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WOLVERINE

ON THE LIGHT ATTACK TRAIL...



LIGHT ATTACK HAS been a hot topic for the US Air Force for many years and one that has evolved through numerous iterations. While some senior officers see it as an unnecessary waste of dollars in an era of tight budgets that should be focused entirely on advanced fifth-generation fighters, others advocate a sensible and sustainable force mix of high/low aircraft. Over the past two decades, high-end US combat aircraft and aircrew readiness for peer-level conflicts have been dogged by an unrelenting schedule of deployments to counter low-grade threats in the Central Command (CENTCOM) operations area. Recent history has shown little sign of what is referred to as the 'high-end fight,' with aircrew often being called on to sit in a close air support (CAS) 'wagon wheel' observing the ground picture in relatively benign armed overwatch roles.

However, being prepared for that near-peer conflict is what the USAF's fighter

squadrons are being asked to do, while battling a recognized pilot crisis and worn-out 'legacy' aircraft. The USAF desperately needs to recapitalize old fleets and build an organization that accommodates low-intensity conflict while enabling near-peer combat-readiness.

So, is it time for the USAF to look at a two-tiered approach? As the military faces a renewed commitment in Afghanistan, the potential enduring impact on US fighter squadrons is huge. Some say it should keep the fifth-gen squadrons for that high-end threat and press a cheaper, lower-tier, support platform into action when the risks remain low. In November 2017, an F-22 Raptor struck a Taliban drug lab in Afghanistan worth around \$2,800. A \$70,000-per-flying-hour stealth fighter was used to do a job that — by comparison — could easily have been achieved by a \$1,000-per-flight-

The USAF's Light Attack Experiment continues to evaluate whether a new, low-cost, close air support platform might help reduce the burden on front line fighter squadrons. For the Beechcraft AT-6 Wolverine, it now involves initial sale of the aircraft and further progression towards a long-held ambition of success on this stage.

REPORT **Jamie Hunter**

A fabulous shot of an AT-6 carrying a pair of GBU-12 laser-guided bombs. **Beechcraft/ Paul Bowen**

hour Beechcraft AT-6 Wolverine with an acquisition cost in the mid-teens.

'If we can get light attack aircraft operating in permissive combat environments, we can alleviate the demand on our fourth- and fifth-generation aircraft, so they can be training for the high-end fight they were made for,' says Lt Gen Arnie Bunch of the USAF's office for acquisition.

Changing times?

The proposed procurement of new Boeing F-15Xs under the Department of Defense's \$718-billion Fiscal Year (FY) 2020 budget — released on March 11 — came as the first sign that the winds of change might be on the way. The USAF says it can't receive F-35s fast enough and that the F-15X offers a streamlined way to replace weary F-15Cs.

The budget also included details of tangible progress when it comes to light attack. Having completed a bewildering array of light attack studies, including

two formal Light Attack Experiments, the USAF recently delayed plans to procure up to 359 aircraft for eight operational squadrons and three training units, which had been expected to be formalized in December 2018. Although the 2020 budget once again shied away from a big-ticket purchase, the USAF instead opted to continue its experimentation, but with a silver lining for the two front-runners.

It requested \$35 million in research and development (R&D) funding to continue light attack experimentation, earmarking

\$1 billion in procurement funding in FY22-24. In the interim, the USAF said it would use \$60 million in R&D funding and \$100 million remaining from the FY18 and 19 budgets to outright purchase three AT-6 Wolverine aircraft from Textron Aviation Defense plus three A-29 Super Tucanos from the Sierra Nevada Corporation/Embraer.

The USAF says it plans to station the three AT-6s at Nellis AFB, Nevada, and the A-29s at Hurlburt Field, Florida, for more rounds of tactics development

AT-6 EVALUATIONS

From 2010, the US Air National Guard Air Force Reserve Command Test Center began evaluating the AT-6 in a congressionally funded technology demonstration of integrated ISR (intelligence, surveillance and reconnaissance) and weapons system

capabilities. Nearly 40 Air National Guard and Reserve Command A-10 and F-16 pilots gained significant experience of the AT-6. It enabled the new AT-6 to rack up hours and build confidence within the USAF, much of which fed directly into the Light Attack Experiment.



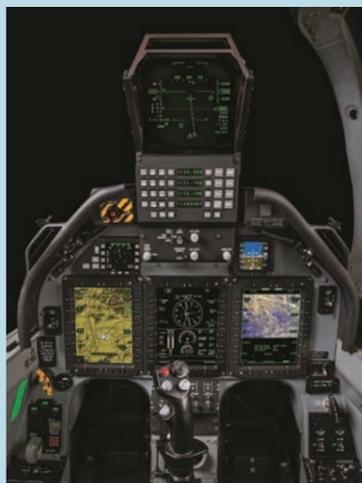
“The Wolverine shares a heritage with the T-6 Texan II trainer, features integrated armor, and is designed for a wide spectrum of missions that fit the light attack mould

and analysis. Additionally, it stated that it would include the US Marine Corps and partner countries in these follow-on experiments, which will begin in 2020. The acquisition of a light attack fleet is far from ruled in, or out, and USAF leaders are still divided. However, the decision to procure even a small number of aircraft is a significant step, particularly for the Wolverine.

The path to light attack

There has been a succession of attempts to field a low-cost light attack aircraft for the USAF, dating back to Vietnam. These include 1967's 'Combat Dragon' with the Cessna A-37 Dragonfly in Vietnam, and 'Combat Dragon II' in 2013, which saw a pair of OV-10 Broncos dispatched to CENTCOM for evaluation.

OA-X (the origin of the Light Attack Experiment) and a search for a new platform to meet needs in irregular warfare date back to 2008. It called for an off-the-shelf design to ensure a more rapid



development/evaluation/fielding cycle, at a reduced cost. It would be able to operate from austere forward operating bases and be largely self-sustaining, since it would fly from bases where maintenance support would be lacking. This led to the issue of a light attack/armed reconnaissance (LAAR) capability request for information (CRFI) in 2009, which initially envisaged a \$2-billion purchase of 100 aircraft.

Candidates included the new AT-6, but LAAR was progressively scaled back in the face of budget cuts. The emphasis steadily shifted from American use of the aircraft towards building the capabilities of partner air forces, such as the ANAAC (Afghan National Army Air Corps), which eventually received 20 A-29s.

The Beechcraft AT-6 Wolverine

The Wolverine shares a heritage with the T-6 Texan II trainer, features integrated armor and is designed for a wide spectrum of missions that fit the light attack mould.

The AT-6 is powered by a 1,600shp Pratt & Whitney Canada PT6A-68D engine, which provides an unequalled power-to-weight ratio among turboprop light attack aircraft. The Wolverine really comes into its own thanks to its proven US combat avionics systems and sensors, which make the aircraft compatible with all fielded US joint terminal attack controller (JTAC) digital voice/data/video capabilities and with their NATO equivalents.

Furthermore, with its FAA-certified CMC Esterline Cockpit 4000 primary flight and flight management system avionics, and a Lockheed Martin combat mission system as used in the A-10C Thunderbolt

Top left: A Wolverine demonstrates some of the stores that have been tested on the type including GBU-12s, the Advanced Precision Kill Weapon System (APKWS) and 0.50-caliber (12.7mm) gun pods. **Beechcraft/Darin LaCrone**

Left inset: The cockpit of the AT-6 was designed with A-10 pilots in mind. Indeed, it leveraged contractors from the A-10C's precision engagement modification. **Beechcraft**

II, the cockpit 'represents a very 'F-16-like' environment, with a very similar pilot/vehicle interface, resulting in a cockpit familiar to any F-16 pilot.

The aircraft is equipped with an L-3 Wescam MX-15Di turret giving color and infra-red cameras, a laser designator, laser illuminator, laser spot tracker, and laser range-finder. This gives the Wolverine an organic capability to find and designate targets, which it can then engage using a wide range of precision-guided weapons thanks to the six underwing hardpoints, four of which are Mil Std 1760-wired, and smart weapon-compatible.

The HMP-400 0.50-caliber (12.7mm) gun pods, Hydra 70mm unguided rockets, Mk81/82 iron bombs, GBU-12/58 laser-guided bombs (LGBs), AGM-114K/M/P and R Hellfire anti-tank missiles, the BAE Systems Advanced Precision Kill Weapon System (APKWS), Raytheon/EAI Talon laser-guided rockets and Orbital ATK GATR laser-guided 70mm rockets have already been cleared for use on the aircraft and the Wolverine has demonstrated superb accuracy.

Despite these structural and avionics changes, the AT-6 Wolverine retains 85 per cent parts commonality with the T-6 trainer as used by the USAF, US Navy, US Marine Corps, US Army and nearly a dozen nations worldwide. Fleet commonality is of huge appeal, especially if customers want to quickly spin up new squadrons of light attack aircraft, leveraging both training pipelines and logistics chains from its existing T-6 training fleets.

Light Attack Experiment

'Working with industry, and building on the 'Combat Dragon' series of tests, we are determining whether a commercial off-the-shelf aircraft and sensor package can contribute to the coalition fight against violent extremism,' said USAF chief of staff Gen David Goldfein in 2017. Goldfein opened the door to aerospace contractors to join a new Light Attack Experiment, saying, 'this is not something we're looking to do a lot of research and development on. This is commercial, off-the-shelf technology that we can rapidly employ.'

The USAF has stated that the experimentation was not a competition. It was an opportunity to see what industry could bring to bear for the warfighter. In essence, it wanted future specifications to not be limited by the scope of its imaginations — the USAF wanted industry to 'show them what they've got'.

When Secretary of the Air Force Heather Wilson spoke at an Air Force Association event in August 2017, she highlighted the need to learn how fast and cost-effectively the USAF can push capabilities to the warfighter. She emphasized the need to explore new ways of conducting business, including incorporating more input from industry and universities in the decision process, approaching innovation differently, eliminating bureaucracy and cultivating greater agility and flexibility. 'We need to get our ideas from the lab bench to the flight line fast,' she said.

The aircraft entered into the evaluation had to be able to perform light attack and armed reconnaissance missions by day and night, hitting stationary or moving targets using 500lb Paveway II weapons, aerial gunnery, and guided/unguided rockets, and with suitably secure tactical communications equipment. Survivability was assessed, including each platform's infra-red and visual signature, as well as weapons, sensor, and communications capabilities, and basic aerodynamic and austere field performance. The requirement also mandated that the aircraft should be able to operate from austere locations with unimproved surfaces and required tandem zero-zero ejection seats.

For the purpose of the experiment, the AT-6 was categorized as 'Tier One' because it (alongside the Super Tucano) met all of the objectives initially specified by the USAF. More than 580 data points included pilot workload to find and track a target, range scores, assessments of displays, capability in austere environments, cockpit visibility, loiter capability, communications, target tracking, lines of sight, sensor tracking, take-off distance, acoustic signatures and weapons delivery. Inert weapons were delivered on the US Army White Sands Missile Range and other sites around Holloman. Some of the aircraft also operated from an undeveloped, dirt runway at Cannon AFB, New Mexico, as part of the austere environment evaluation.

Following this first phase of formal experimentation at Holloman in the summer of 2017, the USAF determined to focus on the AT-6 and the A-29 and move forward with a turboprop combat demonstration in CENTCOM in 2018. After analysis of information gleaned in 'Combat Dragon II', this was abandoned in favor of a second Light Attack Experiment at Holloman in the summer of 2018.

Right top to bottom: This view of the top surface of AT-1 was taken in 2010 when the aircraft visited the Farnborough International Air Show. **Beechcraft/Jamie Hunter**

An AT-6 Wolverine during the first Light Attack Experiment at Holloman in 2017. **USAF/Ethan D. Wagner**

A 500lb GBU-12 laser-guided bomb is dropped during testing. **Beechcraft/Jim Haseltine**



The second phase focused on networking, logistics, interoperability with allied air forces, along with working out issues with weapons and sensors. Brett Pierson, Textron Aviation Defense's vice-president of light attack and former commodore of US Naval Test Wing Atlantic at NAS Patuxent River, told *Combat Aircraft*, 'I was one of the AT-6 instructor pilots at Holloman for the 2018 experiment — we took AT-1 and AT-3 there for the 2018 round. We qualified eight USAF aircrew to fly the airplane without us — over the two phases of LAE, we qualified five pilots and three weapons systems operators. That was a big development — for the aircrew to be on their own, flying without contractor pilots after finishing the pilot in command [PIC] evaluation and developing the capability of the airplane.'

Pierson adds, 'USAF teams, alongside US Navy and Marine Corps personnel, were directly comparing the AT-6 and A-29's performance and ability to deliver weapons. The AT-6 distinguished itself with its greater combat-loaded altitude, maximum ordnance flexibility and short take-off distance on dirt strips.' Textron Aviation Defense dispatching two aircraft to Holloman (in accordance with the USAF's initial invitation to LAE II) also provided a distinct advantage, especially as an AT-6 was made available to the A-29 team when formation work was mandated.

Tom Webster, Textron Aviation Defense's lead AT-6 instructor pilot and regional vice-president of Asia/Pacific sales, added, 'Throughout the Light Attack Experiment, US Air Force, Navy and Marine Corps aircrew — many of whom had previous experience with the T-6 Texan II in pilot training — validated the AT-6's world-class capabilities. In flight, they demonstrated the Wolverine's superior range, handling, climb rate and aerodynamic performance, especially when they conducted dissimilar formation flights with our competitor. On the ground, the AT-6's superior power-to-weight, low center of gravity and markedly smaller taxi turn radius made it the much easier aircraft to operate during austere, unimproved runway assessments. Bottom line, they saw that the AT-6 performs better, flies faster, goes further, climbs higher and does more.'

Unfortunately, the Super Tucano present at Holloman for the evaluation (registration PT-ZNV) crashed on June 22, 2018, killing US Navy pilot LT Christopher Short. The second Light Attack Experiment

Lt Col Terrance Keithley, right, a test pilot for the 416th Flight Test Squadron at Edwards AFB, receives pre-flight briefing information from Tom Webster for the AT-6 during the Light Attack Experiment in 2017. **USAF/Ethan D. Wagner**

SPIRAL DEVELOPMENT

Textron Aviation Defense is currently operating two AT-6s. Under its previous Beechcraft identity, the manufacturer flew the first of its prototypes (AT-1, registration N610AT) on September 10, 2009. The second, production-representative, AT-6 prototype (AT-2, N620AT) first flew on April 5, 2010. It was the first to be powered by a 1,600shp engine, the initial aircraft having had a 1,100shp powerplant. The new machine also had the new mission avionics suite, based on that of the A-10C. And the third, full production aircraft in an exportable/international configuration (AT-3, N630AT), first flew in August 2013.

Although it had primarily built its two AT-6 prototypes with company funds, these were soon flying government-funded sorties under a \$15.4-million demonstration and evaluation program run by the Air National Guard/Air Force Reserve Command Test Center (AATC) in Tucson, Arizona.

This included four phases known as spirals. Spiral One was flown with simulated bombs and gun and included participation in the 'Joint Expeditionary Forces Exercise 10-3' at Nellis. This exercise saw the aircraft undertaking realistic irregular warfare sorties against ground targets in mock war conditions, with a strong focus on net-centric warfare and use of the data link. On one mission the AT-6 landed

on a dry lake bed and refueled on the ground from an MC-130P Combat Shadow tanker.

Spiral Two of the demonstration began in August 2010 at the Gila Bend test range in Arizona and saw the employment of more than 265 bombs and rockets, as well as firing 3,000 rounds from the AT-6's 0.50-caliber gun pods. Additionally, it featured delivery of inert 500lb and 250lb laser-guidance aided munitions.

Spiral Three started in January 2012 at Eglin AFB. The trials included test firings of the APKWS and Talon laser-guided rockets, plus a further round of trials with the GATR and Hellfire missiles.

Spiral Four in September 2013 saw the AT-6 trial the single-channel ground and airborne radio system situational awareness (SINCGARS SA) Waveform capability. The SINCGARS SA Waveform is a software-controlled high-frequency radio designed to provide digital communication and global positioning services (GPS) in both fixed and mobile configurations vital for military armed reconnaissance.

Textron Aviation Defense continued to develop and demonstrate the Wolverine, incorporating advanced technology against ground threats and working with the USAF on an easily exportable datalink system.



was immediately halted, as the USAF decided it had collected sufficient data. Lt Gen Arnold Bunch, the USAF's top acquisition official, told a media briefing that the service had acquired enough data to proceed. However, it might require more logistics and sustainment data from the two contractors.

The right choice?

The new USAF decision to enter into further experimentation and actually procure aircraft again pits the AT-6 and A-29 against one another, albeit from

different operating locations and different command perspectives. The Hurlburt Field location is likely to involve a special operations focus, while Nellis — the proclaimed 'home of the fighter pilot' — may offer more of an ACC 'look' at the AT-6.

Both aircraft clearly fit well into the intended role, but the Wolverine's ability to fit neatly into existing USAF structures in terms of pilot training logistics chains provides a distinct advantage. 'Our global integrated logistics and sustainment [ILS] and comprehensive on-site pilot and maintenance training systems have



Above: The AT-6 demonstrated a max-weight take-off and landing distance of less than 5,000ft in the hot and high altitude conditions of Holloman AFB. **Beechcraft/ Paul Bowen**

Below: Textron Aviation Defense's offerings in the close air support sphere include its Scorpion and Wolverine. They build upon Textron Aviation Defense's heritage that includes the Beechcraft Model 18, the AT-10 Wichita, UC/YC-43 Traveler, Cessna L-19/O-1 Bird Dog, Cessna T-37 'Tweet', T-34 Mentor and many more. **Beechcraft/ Jim Haseltine**

supported the worldwide fleet of 1,000 T-6s since the late-'90s', says Pierson. 'With a global fleet surpassing 3.2 million flight hours across nearly a dozen nations, we have decades of experience minimizing component obsolescence, lowering life-cycle costs and ensuring high readiness rates. Also, the pilots who trained on the T-6 transition naturally into the AT-6 from a flying perspective, but it's got more power and they just need to learn the new mission system.'

Nevertheless, the A-29 offers stiff opposition. The Afghanistan award for the A-29 in 2013 met with a protest from Beechcraft, which was eventually rejected. However, Textron Aviation Defense says it has continually improved the aircraft and is confident in the Wolverine, which it says offers a robust and interoperable air power solution at a fraction of the acquisition cost of its competitor and traditional (fast jet) tactical aircraft, complete with lower operating costs and greater versatility than unmanned aerial systems. At the same time, the aircraft is fully

networked, and has advanced integrated survivability features, rendering it less vulnerable than many aircraft in its class.

Securing the USAF as a launch customer enables Textron Aviation Defense to finish the process of military type certification, completion of which will make the Wolverine far more attractive to foreign buyers. The US government will purchase the three Wolverines via the other transactional authorities (OTA) pipeline, with the entire effort being led by the Light Attack Program Office at Wright-Patterson AFB, Dayton, Ohio. USAF spokeswoman Ann Stefanek confirmed that aircraft procurement funding will stem from previous year budgets, with \$60 million in FY18 research and development funds and \$100 million in FY19 procurement funds.

'The USAF milestone tempo of a draft RFP [request for proposals], final RFP, and contract award has been tracking well,' says Pierson. The combination of a US military customer and the new military certification is certain to be a

major shot in the arm for the AT-6 on the international stage.

The actual plans for the Nellis evaluation are still being formalized, but the aircraft could be assigned to either the 422nd Test and Evaluation Squadron (TES) or the 24th Tactical Air Support Squadron (TASS). Ultimately, the plan calls for the three aircraft to be plunged into tactical developments in the heart of the USAF's active-duty operational test world. It will then conduct testing to ensure interoperability with international partners, which is clearly an overall driver behind USAF light attack plans.

In the meantime, the US Navy's Terminal Attack Controller Trainer (TACT) program has awarded Airborne Tactical Advantage Company (ATAC) — a Textron, Inc subsidiary — an indefinite delivery, indefinite quantity (IDIQ) contract to provide AT-6 Wolverine air services in support of live-air training to forward air controllers (FACs), joint terminal attack controllers (JTACs), and forward air controllers (airborne) along with ATAC's L-39 Albatros and Valkyrie Aero A-27 Tucanos.

Pierson said, 'Textron Aviation Defense is proud to be on this air services contract to equip the TACT community with the Beechcraft AT-6 Wolverine's cost-effective, high-performance close air support capability. The US Navy and US Marine Corps flew the AT-6 during the USAF Light Attack Experiments and are well-acquainted with its unparalleled mission capability and optimized battlespace networking.' ■

