FLYING TIGER

The Tiger ARH's introduction into Australian Army service has not been without its turbulence. But with the critical FOC milestone now achieved 1 Aviation Regiment is taking full advantage of the Armed Reconnaissance Helicopter's growing maturity to allow it to bring an unfair advantage overhead any fight.

WRITER & PHOTOGRAPHY: PAUL SADLER

With the achievement of final operating capability (FOC) on April 18 2016, the Australian Army's fleet of Tiger Armed Reconnaissance Helicopters can now be deployed anywhere, anytime, to deliver its deadly suite of munitions with super accurate effect and to be the eyes in the sky for ground force commanders feeding down intelligence to enhance their situational awareness.

It hasn't been an easy journey, as a recent Australian National Audit Office report has highlighted, but 161 and 162 Attack Squadrons of the 1st Aviation Regiment (1 Avn Regt), 16th Aviation Brigade, remain firmly focused on delivering the considerable capabilities of one of the most modern military helicopter platforms in the world.

1 Avn Regt operates Australia's fleet of 17 operational Tigers from Robertson Barracks, Darwin, with the balance of the 22 Tigers purchased under Project AIR 87 to replace Vietnam War era Bell Helicopter Iroquois and Kiowas at the Army Aviation Training Centre (AAvnTC) at Oakey, Queensland to train future aircrew to operate on what could be described as a sophisticated flying computer with blades.

Although it was 12 years in the making, achieving FOC is only one step of the journey for 1 Avn Regt and Tiger. Compared to the Kiowa and Iroquois it replaced, where the intelligence, surveillance and reconnaissance (ISR) capability was some eyes and ears and a set of binoculars in the front seat of the helicopter, Tiger allows 1 Avn Regt to stand-off, target quickly and strike with absolute precision.

1 Avn Regt operates 17 Tigers from Robertson Barracks, Darwin.

"Tiger's ISR capability has not been fully explored or exploited – there is a lot more to be done here," Lieutenant Colonel Hayden Archibald, commanding officer of 1 Avn Regt, told *Australian Aviation* during a recent visit to Robertson Barracks.

"Now that the machine has become a full operational capability we can start to see how it links into the other networks of Army and the battlespace to ensure the information management and situational awareness tools are fully synchronised. That is a space that I look forward to moving further on in the future."

Whether it's a ground escort for a convoy or an air escort for aviation airmobile operations, Tiger's capabilities can assist commanders to meet set mission objectives.

"So, can we achieve the mission? Absolutely we can," said LTCOL Archibald. "At no point do we expect our soldiers to enter a fair fight. They need to go in with overwhelming firepower and capabilities that defeat the enemies in situ so that our people will win. This helicopter can do that, but yes, it has taken the transition a long time to get to this point."

Lethality

Tiger's weapon suite is also a world away from the Iroquois Bushranger's miniguns and rockets, as a walk-around of a Tiger on 1 Avn Regt's flightline highlights.

Mounted under the nose is a GIAT 30mm DEFA M78, an electronically operated multi-receiver grip single-barrel gun. Capable of firing at a rate of 750 rounds per minute in five, 10 or 25 round bursts – using semi-armour piercing high-explosive incendiary rounds, the gun is typically used for controlled bursts rather than continuous fire due to its considerable recoil forces.

"Our operations would normally see the gun being utilised out to the 1,500m mark," said LTCOL Archibald. "The effects are extremely accurate at that type of range, but we have the opportunity to use the gun up to 2,200m."

Underneath its stub wings, Tiger carries the Forges de Zeebrugge (FZ) 70mm unguided rocket, accurate up to a range of around 4,000m, in either seven or 19 launcher tubes.

"The rockets and the automation that this machine has embedded in its systems allows for very accurate precision effects even for an area weapon such as unguided rockets," said LTCOL Archibald. "I have fired a lot of rockets on other machines and the accuracy that this aircraft has, at range, has suitably impressed me."

To further improve the rocket's accuracy, Army is currently pursuing the integration of BAE Systems' Advanced Precision Kill Weapon System (APKWS) kit. This follows the completion of a recent successful test campaign of the kit which converts the rocket into a low-cost laser-guided precision munition.

Also carried under its stub wings is the Lockheed Martin AGM-114M Hellfire II laser guided air-to-ground missile. Weighing 48kg, including about a 5kg high-explosive (HE) warhead, the AGM-114M is capable of speeds up to Mach 1.3 and has an effective range of about 8,000m.

"Hellfire is extremely lethal and we will continue to use it into the future with some upgrades that are coming through," said LTCOL Archibald. "We have just conducted tests and evaluations using the AGM-114R variant which is a great enhancement to the Hellfire system. We will be able to program the warhead to be either an explosive fragment or an anti-tank weapon."

Lockheed Martin says the Hellfire II 'Romeo' has guidance and navigation improvements over the 'Mike' model, and the pilot can select the blast type while on the move without having to preset a mission load prior to departure. The missile is intended to work well against all three target types of armoured vehicles, fortified positions or soft and open targets.

"To match the changing character of war we must test and evaluate these modernising effects and we must continually invest in our platforms and technology," said LTCOL Archibald. "Precision is one of those. We cannot afford to have area effects in a fight right now in the modern urban environment – nor do friendly forces need area effects. We need precision effects and we can deliver those with all three weapon systems on this platform."

Mounted above Tiger's rear cockpit, a Safran Strix HA optronic

A pair of Tigers take on a load of munitions and fuel at the FARP during Exercise Griffin Guns.

The view from Griffin 31's rear seat with Blade 21 in the lead.

sight comprising thermal imaging, visible and near infrared TV and laser designation capabilities is used for targeting and for ISR missions. The sighting system is used to build situational awareness for the ground force commander which can be communicated via voice, or in the future, data, with a battle management system that is now being integrated into the helicopter.

Linked to Tiger's weapons suite and sight is the Thales TopOwl helmet-mounted sight display (HMSD) to control the firing of the aforementioned munitions. The circa $250,000 HMSD system, which projects a heads-up display and intensified night vision images into the helmet's visor, captures what the aircrew are looking at and works with the weapon systems to automatically build a firing solution for the chosen munition.

"For example, when I pull the trigger of the gun, I don't have to aim off, the system has already done that for me and we will get a pretty high probability of a hit," said LTCOL Archibald.

"Equally, the automation of firing the rockets is line of sight, where what I have looked at and activated against, the system can automatically fly me on line for the rocket solution. I correct for elevation and I launch the rocket once we are matched. The automation the aircraft brings with it and the firing solutions it comes to, is a real combat enhancing function."

Increased persistence, meanwhile comes thanks to Tiger's 365lt external fuel tank. A ballistic plate over the front allows the tank to be loaded on the same wing stub with any of its weapons types installed on the adjacent stores point.

"With our internal fuel, we are on par with most attack helicopters around the world with a two and a half hour range," said LTCOL Archibald.

"With an external tank we can extend that out to three and a half hours easily. That type of persistence in today's environment gives the ground force commander that extra piece of confidence that we are going to be at the right point of space that they need us.

"Today's enemies are not congregating in massed effect, they are dispersed. Ground force commanders need our persistence to deal with a dispersed enemy force and the precision effects to individually deal with those forces over time."

Finally, a self-protection suite of countermeasures and sensors including radar, laser and missile warning receivers aid in protecting the aircrew and the helicopter.

Flying Tiger

Australian Aviation observed the lethality, accuracy and agility of the Tiger ARH from the rear cockpit of A38-002, callsign 'Griffin 31', during 1 Avn Regt's gunnery exercise, Griffin Guns, in early November.

From two metres up in the rear seat usually occupied by the battle captain, two vertically stacked multifunction display screens inset on the instrument panel show flight instrumentation and engine parameters. In addition to standard helicopter flight controls, the rear cockpit includes two gunner armament grips (GAGs) on either side of the seat for operating the sight including the laser designation system and for weapons firing.

> **"Ground force commanders need our persistence to deal with a dispersed enemy force."**
>
> LTCOL ARCHIBALD

Having been helped and secured into the firm seat's five-point restraint harness in preparation for flight, the ground engineer arms the emergency door jettison system for either of the side windows of the cockpit should an urgent egress be required. In Tiger's front seat, 161 Attack Squadron's instructor Captain 'Grant', begins the start sequence of the ARH's first of two MTU Turbomeca Rolls-Royce MTR390-2C engines with ground crew watching for any abnormalities during the start.

With two good engines and rotors turning, the air-conditioning is turned on. While it's really there to keep the avionics cool from Darwin's blistering temperatures, it provides instant relief for the aircrew who are fully encased in their personal protective equipment of flight suit, boots, gloves, Air Warrior survival vest and helmet.

On an adjacent helipad, Tiger A38-004, callsign 'Blade 21', calls in ready on the 'company' frequency. Tiger is equipped with four radios including two VHF/UHF, a VHF/UHF/SATCOM and a HF set. Acknowledged by CAPT Grant, the park brake is released and Griffin 31 begins its ground taxi to the main pad for a departure in between several other Tigers being readied for flight.

In concert, the pair of Tigers depart the barracks and are airborne momentarily before descending for a planned stop at the forward arming and refuelling point (FARP) just a short distance off base. It is here Blade 21 is loaded with 120 TP (target practice) 30mm rounds for its gun, seven inert unguided 70mm rockets and a single AGM-114M Hellfire missile for today's training mission. In its configuration for this exercise, which includes a single 365lt external fuel tank, the Tiger could take on up to 450 rounds, a total of 14 rockets and four Hellfires.

Griffin 31's stub wings remain empty for this flight, except for a 19-tube FZ233 rocket launcher and an external fuel tank.

Watching as the 'Farpies' from the regiment's Logistic Support Squadron (LSS) complete Blade 21's weapons load in the hot and dusty conditions, CAPT Grant takes the opportunity to talk through the cockpit's instrument panel and flight controls as a refresher from flying the simulator the night before.

Arming completed, Blade 21 and Griffin 31 climb out of the FARP in turn, nose over and increase airspeed to about 130kt for the 30-odd minute transit east to the Mount Bundey Training Area located just outside of the world famous Kakadu National Park. There, a Joint Terminal Attack Controller (JTAC) cell will give Blade 21 coordinates and clearances to engage using all three of its weapon systems onto mock targets hiding in the moderately dense vegetation.

Through the helicopter's large and relatively unobstructed windows, the daily forecast thunderstorms begin forming on the horizon as the colours and texture of the remote Northern Territory whiz past a couple of thousand feet below.

Receiving a clearance to enter the training area from Range Control, effectively the guardians of the training area's airspace, both Tigers make contact with the JTACs positioned on an exposed ridge line. Coordinates and a description of Blade 21's first target for the afternoon's sortie is radioed to the cockpit in what the uninitiated could best describe as 'garble'. Decoded, it means a rust-coloured metal box measuring about $1m^3$ placed among the trees in a clearing is posing as a simulated ground threat. This target will soon meet its fate thanks to a HE warhead from a Hellfire shot.

To demonstrate its accuracy, CAPT Grant also enters the relayed coordinates of the target into the Tiger's targeting system. On the lower screen in the cockpit, a red triangle is overlaid a topographical map to mark where the target is hiding.

"We have a six step targeting process," explains CAPT Grant. "We have to positively identify the target; establish it is within our rules of engagement; assess for collateral damage; confirm we have clearance; select an appropriate munition that is proportional for the target and then you're concerned about battle damage assessment."

Flying a low tactical profile in towards the target just above the trees, Blade 21 takes up its position to engage. Popping up a few hundred feet to improve the view of the target, set around 4,000m in the distance, the Tiger's battle captain uses the sighting system to identify and confirm the target. Its ambient temperature, significantly higher than the surrounding vegetation having sat baking in the sun all day, makes it easy to identify using the thermal camera capability.

Blade 21 fires a pair of 70mm rockets at a simulated target.

> "If you defeat their will to fight then that is half the battle."
>
> CAPT GRANT

Acquiring the distance to the target using Tiger's laser range-finder, Blade 21 selects its Hellfire in the weapons system. Having met all the launch requirements, the missile is fired. Despite hearing protection in, helmet on and the noise of a pair of 1,465shp (1,093kW) engines and rotor transmission system, the roar of the Hellfire coming to life as it almost instantaneously breaks the sound barrier on leaving the helicopter cancels out all sound.

The rocket's motor accelerates the Hellfire's 48kg mass from stationary to around Mach 1.3 – pushing it over one kilometre every three seconds – on its flight of about 10 seconds towards the target. A very quick flash is sighted 4,000m down range among the trees as the Hellfire impacts with absolute precision leaving nothing but a lingering dust cloud and a small crater where the metal box once stood.

Tracking towards the column of dust and smoke to obtain a battle damage report, quite clearly the target has been obliterated, while surprisingly the immediate surrounds appear to be left rather unscathed. Impressive.

To put this 'kill' into perspective, it was like firing the Hellfire from one end of Sydney Airport's main Runway 16R/34L and hitting a target about the size of a BBQ sitting off the other end. Army has never had this sort of airborne precision weapon capability until Tiger. Hellfire is as accurate out to about 8,000m – double the distance of Blade 21's shot. Wherever the aircrew point the laser, the Hellfire will hit it.

"You just saw Tiger do a precision strike from 4,000m onto one small target and get a direct hit," said CAPT Grant. "But, if you apply a bit of tactical scenario where two Tigers are hiding from a target, which doesn't know they are there, we could shoot two Hellfires each very quickly. In five to 10 seconds time, four missiles would impact their targets. Just imagine the shock action you would feel as the enemy on the ground. You wouldn't know where it has come from – it would have devastating effects on their morale.

"As a pair of Tigers, in this example, we may not be able to defeat the entire army, but if you defeat their will to fight then that is half the battle."

Standing off low in a designated hold area, Blade 21 is fed details of its next target by the JTACs, who are also undergoing some training as part of Exercise Griffin Guns. A similar sized target is described and its coordinates given. This time, the Tiger will employ its 70mm rockets and 30mm rounds from its gun.

Flying a similar attack profile, Blade 21 pops up from around tree height and transitions into a hover. From about 2,000m away, the battle captain 'lases' the target before releasing two rockets in rapid succession, again delivering an accurate strike. Switching to the gun and two short bursts of five rounds are fired impacting what is remaining of the target.

"As you shoot the gun, the whole aircraft vibrates and moves," explained CAPT Grant as the Tigers both head back to the hold.

"Tiger has a compensation model that stabilises the aircraft. There's about 900kg of recoil per round so if you fire ten rounds, that's a lot of force pushing the aircraft. As you shoot, particularly off axis, the gun is a fair way forward of the centre of gravity and the rotor system, so it will want to yaw the aircraft. Just as the recoil starts, the [flight control] system will compensate for it with an input of necessary controls to keep the helicopter stable."

There is no push from firing the rockets or Hellfire as they are both recoil-less munitions. The Hellfire provides its own thrust and with the help of a spring, launches itself off the rail. The same with 70mm rockets, hot gas goes one way and the rocket goes the other.

As more coordinates come through for a simulated target lurking in the trees, Griffin 31 departs the training area and leaves Blade 21 to prepare for another shoot.

En route back to Darwin Airport for some handling and circuits, a now developed thunderstorm requires a wide berth to remain well clear of the spectacular lightning that is striking from the storm cell's head.

CAPT Grant hands over control of the Tiger – "It's your aircraft."

Just like in the simulator we go though each control input individually to feel the responsiveness and the effects of the controls. Each input is solid and responsive. In the cruise straight and level, the helicopter is quite stable as it rides well through thermals and turbulence.

Making a straight-in approach to parallel Darwin's Runway 29, Griffin 31 transitions into a low hover over the taxiway. With a gusty breeze on the nose, the Tiger sits comfortably in the hover with only minor inputs required to hold station.

On both the cyclic and collective, the Tiger has a Doppler radar hover and height hold as part of its four-axis autopilot. As demonstrated by CAPT Grant, with the press of a button, Tiger stays right where you put it and it does not move.

"It will hold a stable hover at a given height and maintains a null point on the Doppler," said CAPT Grant. "It doesn't maintain a ground position like a GPS autopilot, but it maintains a Doppler zero null shift, so if you drift say to the right, it works out that you are drifting and will make a correction to stop it. It provides us with a stable weapons platform."

The autopilot by design is to reduce pilot workload so the aircrew can focus their mental capacity on fighting with the helicopter.

"It keeps your brain in the fight so you don't have to worry about hovering or basic straight and level flying," said CAPT Grant.

"A lot of what we do is not about training people how to fly – Tiger is easy to fly – although flying it wrong will kill us. It is about the weaponeering and employing it correctly and concentrating on when to fight and when to spend time tracking what's going on in the battlespace."

> **"As you shoot the gun, the whole aircraft vibrates and moves.**
>
> CAPT GRANT

From the hover and nosing over, the Tiger accelerates and climbs upwind in readiness for a left hand circuit. On downwind, and with landing checks complete, Griffin 31 is cleared to land parallel Runway 29. Transitioning again into the hover, judging the height above the ground from a raised seating position takes getting use to, but Tiger settles easily onto its tricycle undercarriage.

To demonstrate some of Tiger's agile handling characteristics, CAPT Grant resumes control. Entering Runway 36 and backtracking to its threshold, the Tiger flies effortlessly sideways at 40ft, and with a bit of pedal to push the nose another 90 degrees, backwards too at the same speed.

Nosing over and accelerating to around 80kt, the Tiger's nose rises to what feels like vertical – in actual fact more like 45 degrees nose up. Pedalling over for a course reversal, the Tiger races down the runway towards its piano keys. Performing a quick stop manoeuvre to rapidly bring the aircraft into a hover, CAPT Grant notes the storm that has been following the flight all afternoon is getting closer and it was time to return to the barracks.

Griffin 31 tracks coastal around Darwin's harbour skirting the city's central business district before making an approach back to the flightline where several of the squadron's Tigers prepare to launch on a night gunnery flight.

With the shutdown sequence commencing, CAPT Grant reflects on the Tiger's handling and firepower.

"We contribute to the soldiers on the ground as a combat force multiplier," said CAPT Grant. "In essence, our job is really simple, we fly and look for the things and then we fly and shoot it or report its position. We can call up the infantry on the ground and provide them with battlefield commentary so they can respond accordingly. We can come in and use Tiger to make the fight bias towards our advantage."

Walking from the Tiger in fading light back to the aircraft life support equipment fitters for the return of helmets and Air Warriors, then to the flightline to sign the helicopter back in, CAPT Grant explains how basic communication skills can determine how troops on the ground would value the overhead presence of an ARH.

Blade 21 prepares for another shoot in the Mount Bundey Training Area.

"In battle, you have to imagine a lot of the soldiers are under stressful circumstances. They are in armoured vehicles with a limited field of view and they may be in contact with the enemy, so the stress and the pressure is on. If we can give them some significant information like a clearing that might be 500m away that would provide them a safe egress – they may have no idea that it's there – if we provide that in a short and succinct manner, they can act on that and it could make a world of difference."

Power of the people

"The regiment is Army's only attack aviation regiment and the people here stand proud of that capability," stated LTCOL Archibald.

1 Avn Regt and its personnel – past and present – have overcome significant challenges bringing into service an immature helicopter operating in the tough environs of the Top End.

"We have some very smart soldiers in the Army today," said LTCOL Archibald. "No matter what challenges the platform has been confronted with as we have taken it through to its maturity level, the people have matured into this capability."

It has been a considerable transformation for the Tiger workforce, from pilots to the rearming and refuelling teams and the maintenance workforce who have had to transition from fairly simple machines the in Kiowa and Iroquois to the state-of-the-art Tiger.

"The understanding of Tiger's technology is key and the transition the workforce has made to that has been incremental and consistent," observed LTCOL Archibald.

"We have some sergeants here who have been on ARH for over seven years. They now understand the system well and they know what to expect. Overall, the attitudes, the culture and behaviours are very different from what they were 10 years ago. The professionalism that is displayed in the cockpit by our combat aviators for the employment of precision fires and effects in my eyes is superior."

LTCOL Archibald himself served initially as an airfield defence guard with the RAAF before transferring to Army in 1998 to begin flying training, being posted to the Kiowa after flying the CT-4 and Squirrel in training.

"I was always focused on the conduct of reconnaissance and reconnaissance operations with a focus towards what AIR 87 was going to bring out," said LTCOL Archibald. "I was fortunate to be posted to 162 Reconnaissance Squadron to cement my time as a young lieutenant and really gain some low, 'down and dirty' pilot time."

> **We are now a fully fledged regiment that has grown to full maturity.**
>
> LTCOL ARCHIBALD

Serving on exchange with the US Army in the 2-17th Calvary Squadron, 101st Airborne Division for two years, LTCOL Archibald flew the OH-58D Kiowa Warrior and deployed to Afghanistan for 12 months in 2008.

"It was a great experience to really look at how armed aircraft operate."

On return from his US Army posting, and completing executive staffing positions, LTCOL Archibald transitioned onto the Tiger in 2010 as a squadron commander. After a short period of flying Tiger, he moved to take up another executive role, before returning to lead 1 Avn Regt as commanding officer in December 2015.

"I am the first regiment CO to have been trained on Tiger previously, which is another milestone demonstrating our maturity. Our younger officers are moving through Army staff positions, returning to the regiment with broad experience and are able to take what they have learnt on Tiger previously and reinsert that back into the capability," said LTCOL Archibald.

"When I was a squadron commander, we only had one squadron of Tigers with 12 aircraft in the regiment. We are now a fully fledged regiment that has grown to full maturity. We have reached the milestone of FOC, completing Tiger's introduction into service, which allows us to embrace what should be seen as a regular regiment on Army's books conducting normal business."

Maintaining Tiger

Given its remoteness and tropical climate Darwin can be a challenging environment, not just for the aircraft but for the pilots who fly them and the maintainers who keep them flying.

The Top End's wet season brings the biggest challenges.

"Everyone has to fly in bad weather because the enemy also has to fly in bad weather, said LTCOL Archibald. "However, the storm season truly affects our combined arms integration by heavily restricting ground manoeuvre in the exercise areas, so we don't get that integration effect. I can still fly and dodge storms, but we go out and shoot by ourselves, and in today's environment, if you shoot by yourself, you are less effective than when you operate in a combined arms team."

Darwin is a harsh environment to operate and maintain Tiger in due to the heat and humidity, dust and salt laden air, challenges that 1 Avn Regt's Technical Support Squadron (TSS) has learnt to adapt to over the years.

"The aircraft is just a giant heat sink, so we don't put them out to sit there in the sun if they're not going to fly for several hours," said 1 Avn Regt's electrical and mechanical engineering operations officer, Captain Boyd Schrader.

Tiger's gun can fire at a rate of 750 rounds per minute in five, 10 or 25 round bursts.

On the flightline at Robertson Barracks.

"Try flicking your computer on after you have left it out in the Darwin sun for a couple hours and see how much it likes you. We try to keep them hangared until we are ready to launch and then we'll aim to take them out just prior to the aircrew needing the aircraft. Sometimes the aircrew may perform their pre-flight inspection while it's still in the hangar to reduce the time they're on the flightline."

But it is not just the heat, the ferocity and the angles at which rain comes down during the wet season is just as problematic for aircraft avionics as the heat.

"Tiger is a perfectly capable machine – the culture of operating it is just very different," said CAPT Schrader. "We have adapted over the years and figured out that we might be able to pre-empt some of the faults and issues just by doing some things a little differently and adapting to the environment. I'm not sure if we are adapting to the environment or adapting to the aircraft because it is such a big change from the Kiowa."

At all trade levels, there are around 120 maintenance personnel in 1 Avn Regt across both squadrons including life support, structural repair, maintenance control, aircraft and avionics trades. Each of the two squadron's Technical Support Troops have around 30 maintenance technicians.

Just dealing with grime sees maintenance personnel wash the Tigers every 60 days and within 14 days of returning from an exercise.

"With the engines, we wash them every 14 days and do an engine rinse sooner if the aircrew have flown below 1,000ft within 5km of the coastline," said CAPT Schrader.

"That can be a maintenance burden because it's one or two people going out to the aircraft to do that for a good period of time plus the time of taking them off the hangar floor to wash an aircraft."

When it comes to maintenance and deployments the technicians at 1 Avn Regt are Jacks of all trades. Over an average year, maintenance teams will see flying from Robertson Barracks, deploy and operate from a RAAF base or civilian airport, be knee deep in mud in remote parts of the country, and do maintenance on an exposed flightline, day and night, in all weather conditions.

"From a maintenance point of view, whether it be vehicles, tooling, how you carry your equipment and what you can take with you, one of the challenges we face is we can never be optimised for one particular task or role," said CAPT Schrader.

"We have to be prepared to do the full spectrum and support it with what we've got. We do everything from a self deployment across the country down to a C-17 deployment. We are never in a comfort zone when we deploy. A RAAF base may look comfortable but we need to be set up to do anything, anywhere – and sometimes it is at the drop of a hat."

With Tiger, Army didn't just bring in a more sophisticated and complicated helicopter, it also brought in a new contractor arrangement, with spares supplied directly through a logistics support contract with Airbus Helicopters (formerly Australian Aerospace).

Embedding a supplier representative from Airbus Helicopters within 1 Avn Regt has greatly improved the visibility and awareness of the parts supply chain.

"Some of our part availability issues have been internal for us which you can't blame on the aircraft," said CAPT Schrader.

"It was our own process of getting spares from a contractor to an aircraft. We have approached those issues by reducing the double handling between us and Airbus on site. As far as scheduled maintenance goes it is a good news story for Tiger. Its deeper level maintenance throughput is healthy and the maintenance chokepoints the helicopter once had have now been managed."

With scheduled maintenance issues resolved, dealing with the unscheduled maintenance in a timely manner remains a focus.

For a military lift helicopter, as long as it can fly, it can do the job. Tiger not only has to fly but it has to see, sense, target and shoot across three different weapon systems.

"In terms of the likelihood of things breaking or an unserviceability it is always going to have a higher likelihood with Tiger – that's just the nature that goes with an armed reconnaissance aircraft," said CAPT Schrader.

"We are both blessed and cursed with being Defence's only operator of Tiger, taking the AAvnTC out because its helicopters are maintained by the contractor. There are certain fleet issues that we have to take the lead on and deal with because there is no-one above us or across multiple regiments. It's also a blessing because for all intents and purpose we are Airbus's single customer operating this aircraft in Australia. I rate the focus it gets from the contractor definitely as one of Tiger's strengths."

The maintenance technicians *Australian Aviation* spoke to during our visit to 1 Avn Regt said they liked working on Tiger because of its uniqueness.

"They get a lot of pride putting it online and they get a lot of pride when it does well and succeeds," said CAPT Schrader. "As Tiger has matured and we are succeeding more, you can see it reflected in their morale."

LTCOL Hayden Archibald, commanding officer of 1 Avn Regt.

Deploying Tiger

Darwin's tyranny of distance means deploying Tiger for exercises or public displays is a complex challenge for LTCOL Archibald and his team.

"We would typically try and get two aircraft down to a live fire demonstration for the combat officer's advanced course in Puckapunyal [central Victoria] at least once a year," said LTCOL Archibald.

"Two days of shooting takes me three weeks of effort to get there. The transcontinental nature of integrating this capability to the rest of Army must be factored into the sustainable employment of the regiment."

Deploying a pair of Tigers onboard a Boeing C-17, however, is a relatively straightforward exercise,with only the helicopter's four main rotor blades needing to be removed. While the landing gear does not need to kneel, the main rotor 'hub cap' of the first Tiger loaded is removed so it can fit under the C-17's wing box.

"It is a very easy aircraft to transport via C-17 and obviously that gives a strategic deployable option, whether we exercise with countries abroad or we deployed locally," said LTCOL Archibald.

For shipboard storage, Tiger can be fitted with a two-blade folding kit which sees one blade swung forward and the other swung aft to be in line with the fuselage. A four-blade fold kit can also be used where all blades are positioned rear in line with the fuselage.

"The four-blade fold is not really 'folding' – that's a bit of a misnomer – it's more removing them and storing them up there [near the rotor head]," said CAPT Schrader.

"The four-blade fold is not something we prefer to use for C-17 because it doesn't take any less time than it does to pull the blades off. In order to push an aircraft on with a [two] blade fold you have to kneel the landing gear struts which you don't have to do when you remove the blades. We'd rather avoid kneeling the struts because of the extra burden to raise it once we offload the aircraft at the other end. But we will have two-blade fold when we are on the LHDs."

Tiger at sea

1 Avn Regt will soon be on the LHDs with first-of-class flight trials (FoCFT) of Tiger on board the Navy's new amphibious assault ships programmed for 2017. Tiger will be the final ADF helicopter type to be cleared for embarked operations on the LHDs, with flight trials giving Army and 1 Avn Regt the opportunity to exercise deck landing qualifications with the Tiger.

A 'farpie' inspects the loading of a Hellfire prior to a sortie.

"It's very exciting times," said LTCOL Archibald. "If you talk with anyone here about getting onto the ship, it is going to be really interesting. We will then do troop tactics and gunnery from the ship which will embrace the full spectrum of logistics, rearming, resupplying and refuelling, then sustaining operations from the amphibious environment. We certainly look forward to that with open arms."

162 Squadron will be part of the Tiger's FoCFT on the LHD with one helicopter from Darwin and one from the AAvnTC being involved in the trial. 1 Avn Regt will provide the manpower to put Tiger online for the Army Aviation Test and Evaluation Section (AATES) and Navy's Aircraft Maintenance and Flight Trials Unit (AMAFTU), which specialise in test and evaluation trials, to take the lead on the flying program.

> "Two days of shooting takes me three weeks of effort to get there."
>
> LTCOL ARCHIBALD

Training Tiger

The growth and sustainment of two operational squadrons of Tigers was the final stamp before the ARH capability could achieve FOC, allowing the regimental headquarters to rotate the squadrons on operations and exercise.

"That rotation occurs between the squadrons," said LTCOL Archibald. "We maintain a squadron that is in a readying cycle and a squadron that is on a ready cycle. Unfortunately for the regiment, we don't get a lot of time for reset, but we maintain a raise, train and sustain model that allows a portion of reset."

One recent reset came after taking part in Army's major training activity, Exercise Hamel 2016, conducted in South Australia's Cultana training area across June and July, with 1 Avn Regt deploying Tiger in its mature state where it flew alongside Army MRH 90 Taipan and CH-47F Chinook helicopters.

"We got to bring them all together on the battlespace to execute full spectrum aviation operations with the 1st Brigade, with whom we have a habitual relationship with being geographically located across the road from us here at Robertson Barracks," said LTCOL Archibald. "And it has lined us up well as we move toward operations in the amphibious environment for Exercise Talisman Sabre next year."

1 Avn Regt also conducts regular ground and air integration training with the United States Marine Corps (USMC) Marine Rotation Force – Darwin (MRF-D). In 2016, the regiment trained with Hawaii-based HMLA-367 'Scarface', which operates the Bell UH-1Y Venom. While opportunities were limited with MRF-D only deploying four Venoms, planning for the next rotation to Darwin is already underway.

"We are looking to maximise training opportunities with their V-22 Osprey, AH-1W Super Cobra and the UH-1Y Venom through 2017," said LTCOL Archibald. "Additionally, Exercise Talisman Sabre 2017 will present some great opportunities to conduct interoperability with other US Army and USMC aviation platforms, along with their tactics, techniques and procedures as well as further enhancing our understanding of manned/unmanned teaming concepts."

Research into the manned/unmanned teaming (MUM-T) operations is already underway at 1 Avn Regt.

"MUM-T is an exciting new concept that we will embrace coming up in the near future," said LTCOL Archibald. "We are now looking at how you bring an unmanned system's tools and situational awareness into the cockpit to further refine the situational awareness of that crew to then maximise their effect on the battlespace."

FOC and improved serviceability also means 1 Avn Regt can concentrate more on its own training activities, when for a number of years working to raise awareness and integrate Tiger across Army was sometimes to the detriment of its own training program.

"We really did need to get out there and execute collective training for the rest of Army," said LTCOL Archibald.

"Since August 2016, we have been focusing on initiatives to centralise our processes here to maximise the capacity. We are also now seeing a level of serviceability increase which has been through careful management principles to maintain the aircraft during down periods.

"What I have done is put in place more time to fix them. Because we have given them more time I am getting more serviceable helicopters. What is going to be interesting is to settle on a matrix for what it actually takes for my maintainers to work on the helicopter."

The regiment's annual gunnery training activities, Exercise Griffin Guns, allows its aircrew to focus building on their live weapons firing experience. The regiment intends to hold four gunnery camps each year, a frequency, when compared to the past decade, that has been increasing since Tiger reached its FOC.

"Now that we are a full operational capability, we have more of a sustained plan to integrate with Army's major activities and our ability to conduct training in-house out of the regiment location," said LTCOL Archibald.

"Darwin and the base here provides a great opportunity for us to leverage off every resource available to conduct live fire training in the Mount Bundey Training Area, which is fundamental for an attack aviation regiment. Having a live fire training facility so close, I am able to align resourcing to achieve those outcomes that build on the great work that has happened previous to get us to this point. And now taking it forward into a sustainable measure to raise, train and sustain a force is really important."

Weapons proficiency

Being an attack capability, 1 Avn Regt's aircrew will fire all of Tiger's three weapon systems regularly to maintain their weaponry proficiency. This can be done during an exercise or virtually on a simulator.

Far from being a cockpit procedural trainer (CPT), the regiment has a fixed base full mission simulator, developed by Thales and operated on behalf of prime contractor Airbus Group Australia Pacific. Linked together, the forward and rear cockpits sit side-by-side with high fidelity graphics projected in a 200 by 60 degrees field of view for the aircrew to immerse themselves into a full battle scenario.

"We must embrace training in the virtual environment even more than we have to date," said LTCOL Archibald. "The simulator that we use for pilot training here dovetails into an excellent tactical trainer. You can shoot all the weapon systems and gain all the currencies required. From initial training to gunnery, there is a set level of events the crews must do as they gain proficiency in the weapon systems and the platform to marry up their capabilities in our category system."

The simulator also allows soldiers from the 8/12 Artillery Regiment, 1st Brigade, to conduct joint fires integration training with 1 Avn Regt. From inside their own virtual environment linked to the CPT, soldiers can conduct calls for fire to rehearse their tactics or practise JTAC procedures.

New Tiger aircrew arrive at 1 Avn Regt from the AAvnTC as D Category aircrew. Progressing with further training at the regiment, they next become qualified as a C Category combat co-pilot and move through to become a Category B combat aircraft captain. Inside the Category B position are sub-categories which include attack flight leads for the aircrew to conduct more mission command duties and take a pair of Tigers inside a battlespace and execute missions. Their final qualification is a Category A air mission commander.

Tiger aircrew are qualified to fly from both the front and rear seats. Junior pilots progress from predominantly flying from the front seat into more complex weapon system and roof mounted sight employment as the battle captain from the rear seat.

> **"We must embrace training in the virtual environment even more.**
>
> LTCOL ARCHIBALD

As a Category A rated aircrew, LTCOL Archibald continues to fly while in his role as CO of the regiment, typically flying at least once a week and daily during exercises like Griffin Guns.

"With the experiences I have had across a number of platforms, I want to mentor my young officers and pass on that information as they deserve to have that level of exposure to fly with the boss, as much as that is fun," quipped LTCOL Archibald.

"I will fly with a multitude of people across both squadrons because you want to cross-level that experience as much as possible. Equally, my squadron commanders, who mainly fly with their own squadron, will occasionally fly with people from other squadrons. Everyone has something to offer and there is always something to learn."

Future Tiger

Tiger's introduction has brought a quantum leap in technologies and capabilities for Army aviation. No matter what the future holds for the Tiger in Army service – it will either be substantially upgraded or replaced by a new type from mid next decade – thanks to its experience with Tiger the regiment will be well prepared to transition to that future – whatever that may be.

"Our people have made a cultural, attitudinal and a behavioural change to embrace full professionalism toward attack operations," said LTCOL Archibald. "Whatever steed we modernise to, then the regiment is much more prepared than we were in 2005 to transition into the future."

Another storm on the horizon – the Top End's wet season creates big challenges flying and maintaining Tiger.