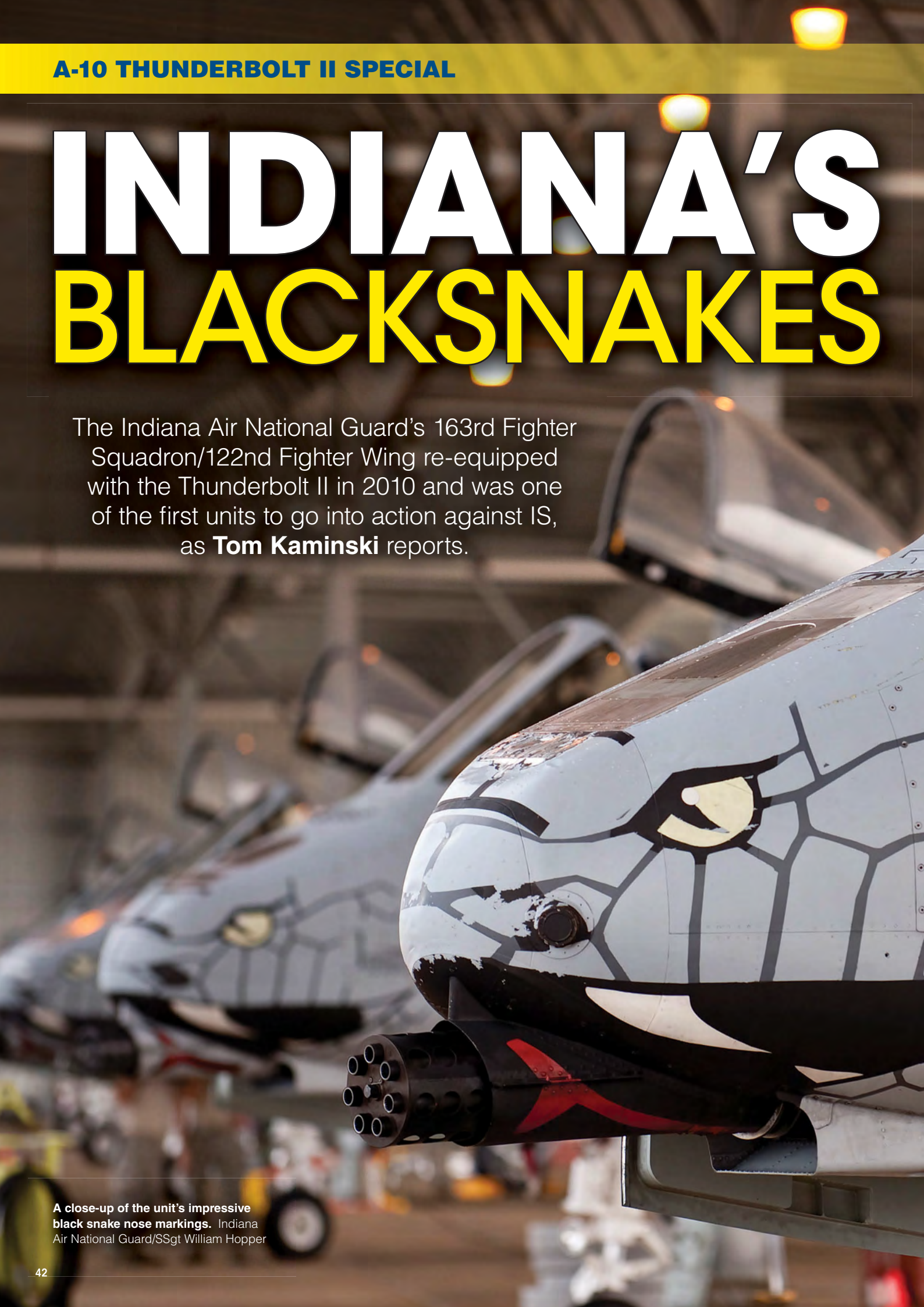
INDIANA'S BLACKSNAKES

The Indiana Air National Guard's 163rd Fighter Squadron/122nd Fighter Wing re-equipped with the Thunderbolt II in 2010 and was one of the first units to go into action against IS, as **Tom Kaminski** reports.



A close-up of the unit's impressive black snake nose markings. Indiana Air National Guard/SSgt William Hopper

The A-10C Thunderbolt II pilots of the 163rd Fighter Squadron 'Blacksnakes' from the Indiana Air National Guard's 122nd Fighter Wing were some of the first USAF aircrew to go into combat against the so-called Islamic State (IS).

Twelve of the unit's aircraft arrived at Ahmed Al Jaber Air Base, Kuwait, between November 17 and 21, 2014 to support Operation Inherent Resolve (OIR). The deployment started on October 15 with the aircraft first going to Bagram Airfield, Afghanistan, replacing the A-10s of the 303rd Expeditionary Fighter Squadron (EFS) as part of the 455th Air Expeditionary Wing.

Events in Iraq and Syria led to the unit's relocation. On November 14, shortly after arriving in Kuwait, the then 122nd Operations Group (OG) commander, Col Mike Stohler took over the reactivated 332nd Air Expeditionary Group.

During the deployment the Blacksnakes flew more than 1,500 sorties totalling more than 8,500 hours. The majority of the unit's missions involved flying traditional close air support (CAS).

Col Kyle Noel, the current 122nd OG commander, said: "Sometimes [during OIR] we did time-sensitive or dynamic targeting [tasked in flight] with a dynamic targeting cell. The Combined Air Operations Center [CAOC] would gather all sorts of intel, find targets and send us to investigate or destroy them.

"For CAS, the CAOC would co-ordinate with Iraqi forces in the field. Our average sorties were anywhere between seven-and-a-half to ten hours from take-off out of Kuwait. We would refuel over the southern portion of Iraq and either be tasked to the central or northern areas of that country or in Syria."

"We did some CSAR [combat search and rescue] airborne alert. We did one real-world CSAR when the Jordanian pilot was shot down." This happened on December 24, 2014 and Lt Moaz al-Kasasbeh was captured by IS forces in Syria and later executed. The unit also supported large force employment packages with NATO partners providing embedded airborne CSAR that placed A-10s on station to support any rescue. Col Noel recalled a mission where IS forces were nearing the city of Kirkuk and the ground battle became particularly intense. "It reached the point the JTACs [Joint Terminal Attack Controllers] couldn't control all the fights that were happening."

In an unusual occurrence, one of the 163rd pilots was retasked to the airborne Forward Air Controller role and subsequently provided clearances to NATO aircraft supporting the Iraqi Army.

During the time 163rd Expeditionary Fighter Squadron [the name used for overseas deployments] was flying in support of OIR, its A-10Cs flew 718 combat sorties, ▶

The Indiana Air National Guard's 122nd FW operates 21 A-10Cs from the Fort Wayne International Airport. Key-Jamie Hunter

A Blacksnakes Thunderbolt II on a strafing run with its 30mm GAU-8/A Gatling gun at the Camp Grayling Joint Maneuver Training Center, Michigan, during the annual Northern Strike combined arms exercise in July 2015. Michigan National Guard/Sgt Seth LaCount

Transition from the Block 30 F-16C to the A-10C started in 2010. Key-Jamie Hunter

accounting for 19% of all missions in the theatre of operations. It expended around 47,000 rounds of 30mm ammunition from the GAU-8/A seven-barrel Gatling gun, fired 110 70mm rockets and delivered more than 272,000lb of air-to-ground munitions.

The Blacksnakes inaugural deployment with the A-10C, the longest and largest in the unit's history, concluded when all 12 jets returned to Fort Wayne, Indiana, on April 23, 2015. The work-up had been extensive with participation in exercises Red Flag-Alaska 13-3 at Eielson AFB and Green Flag-East at Barksdale AFB and the Joint Readiness Training Center, Fort Polk, in Louisiana.

The wing has undertaken three other combat deployments since the terror attacks of 9/11 in 2001. These were for Operation Iraqi Freedom in 2004, 2006 and 2007 when it still flew the F-16C. Those operations were conducted from Ahmed Al Jaber AB, Kuwait, Al Udeid AB, Qatar, and Balad AB, Iraq, respectively.

ON THE ROAD AGAIN

The unit deployed overseas again in July 2016 when eight A-10Cs arrived at Sliač Air Base, Slovakia, in preparation for Exercise Slovak Warthog, which ended on August 3.

The combined training exercise saw the unit participate in joint training exercises with USAF aircraft and Slovakian MiG-29s and L-39s conducted as part of Operation Atlantic Resolve and the European Reassurance Initiative.

Blacksnake pilots also worked with American and Slovak ground forces to provide training for JTACs. The Indiana National Guard has been conducting military exchanges with the Slovak Republic as part of the US's State Partnership Program (SPP) since 1994.

The website of the US Embassy in Slovakia states: "This program links US states with partner countries around the world to promote access, increase military capability, improve interoperability and enhance the principles of responsible governance." This exercise marked the first time Indiana had deployed an aviation package to an air base in Slovakia.

On February 17 this year, eight A-10Cs travelled to the Arizona Air National Guard's Total Force Training Center (TFTC) at Davis-Monthan AFB. The base's North Ramp, which is also known as the 'Snowbird Ramp', is managed by the 162nd Wing. Operation Snowbird was established in 1975 as a winter deployment site for northern Air National Guard (ANG) units, enabling them to conduct training operations in a milder climate for a two-week period between October and May.

The TFTC now operates year-round, supporting ANG and other joint services units preparing for worldwide deployment. Among the different types of sorties flown during the detachment, the Blacksnakes trained with Davis-Monthan-based CSAR units. This enabled pilots to maintain currency as well as upgrade qualifications for the CSAR. They also flew airborne Forward Air Control (FAC) sorties. The unit flew 350 hours and completed 170 sorties during the deployment.

The unit will also conduct a 'mini-det' for CSAR training in Florida later this year. Twelve jets will also be deployed to Nellis AFB, Nevada, in September for Exercise Green Flag-West 17-09, which is concentrated on the National Training Center, Fort Irwin, California. Typically around two to three small (with three to four aircraft) and one or two large aircraft deployments (12 to 18 airframes) are conducted annually.

The 122nd FW is based at Fort Wayne International Airport and is the only one flying within the Indiana ANG. It is one of four ANG units that currently operates the A-10C Thunderbolt II and has 21 examples assigned.

The name Blacksnakes honours General 'Mad' Anthony Wayne, whose ability to wait patiently for the right moment to strike was likened to a black snake by Native Americans. The nickname was given to him during the Northwest Indian War that followed the American Revolution. He died in 1796 and Fort Wayne, which was originally developed as trading post, was named after him.

The unit flew the F-16C prior to the A-10C. The change of aircraft type was announced in

February 2009 and the unit received its first 'Warthog' for maintenance and load training on April 8, 2010. Conversion was completed in June 2012, when the unit achieved initial operational capability (IOC). However, Col Patrick Renwick, 122nd FW CO told *Aviation News* that trained personnel were deployed with other A-10 units as early as 2011. Thunderbolt IIs had previously been stationed in Indiana and operated by the Air Force Reserve's 45th Tactical Fighter Squadron at Grissom AFB, Indiana, until the unit was deactivated in September 1994.

The 122nd FW was awarded the Carl S Spaatz trophy as the highest-rated ANG flying unit in 2015. It had previously received the award in 1959 and 1960. Selection of the winner is based on combat readiness during the reporting year and its performance when evaluated against all of the ANG's flying units. It has also been the recipient of six Air Force Outstanding Unit Awards with the most recent last year.

ENHANCEMENTS

The first of two prototype YA-10s flew in May 1972. The last of 713 A-10As was delivered in 1984, making the newest aircraft in the USAF's fleet 33 years old. The A-10A received several upgrades, beginning with the installation of an inertial navigation system (INS) in 1980.

The Low Altitude Safety and Targeting Enhancement (LASTE), first fielded in 1991, provided computerised weapon-aiming capabilities, ground collision avoidance and enhanced attitude control for aircraft stabilisation during gunfire. There was also a low-altitude autopilot system, ballistic weapons control, target detection and tracking capability added. By the mid-1990s night-vision modifications were installed on more than 370 aircraft to enable the use of NVGs and an embedded GPS inertial navigation system capability was incorporated from 1999.

In 2007, the first of around 100 ANG and Air Force Reserve Command Thunderbolt IIs received modifications that would result in these examples receiving the designation A-10A+. It involved replacing the aircraft's original cathode ray television monitor with a larger liquid crystal, multi-function colour display (MFCD) and added the Situational Awareness Data Link (SADL), which enabled the aircraft to receive data from and transmit it to other platforms. Additionally, the AN/AAQ-28 LITENING AT advanced targeting pod, was integrated. Flight testing of the A-10A+ began in November 2007 and its first combat deployment was to Afghanistan in mid-2008.

The aircraft's most significant upgrade came with the Precision Engagement (PE) programme. Development began in February 2001 and the first A-10C was unveiled at Eglin AFB, Florida, in January 2005. The first of 349 A-10Cs flew at Hill AFB, Utah, in August 2006 and the new model achieved initial operational capability (IOC) with the Maryland ANG's 104th FS in August 2007. The final production conversion was completed in July 2011.

Two A-10Cs operated by the Indiana ANG's 122nd Fighter Wing prepare to refuel from a KC-135R flown by Air Force Reserve Command's 434th Air Refueling Wing. USAF/TSgt Mark RW Orders-Woempner

The 163rd FS was previously known as the 'Marksmen' but took on the nickname 'Blacksnakes' in 1997 to honour the American Revolution General 'Mad' Anthony Wayne. His ability to wait patiently for the right moment to strike was likened to a black snake by native Americans. USAF

Thunderbolt II, 79-0095, taxiing after landing at Sliač AB in Slovakia on July 27, 2016. The aircraft was one of eight deployed for Exercise Slovak Warthog. Ondrej Maliniak

The PE upgrade integrated new systems and capabilities that included two MFCDs and a central interface control unit (CICU) that provided a digital stores management system (DSMS) and avionics integration. In addition, the aircraft has been given improved data management and diagnostics capabilities as well as a new armament/head-up display (HUD) control panel.

The CICU, which replaces components of the original armament control system, also interfaces with other mission equipment and integrates and displays information including the AN/AAQ-28 LITENING or AN/AAQ-33 Sniper advanced targeting pods (ATP), radios and processors.

Upgrades to the LASTE system's integrated flight and fire control computer (IFFCC) were also incorporated into the CICU. Hardware and software upgrades to LASTE added HUD symbology for targeting pods, data link and more smart weapons integration.

The installation of an up front controller (UFC) simplified pilot workload by integrating many weapons, navigation, and HUD commands into a single piece of equipment. Target, threat and friendly information ▶

Colonel Patrick Renwick has led the 122nd Fighter Wing since taking command on September 13, 2014. He has amassed more than 3,300 hours in fighter aircraft, including around 2,000 in the A-10 and 1,300 in the F-16C. USAF

provided via the SADL is displayed on the MFCD serving as the tactical awareness display (TAD). A new control stick grip and throttle assembly enabled fingertip control of aircraft systems and targeting pod functionality. Also, MIL-STD-1760 capabilities incorporated on six stores pylons gave the aircraft more 'smart' precision weapons capability.

The PE improvements enabled the A-10C to employ advanced targeting pods and deliver numerous inertially aided munitions and other precision-guided munitions. Alternately, up to four 2,000lb (907kg) GBU-31, six 500lb (227kg) GBU-38 Joint Direct Attack Munitions (JDAM) or GBU-54 Laser guided JDAM (LJDAM), six 2,000lb (907kg) GBU-10 or 500lb (227kg) GBU-12 laser guided bombs can be carried. Since

163RD FIGHTER SQUADRON AIRCRAFT

F-51D	1946-1951
F-51H	1951-1954
F-80C	1954-1956
F-86A	1956-1958
F-84F	1958-1962, 1964-1971
RF-84F	1962-1964
F-100D/F	1971-1979
F-4C	1979-1986
F-4E	1986-1991
F-16C (Block 25)	1991-2006
F-16C (Block 30)	2006-2010
A-10C	2010-Present

2013, the aircraft has been capable of firing laser-guided 70mm Advanced Precision Kill Weapon System (APKWS) rockets from LAU-131 pods.

Col Renwick commented to Aviation News on the 'smart' weapons capability of the A-10C: "We don't have to see the target to kill it. That makes a huge difference in our ability to operate in any kind of environment, whether it is contested or uncontested. Precision-guided munitions [PGMs] means instead of having to drop a bunch of bombs on the target with PGMs, its generally one bomb, one hit, with far lower collateral damage."

Subsequent modifications installed AN/ARC-210 multi-band and multi-mode line-of-sight/beyond line-of-sight (LOS/BLOS) radios and the AN/AAR-47 missile approach warning system. The Scorpion helmet-mounted cueing system (HMCS) was integrated as part of the Suite 7B software upgrade, which also included the AN/ARS-6(V)12 Lightweight Airborne Radio System (LARSV12) on aircraft operated by the ANG and Air Force Reserve Command. The system is designed to enable A-10 pilots to

Colonel Kyle Noel serves as the 122nd Operations Group Commander. He has flown the A-10C since transitioning from the F-16 in 2010, and has around 1,300 hours in the Thunderbolt II and 2,000 in the Fighting Falcon. USAF

better communicate with downed aircrew, pararescue personnel and JTACs. It provides the downed aircrew's GPS co-ordinates and enables communication with them by voice or text.

Col Noel said: "Some of the things we've fielded, which really changed the lethality of the airplane and our ability to execute on the modern battlefield, are amazing."

He cited examples including the addition of the fourth-generation Sniper and LITENING ATPs, the digital stores management system as well as new communications capabilities including the LARS, AN/ARC-210 and enhanced position reporting location radio system (EPLRS)

Asked for his opinion on the Thunderbolt IIs he now flies, Col Renwick replied: "It's not

Left: **Two A-10Cs during an Operation Inherent Resolve mission.** USAF/SRA Taylor Queen

Below: **Six 163rd Expeditionary Fighter Squadron (the title assumed when deployed overseas) aircraft at Ahmed Al Jaber AB, Kuwait. The 'Warthogs' flew 718 combat sorties and delivered more than 136 tons of ordnance in support of Operation Inherent Resolve while assigned to the 332nd Air Expeditionary Group.** USAF/TSgt Jared Marquis

the A-10 I first flew in 1990, that's for sure. From the 'bird' that was built to bridge the Fulda Gap [in West Germany] and counter the Soviet threat to the precision machine we have today, it's come a long way.

"When I flew it the first time, I called it the steam-driven A-10. When I dropped precision weapons from the A-10 back in the A-model days… that was a lot of work to get it done right."

He added: "I flew the A-model on active duty and, coming back to the C-model in the guard, it is a totally different airplane. I went through a short, senior officers' checkout course lasting about 42 days. It was like getting on a bike because you rode it exactly the same, except this one had a lot of new gadgetry that you had to get used to.

"The basics of flying the airplane was the same, but the employment piece was radically different. With the systems they put on it to make it more effective and survivable in the combat theatre, it's very good. It's a great platform and highly effective in combat."

A planned Suite 9 update to the Operational Flight Program (OFP – the main avionics system) was cancelled due to the aircraft's envisaged retirement. However, a contract has been issued for new OFP software which will improve the pilot-vehicle interface.

In March 2014, the 122nd FW was advised that, in accordance with the USAF's Fiscal Year 2015 Budget Request, its 21 A-10Cs would be exchanged for the same number of Block 40 F-16Cs by 2019. Although the change was eventually approved by lawmakers, the USAF's recent decision to retain the A-10C fleet until 2022 or beyond has effectively cancelled that plan.

Indeed, the F-16Cs that had been earmarked are being retained by the active duty air force as part of its plan to increase the number of fighter pilots. The USAF currently has a shortage of around 750 fighter pilots and is moving forward with the activation of two additional F-16C training squadrons at Holloman AFB, New Mexico.

There are currently no plans for the 122nd FW to switch to another aircraft.

Col Renwick said: "The A-10 has been going away since I first touched it as a lieutenant in 1990."

He added: "We're an operational level command and we train for that every day. We're in the A-10 until they decide that we're going to transition again."

With the unit staying primed for action, it remains ready to strike when called upon – just like a black snake, from which it takes its name. AN

The 122nd FW is one of four Air National Guard wings equipped with the Thunderbolt II. Key-Jamie Hunter

DESERT STORM A-10 OPERATIONS

'Tankbuster', 'Warthog' or just plain 'Hog'. Call it what you will, the A-10 lived up to its rough and rugged nicknames in the first Gulf War, as **Dr Kevin Wright** explains.

The A-10 Thunderbolt II was a child of the Cold War. Its job was to blunt any rush west by Warsaw Pact forces across the central European plain by providing Close Air Support (CAS) for NATO defenders. Once the Communist threat evaporated, some United States Air Force (USAF) commanders and a number of commentators predicted the death of the 'Tankbuster'. Iraq's invasion of Kuwait was the opportunity for the aircraft to earn its battle spurs.

Iraqi forces had swiftly overrun neighbouring Kuwait on August 2, 1990. America rapidly strengthened its forces in the region, fearing the Iraqi military might soon roll straight into Saudi Arabia. The initial American response was named Operation Desert Shield.

Forty-eight A-10s from the 354th Tactical Fighter Wing (353rd and 355th Tactical Fighter Squadrons) were rapidly dispatched to the region. They departed Myrtle Beach AFB, South Carolina, for King Fahd International Airport (KFIA) in Saudi Arabia on August 15, 1990.

'Have Gun Will Travel'. Desert Storm artwork applied to 511st TFS A-10, 79-0224, from the 10th TFW at RAF Alconbury. Key Collection

Another 48 were drawn from the 74th and 76th Tactical Fighter Squadrons (TFS) of the 23rd Tactical Fighter Wing (TFW), at England AFB, Louisiana, arriving just over two weeks later. Eighteen more aircraft followed from the 10th TFW (511st TFS) at RAF Alconbury. They departed for the Gulf on December 27 and were later joined by 18 Air Force Reserve Thunderbolt IIs from the 706th TFS of the 926th Tactical Fighter Group from NAS New Orleans, in early January 1991.

The final element was 12 OA-10As from the 23rd Tactical Air Support Squadron/602nd Tactical Air Control Wing flying in the airborne Forward Air Control (FAC) role. This variant

Above left: **Lt John Marks by his A-10. He and Captain Eric Salmonson destroyed more than 23 tanks in one day during Desert Storm.** USAF/Lt Col Marks

Above right: **'Kiss of Death' artwork is applied to 353rd TFS A-10A 78-0677.** USAF/Tech Sgt William A Bloszinsky

Main photo: **A 355th Tactical Fighter Squadron A-10A over the Saudi desert.** USAF/Tech Sgt HH Deffner

Below: **The A-10 armed and ready to go, carrying infrared Mavericks, free-fall bombs, AIM-9 Sidewinders and an ECM pod.** USAF/Sgt Prentes Trambue

was identical to the A-10, but carrying a different weapon fit, including smoke markers, more suited to this mission. They joined the 23rd TFW(Provisional) from their Davis-Monthan base in two groups in November 1990 and January 1991. By the time hostilities commenced on January 17, 1991 there were 144 Tankbusters committed to theatre, shared between two 'provisional' wings: the 23rd TFW(P) and 354th TFW(P) all at KFIA.

In addition to the main, KFIA, operating base, a fully functional Forward Operating Location (FOL) was established at King Khalid Military City (KKMC) roughly an hour's flying time closer to Kuwait. A smaller FOL was set up at Al Jouf on the eve of war. This was 300 miles from KKMC and just 20 minutes' flight time from the nearest targets just over the border. It became standard for A-10s to fly from King Fahd, up to KKMC, fully armed, then be refuelled and sit alert before departing for their targets, or moving forward to Al Jouf for further fuelling.

The theatre air force chief, Lt Gen Charles 'Chuck' Horner, was initially sceptical of the aircraft, having reservations about its slow speed and vulnerability during low-level operations in high-threat air defence environments that CAS operations would involve. He was to change his mind after war began.

Central Command (CENTCOM) boss, Gen Norman Schwarzkopf was an advocate of the Warthog. As an army commander, he saw CAS as a key tool to give his troops the support they needed during the ground offensive.

The A-10s deployed to the Gulf were not comprehensively equipped aircraft. They had no autopilot, no radio altimeter and needed improved weapons delivery systems. The aircraft possessed no night attack capability, and given the US Army was shifting emphasis towards operations during the hours of darkness, the lack of a robust night CAS capability was widely seen as a major weakness.

NIGHT OPS

Soon after the A-10s first arrived in Saudi Arabia, the 354th TFW CO, Col Sandy Sharpe asked Horner to place his Wing's 355th TFS 'Falcons' on to 'nights', firmly believing they would be needed in this role. Horner, although apparently not keen, appreciated the logic of the argument and approved the request.

Lt Col (later Col) Rick McDow, Commander of the 'Falcons', was 18 months into a two-year tour. An experienced F-4 pilot, he had been taken prisoner after being shot down during the Vietnam War. Converting to the A-10 in 1978 he had flown with the 81st TFW in the UK and West Germany. He became responsible for preparing the 355th TFS for night combat operations. With only a few pairs of night vision goggles (NVGs) being trialled in theatre, the A-10s were going to have to operate in the dark using other means.

He said: "Night operations were a logical and obvious direction for the A-10 to go in. We were CAS experts and already worked extensively with the army. Our priority ▶

became to take the night away from the Iraqis."

He knew darkness offered potential safety for his crews. If the enemy can't see you, he can't shoot at you, was his maxim. They discovered when flying above 5,000ft the Hogs were not heard either. After the start of the air war the 74th TFS also switched to night operations to ease the pressure on the 355th TFS.

AIR WAR

With the A-10 deployed to the Gulf to conduct CAS the original intention was for the type to sit out the initial air campaign until the ground offensive began. However, at the planning stage of Desert Storm a shortage of other aircraft meant it was assigned more roles and so would be involved from the start of the Coalition operation. In January 1991, as more A-10s arrived, Lt Gen Horner, Brig Gen Buster Glosson, head planner; and the two A-10 Wing commanders, agreed the aircraft could additionally be used for 'battlefield air interdiction' sorties. This was usually the task of F-15Es and F-111s. The 'Warthogs' were to concentrate on Iraqi artillery positions, which could have wreaked havoc on advancing coalition ground forces, when the land war started.

Also, during the first 24 hours of the air campaign (which began on January 17), the 'Hogs' sat alert, ready to strike Iraqi artillery had chemical weapons been used.

The final set of targets were the most surprising with A-10s tasked to attack Iraqi early warning radars and the Nukhayb Intercept Operations Centre. They flew deep into Iraq and hit others close to the Syrian and Jordanian borders with eight-to-ten hour missions not uncommon. These high-priority targets needed to be destroyed in the initial wave of attacks, so later raids could penetrate Iraqi air defences undetected.

Those first night attacks were extremely successful. The radar heads were struck, mostly with Maverick missiles and each site bombed and strafed. The strikes earned the Warthogs the further humorous nickname of 'Wart Weasels', based on the 'Wild Weasel' name for American aircraft used to suppress enemy air defence systems. Nocturnal missions became an integral part of operations once the war began. Flying

Above: **AGM-65 Mavericks were successfully used in Desert Storm.** USAF/Sgt Prentes Trambue

Below: **March 15, 1991: 23rd TFW A-10As passing through Sigonella AB, Sicily en route to the US after Operation Desert Storm.** USAF

the aircraft in darkness took even more concentration, just to adequately handle the plane.

Lt Col Rick McDow, 355th TFS CO said: "We began flying trail formations at night with as much as three-mile spacing. Our biggest potential problems were spatial disorientation and aircraft flight conflicts with the lights out. Flying extended trail gave each pilot the time and space necessary to keep a close eye on his own instruments and position, and minimised the possibility of colliding with your wingman. The terrain in Iraq was mostly predictable, so if you kept above 2,000ft on the altimeter you were generally pretty safe."

He explained how his pilots developed ways of overcoming the A-10's shortcomings for these operations. "In the dark, there was extraneous light, with glare and reflections in the cockpit which made working difficult. They [the pilots] tended to leave altimeter, air speed and attitude indicator lights visible. At night pilots walked out to aircraft with lengths of tape hanging on their helmets. These were placed over various instruments, or, over key places in the cockpit, to reduce light glare and awkward reflections.

"Others cut cardboard templates to mask the less vital displays in an attempt to reduce excessive distractions. We normally wore wear Nomex gloves during flight for fire protection, but with the lights very dim or out in the cockpit, most pilots removed them so they could identify cockpit switches by feel. In daytime, we used colour maps, but at night, black and white maps were more easily visible in darkened cockpits, so photocopying the necessary maps made life a bit easier."

McDow said two shifts were adopted for night operations. The first would arrive at 1600hrs to fly twice, with the first take-off at about 1800hrs and the last landing at about 0200hrs. The second shift arrived about 2000hrs for first take-off roughly at midnight and last landing around 0600hrs.

He said 'Night Hog' missions generally took two forms. "About 80% were scheduled, with the remaining 20% sitting ground alert to await tasking. On getting airborne we checked in with our airborne command and control. For us this was usually the E-8 JSTARS. We were often immediately re-tasked to different targets to those briefed on the ground, but that was to be expected. We had worked hard to develop a system and procedures that gave us such a capability."

Pilots were assigned a 30 x 30 mile (48km) 'kill box', with targets sometimes identified for them or found by themselves. They often dropped two long-lasting, ground-burning flares, described as 'logs', as visual reference points for guiding aircraft to nearby targets. Air-deployed LUU-2 parachute flares were used to light up larger areas when necessary. Attackers searching for individual targets were hampered by having to look down what they termed a 'soda straw'. Maverick missiles had a very narrow, optional 3- or 6-degree field of view, visible to the infrared seeker-head, displayed on a repeating screen in the cockpit.

McDow explained: "The infrared Maverick was probably our best tool for finding targets at night. We used its seeker-head as a forward-looking infrared sensor and, though far from ideal, it worked well enough."

The weapons performed, but McDow recalled: "The triple rail weapon racks, were 'iffy' and ordnance would sometimes 'hang-up', failing to launch."

Above left: **A-10 80-0186 from the 23rd TFW was damaged by a close detonation from an SA-16 missile.** USAF/MSgt Kit Thompson

Above right: **Another view of fragment damage to 80-0186 from the 23rd TFW. Nearly half the A-10s used in Desert Storm sustained battle damage.** USAF/MSgt Kit Thompson

Other ordnance included cluster munitions, Mk.82 and Mk.84 'dumb' bombs and Rockeye anti-armour weapons. The GAU-8/A 30mm ammunition used was a mix of armour-piercing and high-explosive rounds.

"We carried a jamming pod but it didn't get much use after the first few days, AIM-9 Sidewinder missiles plus lots of flares and chaff for self-defence," he said.

"On the first few nights we found large numbers of targets and were very successful. But word spread rapidly among the Iraqis that nightfall did not bring impunity."

As the air war progressed, some senior commanders' misgivings about the Warthog gave way to more positive views. At a press briefing, on the evening of January 19, 1991 the crews received a massive morale boost when Chuck Horner said: "I take back all the bad things I have ever said about the A-10. I love them. They're saving our asses."

The statement flashed round the entire community within hours, all the sweeter as it came from such a senior and previously persistent critic.

Hunting Scud missiles soon became a coalition preoccupation, and Hog played its part. Daylight Scud Combat Air Patrols (CAP) were mainly flown by ten aircraft assigned to the Al Jouf FOL. They conducted road reconnaissance missions in pairs, as the Iraqi missiles were usually launched close to major highways. Crews used binoculars to assist a visual search. The Scud CAP flew at 12,000-15,000ft, remaining above effective anti-aircraft artillery fire, working their designated 'kill boxes'.

MISSION CREEP

Success with allocated tasks brought 'mission creep' and eventually exposed vulnerabilities. There were instances of ▶

Personnel from the 355th TFS 'Falcons' pose for a post-war group photo at King Fahd International Airport in Saudi Arabia. USAF

poor resource allocation. Warthogs were tasked with deep penetration missions into Iraq and Kuwait to attack air defence related sites, while F-16s hit armoured concentrations in border areas.

Another dilemma for commanders remained. Flying at higher altitudes, above 10,000ft, made it more difficult to identify targets, but kept the aircraft largely safe from intensive Iraqi anti-aircraft fire. From January 31, Horner permitted the Warthogs to fly at lower levels, initiating attacks between 7,000 and 4,000ft. This increased bombing accuracy, but the aircraft began to sustain more damage and incur losses.

Working their allocated 'kill boxes', straddling Kuwait's western border with southern Iraq and the joint Saudi, Kuwait and Iraq border area, pilots conducted more than 1,700 strikes, hitting elements of the Republican Guard Tawakalna and Medina Divisions plus parts of one armoured and 13 Iraqi Army infantry divisions.

On February 15, Horner decided, after two A-10s were lost, to "use them only against the Iraqi divisions near the border... until later in the war when the Iraqis had run out of heat- seeking missiles".

The A-10s worked successfully in the Combat Search and Rescue (CSAR) role, most notably playing a key part in recovering US Navy F-14 pilot, Lt Devon Jones, shot down over the desert on January 21, 1991.

Sitting alert at KKMC, Capt Paul Johnson and Capt Rand Goff, were called to find the downed pilot and his radar intercept officer, Lt Larry Slade, who was captured and held POW until March 3. Having searched and run short of fuel once, with no success, they air refuelled and returned to the hunt. About 150 miles (241km) west of Baghdad they finally heard a transmission from Jones but had to break off for another air refuelling, this time over Iraq itself, before acting as top cover to the HH-53 heading to recover him.

As the helicopter approached Jones, an Iraqi direction-finding lorry, also trying to locate him, was destroyed by GAU-8/A Gatling gun fire, within 100 yards of his position. Once pulled aboard the helicopter, it headed towards safety, shadowed by the two aircraft. By the time Johnson and Goff got out of their cockpits they had been airborne for 8hrs 45mins.

"The wartime maintenance record was excellent, with between 93% and 97% of the fleet being 'fully mission capable'. It was even better than peacetime rates."

After the air war the ground campaign (which began on February 23 and concluded after 96 hours) saw the A-10 come into its own, flying CAS for US and Coalition troops. The swift advance soon saw the Iraqi retreat turn into a rout.

As Iraqi armoured and motorised forces tried to escape Kuwait, they were attacked by huge numbers of allied aircraft. Hog pilots, Capt Eric Salmonson and Lt John Marks recounted in an interview for TV channel C-SPAN how, over seven hours in the air, they destroyed 23 tanks on February 25.

They headed towards a Republican Guard tank position identified by the night squadron, 80 miles (129km) inside Iraq. Lt Marks said: "The night guys had done what we normally do, attacked the leader and trailer so they were bottled up."

Working with an OA-10 airborne FAC and two more A-10s from Myrtle Beach, they divided the area between them. "We were in and had tanks burning within five minutes," he said.

On their first mission, they destroyed eight Iraqi tanks with a combination of Mavericks and guns, then returned to the FOL for refuelling and rearming. Expecting to go back on 30-minute alert they left their aircraft and walked into the squadron only to be told "the Marines want you". Twenty minutes later they were airborne and claimed eight more tanks, then on their third, final, mission destroyed another seven.

The official Gulf War Air Power Survey (GWAPS) report recorded 7,983 operational A-10A sorties and 657 for the OA-10A in the 42-day air war. There was a total of 294 Warthog sorties on the first day of operations.

Just over 75% of all combat sorties were air interdiction missions. Of the total number of missions 455 were against ground-based air defences. After these two roles were the initial focus for the A-10 in the campaign when the ground phase of Desert Storm started the emphasis moved to CAS.

The wartime maintenance record was excellent, with between 93% and 97% of the fleet being 'fully mission capable'. It was even better than peacetime rates. McDow added: "The A-10s had an 85% effective combat sortie rate. The non-effective missions were mainly due to: bad weather, thick smoke plumes [from burning oil wells] or the multiple weapon launcher rails not working properly."

The renowned GAU-8/A Gatling gun, as well as being heavily used against ground targets, also achieved two air-to-air kills during the war. On February 6, 1991 Capt Robert Swain from the 706th TFS shot down an Iraqi Bo 105 helicopter. This was followed on February 15 when 510th TFS pilot, Capt Todd Sheehy, brought down another Iraqi helicopter using his GAU-8/A.

Battle damage was always likely, given the assigned tasks, but ruggedness was built into the design and layout. It was intended to be resilient enough to get home. To return damaged jets to the air, the 2951st Combat Logistics Support Squadron deployed four teams from McClellan AFB in California from

Lt Col Rick McDow's assigned aircraft as the commander of the 355th TFS 'Falcons' was A-10A serial 79-0158. It carried the name 'Falcon 1' as well as mission markings when it returned to Myrtle Beach AFB at the conclusion of Operation Desert Storm. Kevin Foy via Don Logan

An A-10 over the Saudi desert. Most A-10 attacks took place from medium altitudes to minimise the risk to the aircraft. USAF/Tech Sgt Rose Reynolds

December 1990 to King Fahd International Airport (KFIA) in Saudi Arabia and KKMC. They repaired about 70 Hogs, nearly half of the force.

Damaged aircraft were 'triaged' by assessors and 'quick fix' teams went out to them when they landed. The GWAPS records more than 50% of repairs were completed within four hours. In addition, the teams worked on more than 23 more seriously hit, returning most to flyable condition. These included replacing shredded vertical stabilisers, rudders, flaps and elevators, as well as shrapnel-damaged engines, wings and windscreens.

Four were lost during Desert Storm, and another crashed on recovery to a forward airfield. An aircraft from the 23rd Tactical Air Support Squadron was shot down, as was one from the 76th TFS with both pilots becoming POWs. Two more, from the 353rd TFS, were downed on February 15, northwest of Kuwait City. One pilot, Capt Steve Phyllis, was killed, with the other, Lt Robert Sweet, taken prisoner. The final loss, on February 27, saw OA-10 pilot, Capt Patrick Olson, attempt a single-engine emergency landing with no hydraulics at the KKMC FOL. Tragically he was killed when his aircraft flipped over on landing. Another very badly battle damaged example was stripped of re-useable parts and bulldozed into the desert.

In contrast to daylight operations, darkness certainly brought safety and at war's end, and hundreds of night missions, not a single A-10 had been damaged or lost. The 355th TFS accumulated 1,512 combat sorties and 3,325 combat flying hours.

The Gulf War saw the Warthog perform with great success in combat, overcoming many of its critics, including heavyweight military professionals, thus ensuring its survival. Plans to retire the type entirely from service were shelved. Instead 390 of the 650 inventory were retained and have undergone a number of upgrades.

Since 1991, the aircraft has repeatedly seen combat: in the Balkans, Libya, Iraq, Afghanistan and Syria, but it secured its place in aviation history, and post-Cold War survival in the skies above the desert during 1991. AN

Above: **Kill markings from Operation Desert Storm on a 23rd TFW A-10.** USAF

Right: **A-10s exchanged war-loads for ferry tanks for the trip home.** USAF