

AIR FORCE NEWS

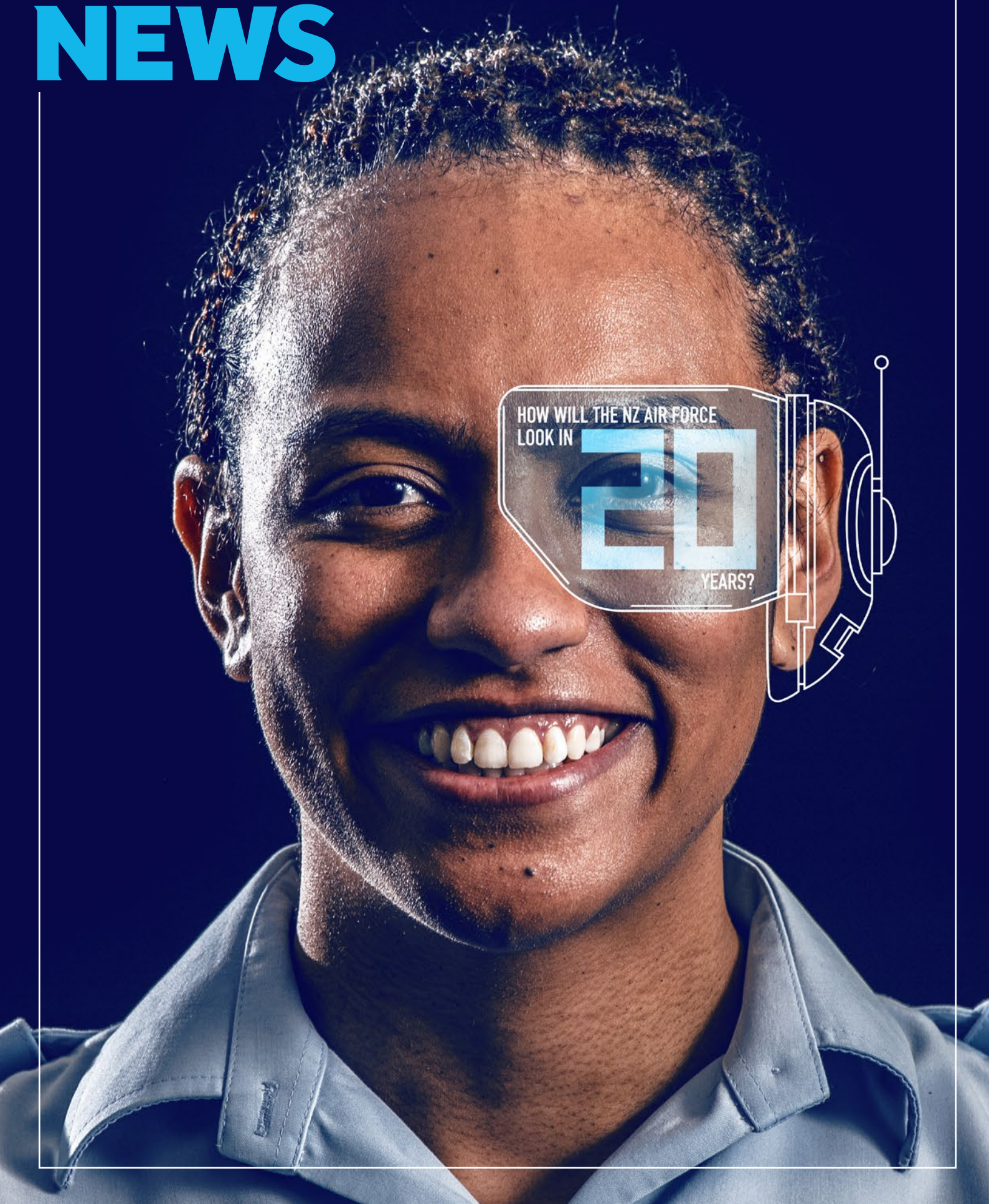
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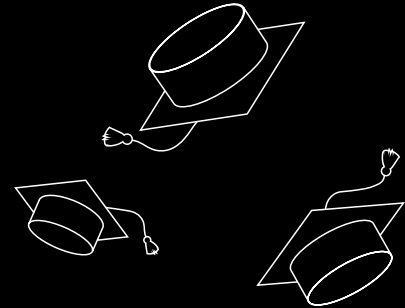
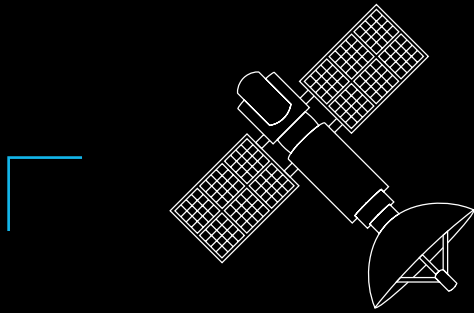
FEB|22

HOW WILL THE NZ AIR FORCE
LOOK IN

20

YEARS?





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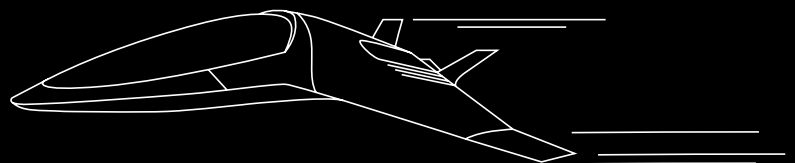
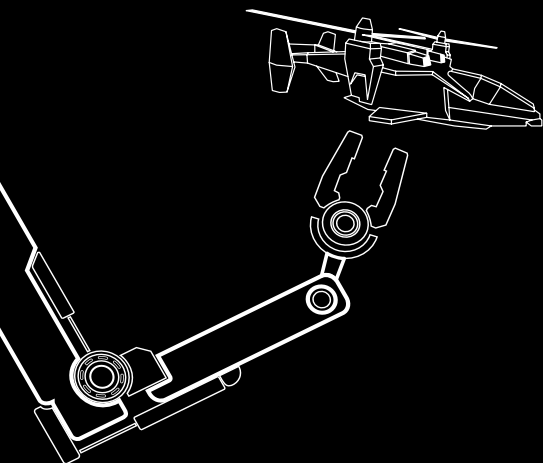
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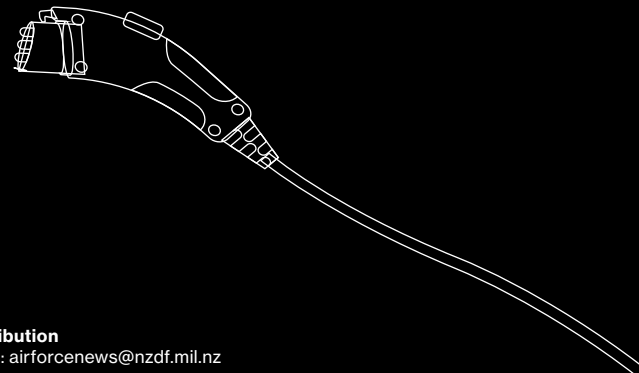
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FIRST WORD

Tēnā koutou and welcome to the Future Edition of the *Air Force News* where our people share what they believe our work may look like 20 years from now.

There are predominant themes in all the stories you will read in this issue – concern around climate change, an increased need for cyber security, space exploration and technological advancements. Each and every one of these fields is experiencing rapid advancement. So fast in fact, that for many of us, we can't comprehend what jobs may exist in STEM related sectors. So firstly, what is STEM? As an Air Force, we are no stranger to acronyms, but in recent years, this one in particular has leapt into the spotlight. It stands for Science, Technology, Engineering and Mathematics and is the future of our workforce.

In the RNZAF, we are lucky to be serving in an exciting, advanced and innovative workplace. But the reality is that New Zealand could well have a tremendous 21st century STEM skills shortage in the future.

As leaders and role models, we need to invest early to influence change.

Operation Tangata Kanorau is one of the RNZAF's key strategic change initiatives, which aims to engage and invest into targeted groups early in order to deliver diverse personnel capable of adapting and operating effectively in a modern and changing environment.

We work with young children around the country teaching hands-on, aviation-based STEM. We host high school women and teachers on our own bases for School to Skies annually.

Most importantly, we glean support from incredible Air Force personnel to demonstrate both our values and the success of their career pathways.

By showcasing opportunities that are reflective of our STEM-related trades with diverse communities, we in turn influence the generation of a larger talent pool, which is nationally beneficial to the STEM-related sectors and representative of New Zealand society.

We are just a small piece of the puzzle and we recognise that we cannot achieve this future outcome alone. We must continue to work collaboratively alongside our industry partners, organisations and educators.

Studies have shown that the jobs children are interested in at age seven will influence their subject choice during school and ultimately the jobs they pursue when entering the workforce – jobs and careers we have only ever imagined up until this point.

I hope that you find this issue inspiring and that you challenge yourselves to keep your fingers on the pulse, embrace change and foster curiosity in the next generation.

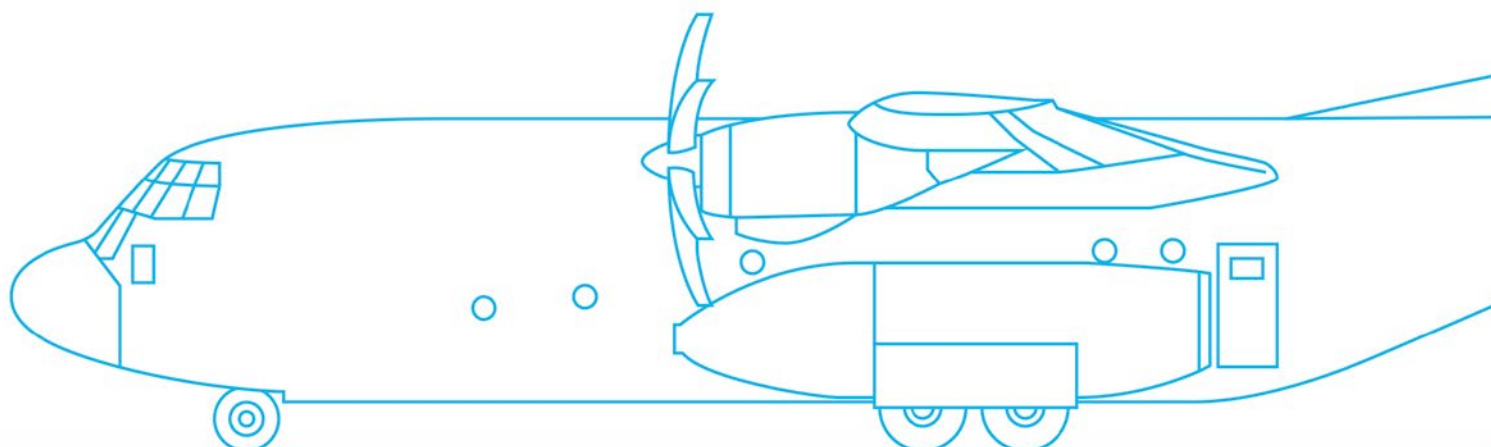
FLIGHT LIEUTENANT EMMA RAVEN
OFFICER IN CHARGE
OPERATION TANGATA KANORAU
AND SCHOOL TO SKIES

“When we look towards the future, it is important to think about not only what we will be doing, but how we will be achieving our strategic and operational aims and who we employ.”



A HARDWARE EVOLUTION

In two decades' time, aircraft technicians like Leading Aircraftman Jackson Harland will be working on new aircraft in a totally different way.



The P-8A Poseidons and C-130J Hercules will have been in service for almost that entire time, replacing the aging fleet of P-3K2 Orions and C-130H Hercules. The Boeing B757 will have also been replaced by 2042.

The change in aircraft will bring a change in tools for Leading Aircraftman (LAC) Harland.

“Currently we are using 1960s technology to do a job in 2021. In the next 20 years we will be using 21st century technology.”

Climate change will play a major factor in how the Air Force operates, with a reduced reliance on non-renewable resources, LAC Harland said.

“There will be the potential of aircraft using different fuels such as hydrogen and maybe even electric engines.

“We could access energy through clean means such as wind farms or solar power,” he said.

The utilisation of more electronic technology within the aircraft could mean less physical fault finding and more reliance on computers finding and analysing problems.

“The future technicians will be learning their trade in such a different way. They’ll need to be really switched on in avionics theory and principles.”

Changes might also be seen with aircraft paint and materials, LAC Harland said.

“Paint could be lower resistance, which will save on fuel, in turn saving money. It would also lower our carbon footprint.”

The technician’s role would always be required, but it will undoubtedly go through an evolution to keep up with the changing technology.

“The military won’t stay static, that’s for sure, we will need to adapt. It will be a big learning curve for a lot of people and maybe even a small shock to the system. To plan for a long career in the Air Force, that’s what we will need to mentally prepare for. You almost need to redo the whole trade and learn different ways of doing the job.

“I don’t have any plans on leaving the Air Force anytime soon – there is so much diversity and variety of jobs within the Air Force. It would be great to help develop and look after the new generations that come into the Air Force.”



Jackson
HARLAND

AIR F







GREENER SKIES

Work as a supply officer will be a lot busier in the future as climate emergencies dominate Air Force missions, Flight Lieutenant Shirley Barakuta reckons.

The role of a supply officer posted to the Operational Support Equipment team involves looking after operational support equipment including generators, vehicles, life rafts and everything vital for operations before they are needed for the flight.

In the future the equipment will probably look quite different to today, but Flight Lieutenant (FLTLT) Barakuta said her team's high pace of work will continue.

"I think with climate change challenges in front of us, especially in the South Pacific, there will be a lot more dependence on platforms deploying and when they deploy they also need that support equipment that goes along with it."

A commitment to green technologies, where able, might see a change in vehicles to electric options, as much as possible, she said.

"We've already seen the small diesel transport vehicles that we use around the base, being replaced by electric golf carts.

"However, even if new vehicles are electronic, they will still need that maintenance support. My team doesn't spin the spanners, but if they need external repairs, they still need to be contacted to facilitate that," FLTLT Barakuta said.

"I see a lot of the principles of the things we do won't change, but definitely the equipment that we use to look after assets, like electric vehicles, will be modernised."

The Defence Force will almost definitely move towards green technology and limiting its carbon footprint for deployments, FLTLT Barakuta said.

"While we might not be able to eliminate all of the hazards and all of the substances we use because they are unique to the platforms, we can work out how to minimise our impact of them on the environment."

Another major aspect of the supply officer's role is to catalogue the equipment they look after.

At the moment they are recorded on a computer-based system, but this will be upgraded to a cloud-based one, she said.

"The way we see the information will change, but essentially our airworthiness principles around tracing items from when we purchase it through to when it's issued to an aircraft, things like that won't change, especially in supply.

"I'm excited because my team will see the benefits of new equipment. There is some equipment here that has been here longer than I've been alive and so that environmental focus has meant we can change with the times."



HOT UNDER THE COLLAR

An increase of bases and personnel to combat the effects of extreme temperatures as a result of climate change could be on the cards for Air Force firefighters, Leading Aircraftman Matthew Anderson says.

“We’re going to need more people so we can fulfil more deployments domestically and internationally. It’s important that if we’re needed to deploy firefighters we can still support military flying at all three bases and keep our commitments to Marlborough Airport and Op Alternate at Base Ohakea.”

There will probably be more deployments to places like Australia, which is already seeing an increase in devastating fires, such as in the summer of 2020, which burned more than 18.5 million hectares, Leading Aircraftman (LAC) Anderson said.

“That’s where the extra trade numbers will come in handy and recruiting will be really important over the next few years.”

Manning and retention is an issue that the fire trade is dealing with on a daily basis.

With the fire seasons becoming longer and more intense the Air Force will need to look at future-proofing the trade so it can protect Defence Force personnel and assets.

Climate change will not only bring on more extreme temperatures, but it will be interesting to see how it affects the local water supply and how much will be available to support firefighting operations, he said.

“We don’t have a huge supply of the type of fire retardant that is dropped from aircraft in New Zealand, but that might be something that will need to change if we start to experience frequent large fires.”

However, while signs are pointing to more deployments, the world may also face continued challenges such as further pandemics, which will make travel overseas difficult, LAC Anderson said.

“That could also affect New Zealand if firefighters are unable to travel here to help if there is a catastrophic fire in somewhere like the South Island, which can get very dry over summer.

“Climate change seems to be bringing with it longer fire seasons for places like Australia and the United States. We are starting to experience the same type of weather conditions that have fuelled the fire overseas, here in New Zealand.”

In the future the Defence Force’s ability to train throughout the year could be impacted with the heightened threat of fire in Defence training areas, LAC Anderson said.

“With longer fire seasons, it will be harder for vegetation as we know it to regrow. This will impact New Zealand’s native fauna and flora and endanger native animals and their habitats.”

The rural firefighting gear the unit wears now is always being improved, with the latest change moving away from overalls and to more breathable trousers and tops.

“We are always looking at better boots and helmets – they are always an ongoing development. The helmets we have are already quite lightweight, but visors are always improving. We are always looking at ways to improve safety for our firefighters when responding to an incident.”

As well as the rural aspect, Air Force firefighters might be called on to help Fire and Emergency New Zealand (FENZ) in more urban settings, LAC Anderson said.

“Our goal is also to help FENZ more in the future and help with more day-to-day emergencies, such as house fires and vehicle crashes. It will be good, because it’s what I signed up for, to be able to help and support my community.”

SATELLITE CONNECTIONS



Air loadmasters operating in the cargo compartments of C-130 Hercules will be moving from 1960s technology to 21st century high tech systems, including using space satellite information to communicate across the world, within a few years, Flight Sergeant Dave Cresswell says.

The new C-130J Hercules will bring with it technology that will leave the “old school” slide rules and mechanical systems in its wake, he said.

The new model has more automated systems for the weights and balance and cargo handling. All the load planning will be done with the aircraft computer (Flight Management System). The computer software will do a lot of the weight and balance and aerial delivery calculations.

“So we will be moving from pen and paper and a slide rule to entering information into the aircraft computer.”

While many aspects of the job will remain the same, loadmasters may be required to also pick up other specialities with battle space management, mission planning, and helping with aircraft communications, Flight Sergeant (F/S) Cresswell said.

“The four to five-person crew will need to work together to process large quantities of information, which becomes critical when you have a smaller crew. The ability to load share information amongst crew members becomes more important compared to larger crews.”

Reliance and integration with space-based assets will increase with the new aircraft platforms and the space realm is going to be critical to get the most out of what the aircraft are capable of doing, he said.

“This will revolve around satellite communication, imagery and navigation. A lot of systems now rely on a GPS time and GPS navigation. Weather forecasting and global communication are space-based.

“The Hercules has a satellite phone and data link (text message/email) where we can call or message anyone in the world when we are flying. In the future with the newer models, we can potentially go to video calling and live-streaming information.

“We will become less restricted with the bandwidth that the aircraft is capable of because we will have enhanced systems that can manage large amounts of information.”

Satellite imagery and communications will also play a major role with increased natural disasters, here and in the Pacific, as a result of climate change, F/S Cresswell said.

“We will see an increase in providing support to places affected and may see more events like last year’s flooding in Canterbury and Westport, as well as extended cyclone seasons in the Pacific.

“We will find that more and more areas are going to be affected by climate change, which will likely mean we will be asked to provide additional support domestically and to the wider Pacific and our new aircraft will be more than capable of providing that support.”



QUANTITY:
LOAD WEIGHT:
CONTENTS:

POSITION:
DEPARTED:
ARRIVAL:

SPEED:
ALTITUDE:
CREW:

The Safety and Surface trade could undergo a major evolution in 20 years, working with high tech materials to suit a totally modern Air Force, says Safety and Surface technician Corporal Germaine Porea-Colvin.

A MATERIAL CHANGE

The technicians have one of the most diverse roles in the Air Force, looking after the maintenance and repacking of personnel and cargo aerial delivery equipment, the manufacture and repair of aircraft furnishings and fabric items such as survival packs and aircraft seats, full strip and application of specialist aeronautical paint finishes to aircraft, and the maintenance of aeronautical life support equipment.

As some of the Air Force's fleet of aircraft are replaced over the coming years, the type of equipment and materials the technicians work with will also be upgraded.

"I currently work in the Personnel Aerial Delivery Equipment Bay and we might need to change some of our current parachute systems after the C-130J Hercules replaces the C-130H models, due to the aircraft system only recognising military parachutes," Corporal (CPL) Germaine Pura-Colvin said.

Climate change will probably mean more cargo drops by the Hercules in a humanitarian aid and disaster relief capacity. Areas damaged by natural disasters here and in the Pacific may not have usable landing strips meaning the use of GPS guided cargo aerial delivery systems such as the Joint Precision Airdrop System would allow first aid, food and water to get to those in need quicker and with greater success, CPL Pura-Colvin said.

Practical changes in the way the trade acquires equipment might also undergo a revolution, she said.

"Changes in the aeronautical surface finishing bays is highly likely. Products used in the paint shops will hopefully be more environmentally friendly, while making the strip and repaint process of an aircraft and aircraft components quicker, more economical and with less waste.

"Specialist paint finishes will hopefully become more durable meaning less touch-ups and repairs required during the aircraft's life."

In the Aeronautical Fabric Work Bays there could be more use for 3D printing for prototyping parachute packing equipment, life raft maintenance tools or even creating small air brushing stations for our paint shops, she said.

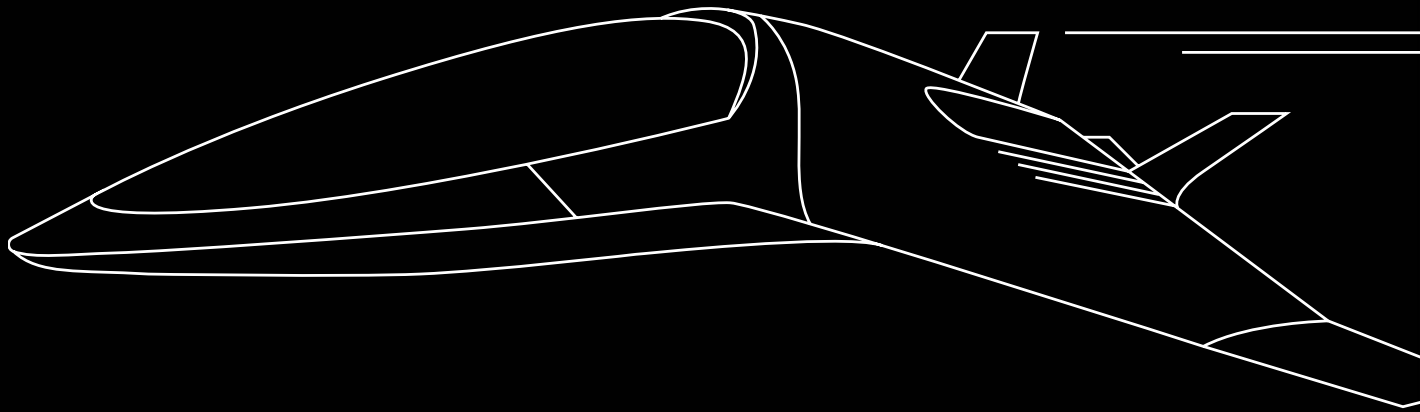
"Prototyping these items could allow the trade to see if they are fit for purpose before spending money on something not quite right."

Aeronautical Life Support Equipment will likely continue to evolve. Recently the trade has introduced new immersion suits that "purge" all the air out with integrated Pressure Release Valves compared to the old suits where the user had to push the air out themselves, she said.

"The equipment that will be developed over the next 20 years will continue to have efficiency improvements. It could also end up being fitted and moulded to each aircrew member.

"I'm excited about what new things will come for the trade. What I'm working on now, I'm not expecting to be around in 20 years. So being able to see the change will be really cool."





UNMANNED SKIES

The unrelenting effects of climate change over the next 20 years will almost certainly increase the number and intensity of severe weather events such as tropical cyclones. This will undoubtedly result in a surge in Humanitarian Aid and Disaster Relief missions for No. 5 Squadron, Air Warfare Specialist Corporal Tyler Manville says.

Warmer waters as a result of climate change may also force some fish species to migrate and for fishing vessels to follow suit, resulting in an extension to our area of marine surveillance operations, he said.

However, the environmental changes would not necessarily mean extra aircraft would be needed for missions, as unmanned technology is rapidly gaining momentum, Corporal (CPL) Manville said.

“With RPAS (remotely piloted aircraft system) technology on the rise, there is plenty of potential for them to pick up some of the capability to conduct fishery patrols, search and rescues and multi-agency operations capability.

“So I would expect my job to be supplemented by RPAS and have the ability to work in conjunction with these drones.”

CPL Manville is also anticipating more civilian roles equivalent to a sensor operator, outside the Air Force.

“This co-operation with RPAS could also be extended to working alongside satellite-based systems as part of the Maritime Satellite Surveillance Capability upgrade in the Information domain as part of the Future 35 plan.”

An increased Air Force presence will likely be required for all resource protection but specifically for fishery patrols if overfishing continues to be a growing concern, CPL Manville said.

“By this I mean maintaining a presence and acting as a deterrent for fishing vessels to help ensure they are following fishing regulations. Again, this presence would be in conjunction with RPAS operations.”

Operations around the Antarctic region are likely to rise as the resources in the Southern Ocean will be increasingly sought after. This could transpire to increased operations to the Southern Ocean with the possibility of extended operations based out of Antarctica, he said.

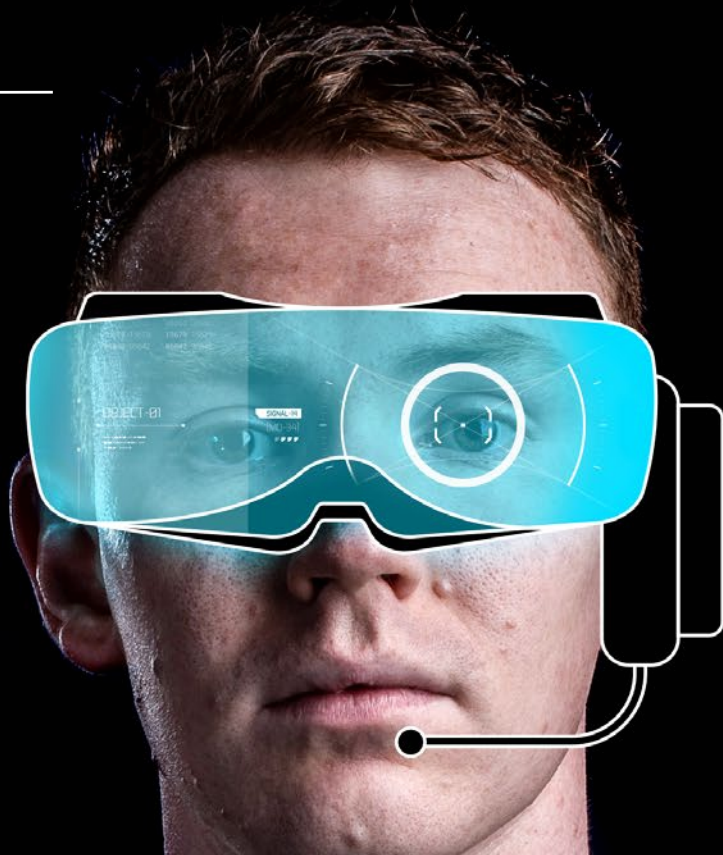
“I would also expect a greater interest in operations in our own region.”

Casting his thoughts to future warfare, CPL Manville believes cyber warfare and other forms of electronic warfare will likely dominate the world.

“As an air warfare specialist we can continue contributing to the electronic warfare realm and analyse information in areas of interest.”

The Air Force's future aircraft, the P-8A Poseidon, will be in full use in 2042, with training probably occurring mostly in a simulator, leaving the aircraft itself reserved for taskings and operations, he said.

"With a brand new simulator being installed in the Ohakea fit out it will provide the ability for more complex scenarios to be created and thus sharpening our skills for when they are required in real-time."





WEIGHT
92.3KG

CONTENTS
WATER
CLOTHING SUPPLIES

DIGITAL DOCUMENTATION

Leaving the paper trail in the past and switching to an online communications system with aircrew will be how Air Movements personnel will work in 20 years, Leading Aircraftman Sarah Matheson says.

“We still do everything paper-based at the moment for flights as well as digitally for our records. By the time a flight departs, the flight file given to the loadmaster is a huge file of paper depending on how many stops they have to their destination.

“I’m sure in 20 years’ time we will have moved well away from paper. Eventually the loadmasters, pilots and us will use iPads that will allow ease of information sharing. They already use iPads for their publications, but the technology isn’t there yet for us to give freight and passenger manifest details to them digitally,” she said.

Using technology will also be how the Air Movements team share information with the pilots about any dangerous goods on board.

“They need to know the location and type of dangerous goods on board in case of emergency and in the event they need to jettison it out of the aircraft. Everyone will be connected – it’s just a matter of funding, innovation and catching up in some aspects.”

The technology and security of online communications will have advanced sufficiently by 2042 that the information can also be shared with foreign nations, Leading Aircraftman (LAC) Matheson said.

“That’s good for safety as well, because if the aircraft had any in-flight issues, information would be on ours and our allies’ systems rather than relying on paper-based information.”

The C-130J Hercules will be flying further and more frequently than the C-130H aircraft used at the moment, which will require more work by the Air Movements team, she said.

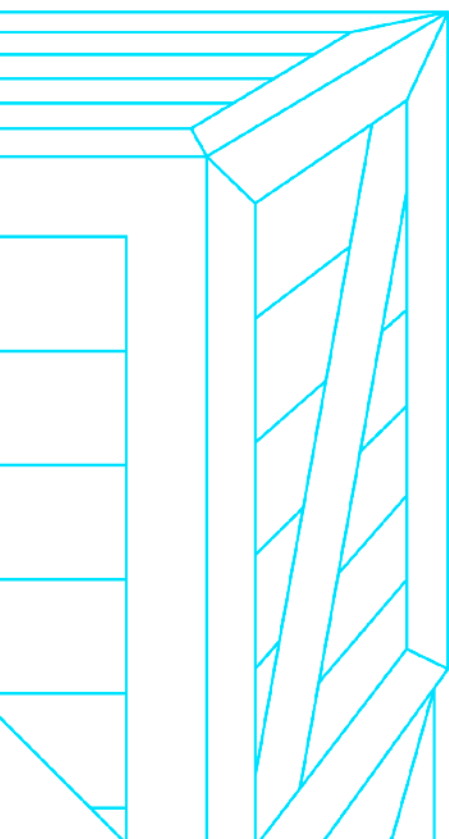
The extra pallet station in the J model means the aircraft can carry more freight, which will become useful in the future as global warming leads to rising sea levels that may result in more natural disasters in the Pacific.

“In the HADR (Humanitarian Aid and Disaster Relief) season, we build hundreds of pallets with aid supplies. In the next 10–20 years extreme disasters for Pacific islands will occur more often, leading to more HADR flights by the C-130J.”

Another aspect of LAC Matheson’s role to evolve in the wake of the Covid-19 pandemic is passengers may need to show proof of immunisation against contagious viruses before boarding an international flight.

“Passengers may have to carry proof of vaccination, electronically loaded onto their passports for when they are checked in for overseas flights.

“The future is going to look very different,” she said.



CYBER DEFENCE

Computer technology will have advanced to such a high level in 20 years, it's almost impossible for us to imagine what it will look like. But it will be exhilarating to keep up with, Leading Aircraftman Johanna Quinn says.

"Look at where we were 20 years ago – could we have anticipated technologies like cloud computing or even fibre Internet? It was unheard of, we were all still on dial-up and barely had cellphones."

The Communications and Information Systems (CIS) mechanic says Moore's Law observes that the pace of technological development is exponential.

"The speed of computation can be expected to roughly double every two years."

Computing as we know it will become obsolete as quantum computing comes into play, which could revolutionise the transistor-based classical computers we have at the moment, Leading Aircraftman (LAC) Quinn said.

Quantum computing throws the whole concept of binary computing out of the window by using properties of quantum states called superposition and entanglement.

"A classical bit represents either 1 or 0, but a quantum bit in superposition can represent 1 and 0 at the same time. On a slightly larger scale, a classical byte (8 bits) can store a single number between 0 and 256. A quantum byte will store all 256 numbers at once – so the implications for processing capacity are absolutely enormous," she said.

"It's concerning from a cyber security perspective because it means that the encryption methods we use at the moment, which take years of brute force with classical computing, could be broken within seconds because quantum bits try every combination of 1 and 0 at the same time."

It's not all bad news, however. Like most emerging technologies, quantum computing represents an opportunity as well as a threat.

"The quantum property of entanglement means that quantum entangled particles can exchange information instantaneously, regardless of the physical distance between them."

When the value of information depends on timeliness, the value for communicators is self-evident, LAC Quinn said.

"In cybersecurity it's a constant battle to stay one step ahead of adversaries. Once you get this disruptive technology coming into play, it's the space race or the nuclear race all over again – it's about who gets there first and who can put this technology into play. There is potentially a massive first-mover advantage."

Future CIS technicians will no doubt have to have knowledge of cybersecurity to stay competitive in that space and to remain interoperable with our allies, LAC Quinn said.

The nature of cyber means it will be difficult to attribute attacks and could come from individuals rather than countries.

"On the dark web cyber attack tools are available to everybody. You don't need to be a technical expert to launch a cyber attack. And you only need one weak point into a network – it's like the invincible door fallacy, where if you can't get through the door you just smash through the wall beside it."

However, at the same time, the technology was very exciting, she said.

"We've got all these new technologies coming in, like a greater reliance on artificial intelligence, and there is huge potential for us to become a cyber-enabled force, which is really exciting."





FUTURE GAINS

Advances in technology are a double-edged sword for a future Defence Force. More computer-based occupations could equate to more sedentary lifestyles leading to a decrease in physical activity and greater exposure to physiological stresses.

However, Physical Training Instructors (PTIs) aim to have access to improved technology providing on the spot data to specifically target training demands, says PTI Corporal (CPL) Ollie Baker.

“We would be able to monitor and analyse more data to aid in the performance of tactical soldiers and athletes with immediate feedback,” he said.

“Currently we can instantly access hydration levels, blood sugar levels and heart rates. Advancements in this area, such as the data displaying live tracking, could enable us to increase or decrease individual performances at specific stages throughout their training to meet service expectations. Fatigue management is already being researched by the NZDF Health Sciences team with findings already being implemented into training environments. Supporting their research and applying their findings is leading us into the future.

“Elite sports teams have facilities that allow them to optimise training conditions including temperature, weather status and altitude. Something similar would see us able to train our airmen, soldiers and sailors accordingly and specific to the deployable environment enabling them to carry out future missions effectively with minimal effects on the body.”

Aircraft travelling further on long haul flights and potential forays into space means a focus on maintaining the health of pilots, aircrew and possibly astronauts, CPL Baker said.

“Making sure they have the physical capability to withstand long duration flights and giving them tools to stimulate the body is something I believe we could play a big part in.

“Training pilots to conduct tactical flying in potentially new and advanced air/space craft with a minimal toll on their body, particularly their neck and back, is something being researched now so we can apply it within the no-so-distant future.”

The Air Force is aiming to have greater female representation across all ranks by 2025, so by 2042 our approach to education and technology will need to change to appropriately cater to the specific needs of female physiology. Such knowledge acquisition is already in place with PTIs being trained in pre-natal and post-partum awareness and exercise implementation, along with specific training for women athletes.

“Providing safe training spaces and adequate resources for our wāhine and their babies may need to be considered,” he said.

“Whether it be a more sedentary lifestyle pre or post-induction training or increased demands on the body, injuries occur and rehabilitation is imperative to being operationally deployable. Hopefully we can establish a more advanced way of being able to rehabilitate our personnel with trained staff and resourced facilities to meet NZDF expectations.”

The LGBTQI+ community is well supported by the Defence Force with ever-increasing personnel identifying in different ways.

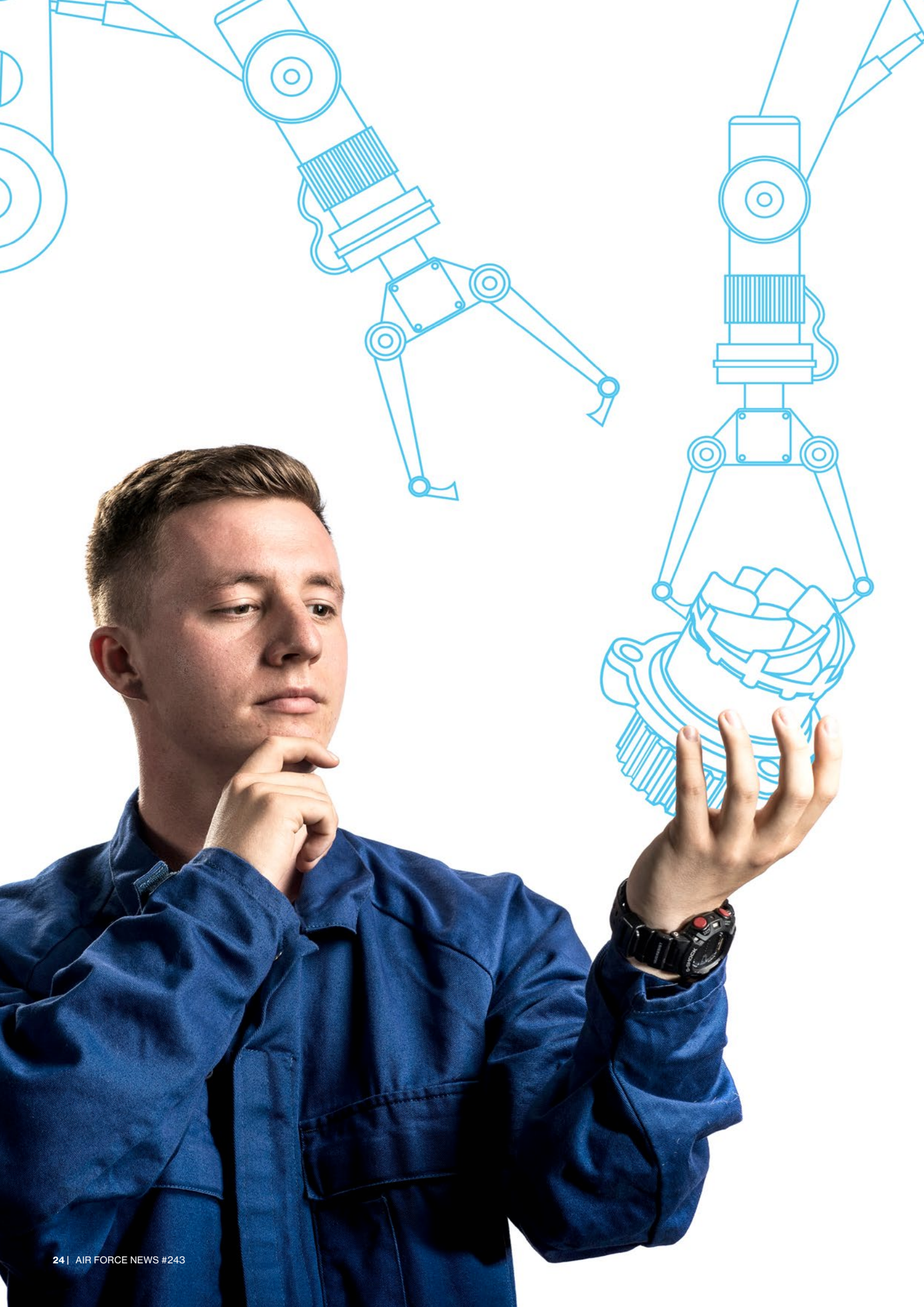
“If we intend to modify our training to meet these changes then it’s only appropriate that gender-neutral fitness testing may need to be considered with equitable standards in the future,” CPL Baker said.


“We could have a wider range of training styles in the future. I believe there will always be a place for the hard discipline style PT for new Recruits and Officer Cadets, but with such an increasingly diverse population in the Defence Force, we will need to cater to the wide range of cultures of the people we serve. What I hope doesn’t change within the trade is our standards and discipline that give us our culture.”



RNZAF
PHYSICAL TRAINING
INSTRUCTOR

REPS	FORM
08	87%
BPM	TIME
79	1:45





A ROBOTIC WORKFORCE

Robots on the assembly line, fixing aircraft components in order to eliminate the possibility of human error, is a future that Aircraftman Liam Robson can visualise.

The No. 5 Squadron mechanic reckons there will be a major shift in the way his trade works and what it will be working on in 20 years' time.

"There's obviously going to be the P-8As and the C-130Js. The Seasprite helicopter replacement will definitely be introduced by then and hopefully a Boeing 757 replacement," Aircraftman (AC) Robson said.

The aging fleet of P-3K2 Orions and C-130J Hercules require "traditional" methods of diagnostic testing and fault-finding, he said.

"At the moment, if there is a wiring fault, we get the multimeters out, we disconnect wires and perform tests. In newer systems there will certainly be the computer technology available to immediately tell us the fault in question."

There are some fundamental aspects of the role that won't change for mechanics in the future, AC Robson said.

"So that includes the fundamentals of aeronautical engineering. Things like electrical systems, aerodynamics and the auto pilot system won't change. I can see the fault-finding and the general work will be completely different because it will be computerised, it will be digital and automated.

"We might even have robots come in and do certain tasks in the workplace such as disassembling and reassembling components and our role would evolve to supervise that function."

However, robots wouldn't take over completely, as people would still be needed to programme them, he said.

"That's what I think a future role coming out of a work place like this could look like for someone in a similar position to me right now.

"In terms of aircraft maintenance it's all about reducing the risk of components failing in flight. If you remove the human element, you're reducing the chance of human mistakes being made.

"I'm really excited to see what's coming. Looking back to see the changes in the Air Force over the past 20 years, it's almost impossible to imagine how many things will change in the next 20 years," AC Robson said.

The introduction of these new aircraft that come from overseas manufacturers could also mean experts from overseas coming to join the Air Force to work on them.

"That could bring a wide range of diversity in the workplace. It's something that I'm looking forward to seeing – it's going to be a lot cooler and more exciting from here on."





HIGHER FURTHER FASTER

Boeing 757 co-pilot Flight Lieutenant Flynn Cribb says not only will the aircraft fleet have been replaced by a more modern and energy efficient model in 20 years, but his role in flying it might not exist.

“I think it will be inevitable by then the Boeings will have been replaced. I think maybe after a decade from now.

“The aircraft we’re flying now is fairly outdated compared with what everyone else is using today – we’re well behind in terms of flight deck equipment and avionics. So that will be a massive change for whenever it does come.”

The technology in new aircraft will be on par with the P-8A Poseidons and C-130J Hercules, which will be joining the Air Force whānau in the next few years, Flight Lieutenant (FLTLT) Cribb said.

There has been chatter in the industry about different crewing scenarios with future aircraft that has more intuitive equipment installed. Self-driving car technology could move into the aircraft space, he said.

“I think we are safe in the front two seats for the moment, but that might not last forever. There could be single-crew airlines and getting automation involved to a level where it’s safe to have the single person flying the aircraft. There would be others on board, but maybe nobody sitting in the co-pilot seat keeping an eye on everything.”

Recent upgrades have seen more connectivity with air control on the ground, so aircrews can get much more data than they used to be able to get with the extra level of automation, FLTLT Cribb said.

Better equipment might result in a range of routes further than normal that aircrew could fly to.

“With the B757 you can draw a circle from home base with one day, two days’ and three days’ voyage for how far we can get. That could significantly change with an aircraft with a different range.

“If that ring gets bigger for what we can do in a single return trip, then routes could expand deeper into South East Asia and potentially into the Americas more easily.”

Whatever aircraft replaces the B757, it will undoubtedly be more fuel-efficient and better for the environment, FLTLT Cribb said.

“Every iteration or generation of new Boeing gets more efficient and will continue to do so. For any given task our carbon footprint will be reduced. But ultimately there will still be a cost for every task and it can’t be minimised to zero.

“We’ll have to look at offsetting it in other ways because at the end of the day, the core role will probably never change – we’ll always need to get from point A to point B.”



FORWARD THINKERS

Student-led learning from iPads rather than classes with teachers standing up the front could be the way future recruits learn about the Air Force in 2042, says Corporal (CPL) Geneva Hoggard, who works in the Command Recruit Training Squadron.

The challenging three-month course will almost certainly be maintained, but it will look quite different, she said.

“I see the main changes being online training modules conducted by the potential airmen prior to them being accepted into the Air Force. In the technical space will be the requirement for all recruits to be proficient in utilising multiple online systems with an emphasis on security and information.

“Instead of an instructor standing in front of a class giving lessons, students would come up with the content themselves with the correct manuals. We would be there to facilitate and assist and pull out the key learning points and objectives to make sure they are met and understood.”

However, the traditions of the Air Force will still be a core element of the recruit course with drill, discipline and lead self being a high priority, CPL Hoggard said.

With the population becoming increasingly diverse, there will be an increasing requirement for an airman to be able to engage with members of the public in multiple ways.

“This could be from having basic knowledge of other languages to understanding customs and cultural norms of the multiple communities that New Zealand has.

“With a greater diverse New Zealand population that will naturally lead to more diversity seen within the Air Force ranks.”

Over time, rules around Air Force dress and uniform might relax. Recently regulations around growing beards have changed and other restrictions might change too, CPL Hoggard said.

“I see the Air Force moving towards the Royal New Zealand Navy approach in regards to gender-neutral grooming standards and also allowing long hair. Maybe in the future, males could be able to have piercings too.”

EYES IN THE SKIES





The future battle space will move from the front lines in the field to behind high tech computer screens and the Intelligence trade will need to keep up with the changing landscape, intelligence specialist Leading Aircraftman Jack* says.

“The future of the conventional battle space will see intelligence being relied upon even more heavily by commanders at all levels. Not just for offensive manoeuvres, but for defensive posturing as well.”

Between unmanned aerial vehicles, full motion video, cyber, and space, the concept of non-kinetic warfare and non-tangible effects will be dominating the battlefield, he said.

“Why would adversaries spend money on drone strikes, when they could cripple the internet and hold state governments to ransom? Why would they spend money trying to hide their assets when they could potentially jam allied satellites and limit the coverage of imagery to the allied nations?”

The future threats could mean the evolution of a separate specialisation, outside of the electronic warfare, geospatial imagery analyst and intelligence trades, which could be created to help support, forewarn, and protect New Zealand and its allies, the specialist said.

“If we continue to grow as a trade, both in knowledge and in personnel, the possibilities are pretty near endless for where we could end up.”

One of the biggest challenges looking to test the intelligence community is the over-saturation of misinformation as modern technology enables everyone to be a source of information.

“Intelligence is merely processed information, but when 90% of the information you’re getting isn’t worth the paper it’s written on, how can you accurately turn it into intelligence?”

As satellite technology improves in the future, it will have a direct impact on the geospatial analysis used by the intelligence teams, he said.

“Imagery is our bread and butter and it’s pretty much guaranteed to advance with more detailed imagery. That means our analysis will be a lot more in-depth as we get that higher capability.”

“Up-to-date information will make a real difference during humanitarian aid and disaster relief missions because if we can get satellite imagery immediately before and after a cyclone, for example, we can see instantly where the damage has happened and we wouldn’t need to wait for the maritime surveillance aircraft to return from a surveillance flight with the footage.”

Twenty years ago air intelligence didn’t exist as a trade in the Air Force, he said.

“To think how far we’ve come from just being No. 5 Squadron mission support to where we are today, it’s a massive leap we’ve already taken. Ten years ago, No. 3 Squadron and No. 40 Squadron didn’t have any intelligence support and now we’ve got dedicated teams embedded as well as No. 230 Squadron being the ‘hub’ for Air Force Mission Support.

“In less than 10 years, we have defined our own scope for the trade, deployed as specialists and created squadron-specific intelligence teams to deliver specific and key support to commanders across the Air Force,” the analyst said.

“We have amazing, smart people in our trade. We have come so far in the past ten years and I believe the people we have in place now will help with equally big advances in the next decade.”

*not fully identified for security reasons



HIGH TECH HEALING

The human body probably won't change so much in 20 years, but new types of weapons to cause it damage will, medic Corporal Nate Farrow says.

And that means medical techniques and equipment will also have to evolve.

It's impossible to know what future conflicts may arise and whether New Zealand will be involved. They may take the form of country versus country or extremist groups rising up.

Where nations are taking an interest in chemical and biological weapons, that is something that needs to be kept an eye on, Corporal (CPL) Farrow said.

"There are also weapons that could be developed like pressure-wave and sonic weapons. So I'm not sure how that will affect our medicine in the future, but it's something that we will need to consider," he said.

"I envision there will be a greater degree of specialisation alongside an increased connectivity with technology.

"So things like improved tele-medicine, which is the ability for a doctor to video call into a scene to see what's going on, but still have the medic be their hands, so to speak," he said.

"Technologies like augmented reality will come into play a lot – so the ability to lay a digital interface over what you're seeing so you could see exactly where blood vessels are expected to be running and be able to monitor patient vitals in real time."

There are some interesting developments around artificial intelligence (AI) diagnostics as well. There could come a time when a medic could look at a patient through a camera and be able to diagnose a problem based off changes of colours that AI sees through the lens, he said.

"As far as stitching goes – in the past super glue was used as a bonding agent and there has been some progress in developing new instant binders like that, so I think as far as in an emergency care situation, we'll see a lot more of future superglues."

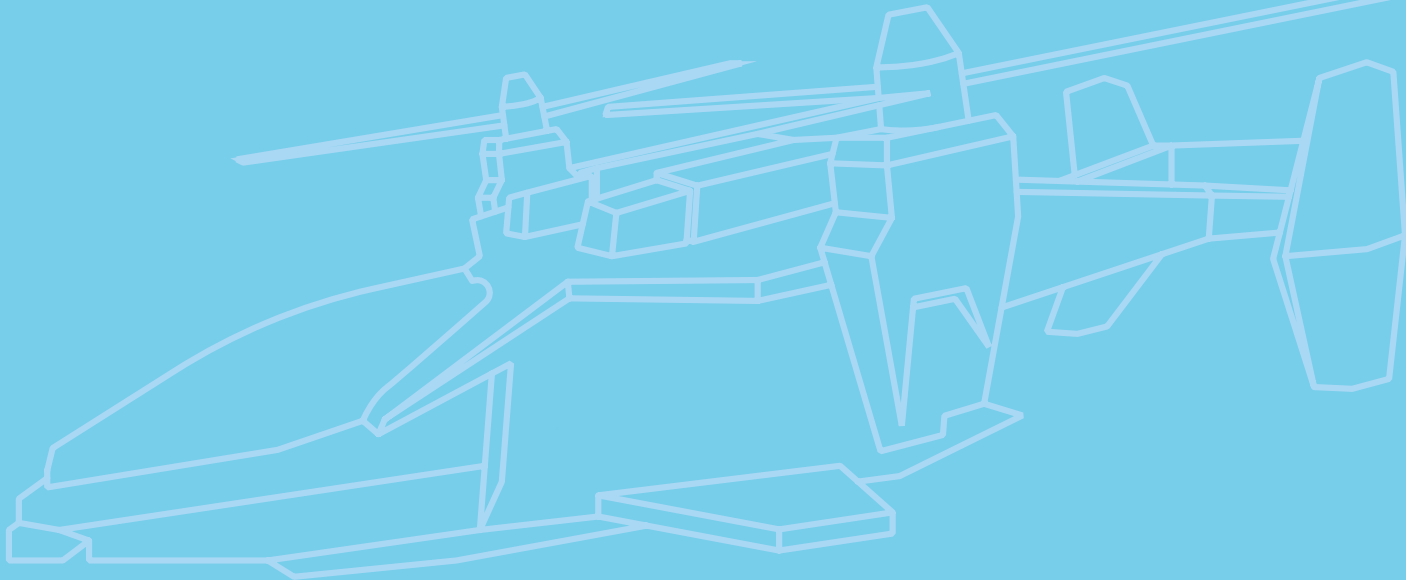
Regardless of the improvements in treatments to combat evolving weaponry, the people who choose a career in military medicine will need the same character traits as those working today, CPL Farrow said.

"I think the base skills of young medics in the future aren't going to change too much. They'll still need a strong drive, a willingness to learn and a keen mind for problem solving and adapting."



A self-camouflaging, self-diagnosing helicopter, designed to identify airborne threats, could be the Air Force helicopter of the future, aircraft technician Corporal Phill Hill said.

The current Air Force medium utility helicopter, the NH90, will have a lifespan that will come to an end in about 20 years, so the Government will be eyeing what type of model will be the fleet's replacement.



SIGHT UNSEEN

The upgrade in technology could result in a transformation of some aspects of an air technician's role – while still needing to be hands-on with a “keen eye for detail”, much of the job could be done in front of a computer screen, he said.

“Fewer components will likely need to be serviced by us, they will be more like serviced units in boxes, removed from the aircraft and a serviceable one put back in.

“A lot of the traditional aircraft fault-finding is looking into cracks or dents or leaking hydraulic hoses. In years ahead, we will probably be more reliant on computers and learning how to use the on-board diagnostics that the aircraft has, which will spit out codes that will describe a fault.”

The system will be a more reliable method of finding problems because it will cut out human error, Corporal (CPL) Hill said.

However, advances in computer technology mean advances in hackers' abilities to crack the systems, so all future technology would need to be robust against those types of attacks, he said.

The material covering the helicopters could also evolve to suit combat environments.

“Paint is developing pretty quickly. It will probably also be harder-wearing. Maybe it will be developed with electrical charges that change the colours to match the background the helicopter is flying in – like desert or over water.”

The future is often depicted with flying cars and while it's unknown if they will be part of the skyscape there are bound to be far more drone-style unmanned aerial systems flying in air space traditionally inhabited by helicopters, CPL Hill said.

“There will probably be a lot more drones in the sky and helicopters will have to ensure they have sensors to pick up the extra traffic and how to differentiate between a friendly craft and the enemy.”

Noting that future conflicts could utilise attack drones, the aircraft's defence systems would need to represent the changing face of conflicts, CPL Hill said.

