back and cycle the weapon.

An op rod system runs inherently cleaner and cooler than a direct-gas impingement because you're not sending hot gas, carbon and fouling back into the weapon's action. Cleaner operation means that the weapon requires less maintenance. Theoretically, the cooler-running aspect of an op rod system should assist in lengthening the life of the gun. The advantages of short-stroke gas-piston operation have received a fair amount of publicity of late due to the operational success of the HK416 (and now HK417) already in SOF use.

Finally, with a short-stroke gas system, barrel length is much less crucial than it is for a direct-gas-impingement system. With direct gas, you have to worry about gas pressure. You need enough gas pressure to cycle the weapon, without creating an over-pressure situation. In order to have enough gas pressure, you need to have a certain amount of barrel in front of the gas port, which has to be the correct

SCAR's Dark Under-Belly

Or is that under-barrel? While the Light and Heavy rifles were under development, so was a new grenade launcher module.

By David Crane

IF you're developing a new family of battle rifles, you don't want to forget an underbarrel-mounted 40mm grenade launcher, and the SCAR developers certainly didn't. In fact, they've developed a new "side-loading" Enhanced Grenade Launcher Module (EGLM) designated as the MK13 MOD 0).

Reportedly based on the FN F2000's underbarrel-mounted grenade launcher, the MK13's breach not only slides forward, but also swings out to either side for ambidextrous use. It also allows the operator to load longer-length, enhanced-lethality, low-impulse/velocity and medium impulse/velocity grenade rounds, which the Mk13 is designed to handle.

"The unique feature about the MK 13 EGLM is that it can handle the 40mm grenade ammunition that the military uses right now, which is all low velocity, but it's designed to handle the medium-velocity stuff which basically has twice the range of the low-velocity round," David Merrill, former Director of Military Marketing and Communications at FNH USA said.

"So the design and the architecture of the weapon are very unique in that it can handle this extra-heavy kick when the military finally decides that this is the munition that it wants to move to."

Based on Merrill's statement, it would seem logical that the MK 13 EGLM would be capable of handling rounds like the HellHound HE/HEDP and Mercury HEDP multi-purpose rounds from Martin Electronics which are longer in length than standard 40x46mm low-velocity grenades.

The HellHound actually comes in two versions: High-Explosive (HE) and High-Explosive Dual-Purpose (HEDP). Both versions of the HellHound contain twice the fill amount (A5 explosive) of a standard-length M433 40mm round as well as an outer fragmentation band component around the outside, giving it a 40 percent greater shrapnel pattern than the M433 and a lethal diameter of 10 meters.

The HellHound has a maximum range of 400 meters (437.6 yards), and it utilizes a point-initiating, base-detonating fuse with Safe Arm technology. The Mercury HEDP round is essentially the medium-velocity version of the HellHound HEDP round, except that it has a shorter fragmentation/shrapnel outer band component and a correspondingly shorter overall length. The Mercury can reach out and touch the enemy out to 800 meters (874.9 yards), so it has double the max range of the HellHound.

Gabe Bailey, Marketing Director, Combat Rifles & Technical Support, FN Military Operations, informed me that the EGLM hasn't actually been tested with medium-velocity 40mm ammo yet.

The MK13 also features a double-action trigger, allowing the user to strike the round's primer again and again as necessary in case of a misfire, without having to re-cock the weapon by opening and closing the breach like on the M203. The MK 13 also utilizes a rotating, locking barrel to close and lock the breach.

An advanced Fire Control Unit (FCU) is being developed for the MK13 that appears to operate in similar fashion to the developmental Aimpoint BR8 FCS (Fire Control System), which is essentially a computerized combat optic that will allow the warfighter to hit targets accurately out to 600 meters.

Here's how the BR8 works: While looking through

the site, find your target. Then, aim at your target by puyting the solid red dot on it and measure the range. A secondary blinking red dot will appear beneath the initial solid red dot. This blinking red dot is the new, corrected aiming point. So, now just super-elevate the weapon until the lower blinking red dot is on the target, and fire. The target should go away.

Like the M203, the MK13 can be operated as a stand-alone unit when the launcher tube and trigger assembly component is combined with the stand-alone stock component, which consists of an integrated Mil-Std-1913 rail and telescoping buttstock.

The requirement states that the EGLM shall have a functional and effective barrel life of 5,000 rounds.

size. By contrast, an op rod-driven system frees you up from having to worry about this precise gas pressure balance with subcarbine-length barrels and gas port-erosion.

The SCAR weapons utilize a reciprocating charging/cocking handle. "A lot of operators are not used to having the charging handle going back and forth," said Bailey. "Once you explain it and you show them immediate action drills, should the weapon malfunction, it's all gross motor skills. With a carbine or M16 rifle, you have to take your hand and your head off the weapon to really perform an immediate action drill. With our weapon system, and with the charging handle located in the position it's in, it's very, very easy to conduct an immediate action drill.

"And, once they learn this, they love it. I've seen several reports that the government has put out. At the onset of a user assessment, they complain about it. By the end, they say they wouldn't trade it for the world, because it just makes sense."

Since SCAR is now into the fourth or fifth generation of development, a number of features have evolved over time, particularly aspects that pertain to weapon ergonomics. The selector switch is one of these items. The SCAR selector switch has a 90-degree throw from "Safe" to "Full-Auto," as opposed to the M16A4/M4A1's selector switch, which has a 180-degree throw. To get to "Semi-Auto" from "Safe," it's a 45-degree throw, and then another 45-degree throw to "Full-Auto."

The advantage of the shorter throw is that, once the operator gets used to it, it is quicker and easier to get to "Full-Auto" because a 90-degree throw is half the distance. The crucial element here was to make the selector click securely enough into position on all of the settings so that it doesn't get moved without the operator deliberately moving it from position to position.

The selector is ambidextrous and features a long paddle on the left side for thumb actuation and a short paddle on the right side for index finger actuation. During testing, the developers and testers found that the ambidextrous selector lever was catching on operators' clothing and gear on the primary side (left side), so the developers changed the detent spacing on the tumbler, which cut down on it kicking over to the next position.

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They then lowered the profile of the manual thumb selector so it wasn't as prone to catching on an operator's gear. They also made the selector switch reversible for lefties so they can have the long paddle on the right side of the weapon, and the short panel on the left side.

Materials Evolution

Some of the changes have been based on an evolution in materials. Due to the requirement that the weapons be able to fire 15,000 rounds without any parts breakage, some of the parts had to be strengthened via materials changes. An example of this is the MK 17's bolt, which was initially breaking prematurely due to excess sulfur in the steel.

The barrel extension and lugs also apparently had a bit too much sulfur in them. According to Paul Miller, NSWC-Crane, SCAR Deputy PM and Lead Crane Engineer, the high-round-count test schedule revealed pretty much any type of materials brittleness problem, including this one.

"Our test schedule calls for, say,

10,000 rounds in a test, then 5,000 rounds that are in full-automatic mode, and 2,500 rounds are suppressed. And, under those firing conditions, it's a very severe firing schedule, which, if you've got any issues with the design or the structure, you're going to see it during our endurance phases.

"And what we were seeing was, with this sulfur contamination, we were getting some cracks prior to our expected service-life limit," Smith explained. FN corrected the formula for the material, and that solved the problem.

On one of the early generations of SCAR, there were some problems with the folding/telescoping buttstock. A contact of mine out of U.S. Army Special Forces explained that when his group tested the weapons, the hinge on the buttstock wasn't robust enough, and they were able to break it. As it turns out, this problem occurred on a first generation gun and was fixed shortly thereafter.

This same SF contact informed me that the SCAR stock was too "chunky" for his tastes, using words like "big," "thick" and "crappy" to describe it.

"FN just went about it a little bit wrong," my source explained. "They tried to please everybody by giving them length-of-pull and cheek-to-stock height— with a bad hinging system. And, it's all just a big, thick, plastic, crappy… you know. Somebody can do much better with an aftermarket version for that, and they will. When it becomes mainstream, somebody will make a better aftermarket stock because nobody likes that thing."

It should be noted that, with any infantry small-arms development program, problems are going to show up that have to be solved. In addition, various aspects will have to be tweaked or improved, based on operational requirements. Also, it's very difficult for any company to make repeated changes and modifications based on continuous operational testing and operator feedback.

The Costs

The procurement cost by itself is a major issue because not only is SCAR intended to replace every infantry rifle, carbine, subcarbine and underbarrel-mounted 40mm grenade launcher currently in service with SOCOM, but it's also seen by some as a potential replacement for every rifle and carbine in the Big Army and the Marine Corps. That's a lot of weapons!

When I interviewed Bailey, he spoke directly to the procurement cost issue: "I don't think a lot of people understand the SCAR program. When we're talking about the weapon system, we're not talking about just the gun. We're talking about the magazines, we're talking about a vertical grip, we're talking about a rail panel kit, we're talking about a bipod, we're talking about a suppressor.

"That's what the weapon system is, and there's some other things that I probably left out. When we talk about cost, you have to look at what we're replacing."

And that's really the name of the game— cost. Bottom line, the SCAR will be less expensive to produce as a family than competing weapons, particularly the HK416 and HK417, especially after SCAR moves to a single common receiver for the MK 16 and MK 17, which, again, is the goal.

SOF Weapons at NSWC Crane is already claiming 83 percent parts commonality, even without a common receiver. "In terms of the commonality between the parts, you're looking at an increased benefit with the cost to the government for purchasing these weapons and also an increased benefit in terms of logistical footprint of a deploying unit, because you have to consider how many components they're going to have to take and what weapons are they replacing with that," says David Merrill, former Director of Military Marketing and Communications at FNH USA.

The program managers argue that SCAR would also cut way down on training costs. Bailey touched on this very point during the interview, while also addressing system performance. "One of the first things that you're talking about when you look at the weapons between the M16 and the SCAR-Light and the SCAR-Heavy, they look very similar. All the ergonomics are the same, the adjustments are the same, for the most part, if you train to one, you train to the other.

"So, when you have three different barrel lengths in two different calibers, [when] you train to one gun, you've basically trained to six guns. And if you know the current SOF arsenal right now, there's a lot of differences in those weapons systems that we're replacing.

"It's not just a replacement of the M4. You've got the Mk 18 with a 10-inch barrel, the M4 and the Mk 12, and then on the 7.62 side, you've got your Mk 11 and M14. We add a new capability with the CQC 13-inch barrel. You've got three different barrel lengths in each weapon.

"You change that out at the operator level, if so desired, in just under five minutes. If you do it in the fashion in which we put in our manual, we guarantee accuracy within a minute of angle. And for an assault rifle, on a previously zeroed barrel, if you change it out and you get a minute [of angle] accuracy, that's exceptional."

It is indeed exceptional, especially if this can be accomplished under the weapon's rather grueling operational and endurance testing regimes. The endurance testing has been nothing if not harsh. Miller estimates that the MK 16, MK 17 and Mk 13 test weapons have a combined round count of 1.75 to 2 million rounds through them so far between technical and operational testing.

The weapons have been tested in hot and cold environments, blown up, fired while being water-saturated, fired with bullets in the bore (called a bullet-obstruction-in-bore test), you name it. The testers have done everything they can to verify the weapons for total operational reliability, durability and longevity. Just to give one example, that of the extreme temperature test, they went to minus 50 degrees and plus 160 degrees Fahrenheit in a temperature chamber.

And all the developers are involved with the testing. NSWC Crane, FN Manufacturing, and FN Herstal all conduct the same testing in the same manner and communicate the results with each other. According to Troy Smith, NSWC-Crane, SCAR Program Manager, this system has worked out exceptionally well for them.

The SCAR SSR

There's one final SCAR rifle worth mentioning, which I first found out about through an industry contact of mine and later confirmed with the folks at SOF Weapons (NSWC Crane). It's called the MK 17 Sniper Support Rifle (SSR).

The SSR is basically a longer-version 7.62mm sniper rifle that's significantly longer than even the MK 17 long-barreled weapon and even more accurate. This is significant because, according to my sources, the MK 17 long-barreled weapon is already impressively accurate and even more accurate than certain semi-auto sniper rifles that are already in the supply chain.

According to Miller, the goal for the SSR is that it "shoot to the same criteria that you'd expect out of the old M24 system." Tucker Campion added, "See? This is the excitement that has created a kind of a dual path

forward on SSR development. We've gone to a modular system. In order to stay with the modular system, our snipers came and shot the [MK 17] long-barreled weapon. They were so excited about shooting a long-barreled MK 17, that we're making the most of that. We're doing a developmental effort this year with the intent on making a magazine-fed, fully-auto-capable weapon as accurate as a light sniper rifle like the M24 or M40."

The SSR, if it goes into production, is essentially the final arrow in the SCAR quiver, the SCAR taken to its ultimate long-range accuracy conclusion, if you will. But why do snipers need the SSR if the MK 17 Long-Barrel Weapon is as accurate as the developers claim?

"You get snipers excited, they want be terminally excited," said Campion. "We show them that we can give them a minute gun [1 MOA] that has 4,000 rounds between stoppages and can fire accurately on full-auto, they go, 'Make me more!'

"So, we're taking advantage of that. We know that there are some things we can do to that weapon system to make it even more accurate. We're trying to get bolt-action performance out of a fully-auto-capable weapon."

In other words, SOF Weapons wants to see just how far they can push the performance envelope. "We want the guy to be out there with a fully functional sniper rifle that, if he's required to, he can fight with it as a standard assault gun," said Miller. "These guys were hitting a 9-inch Pepper popper at 600 yards on full-auto with two rounds," Campion added.

But what about full production? An article in the July 2005 issue of *National Defense Magazine* reported that "the original SCAR solicitation specified production quantities of 84,000 SCAR-L standard, 28,000 SCAR-L for close-quarters combat, 12,000 SCAR-L sniper, 15,000 SCAR-H standard, 7,000 SCAR-H close-quarter combat and, 12,000 SCAR-H sniper variants."

However, the *Pittsburgh Tribune-Review* reported on June 22, 2008, that SOCOM plans to order only up to 40,000 guns total at a cost of approximately $100 million, or $2,500 per gun. But even that's only if the program goes the distance, which is still a question mark. Ultimately, "The success or failure of this weapon is in the hands of, and the responsibility of, the SOF community and its operators who developed the requirement, unanimously chose the vendor and defined every aspect of the present design," said Campion.

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