

**POLICE
LIFE**

THE SINGAPORE POLICE FORCE MAGAZINE
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SITTING WITHOUT DRIVER

Time to Tech Up!

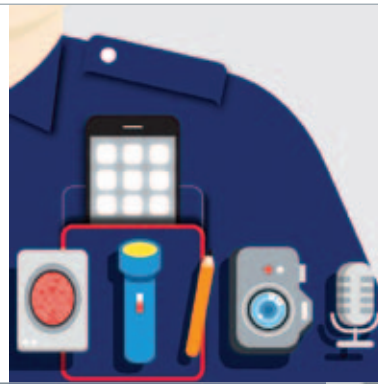
Personal Manufacturing Made Easy



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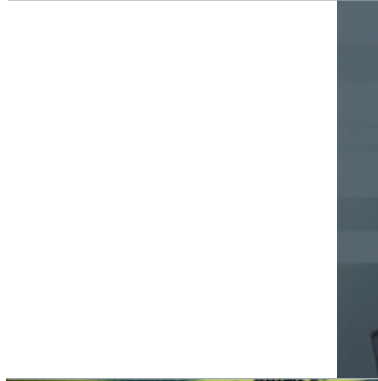
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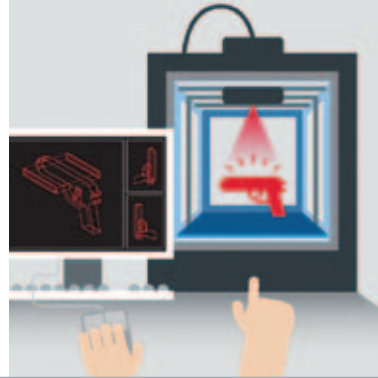
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FOREWORD



SC/Cpl Muhammad Alif Bin Sapuan
Journalist
Police Life

Each time I watch Hollywood Science-Fiction films with my friends, we tend to go “Wow! *That’s cool*”, especially when there are scenes depicting the use of sophisticated technologies. Often, we discuss and imagine how different society would be if these technologies could be used in real life.

The stories we present in this issue are not a prediction of the future, but an exploration of the possibilities of developing technologies.

We imagine the future with technologies such as wearable gadgets, nanotechnology and 3D printing, and their potential ability to aid law enforcement in Singapore. This issue is all about the “What If” when we let our imagination run wild.

COMMITTEE

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Senior Editor
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Ms Chew Si Lei Jinnie
SC/Cpl Muhammad Alif Bin Sapuan
SC Mok Wen Jie

Photographers
SSgt Chee Yong Tat
SC Mok Wen Jie

Design and Production
Redbean De Pte Ltd

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SITTING WITHOUT DRIVER

By SC/Cpl Muhammad Alif Bin Sapuan

Imagine it is the year 2024. The Police and the public no longer have to drive as technologies have advanced far enough for fully autonomous cars. How would you imagine a “driverless” car cruising on our roads?

More Focus on Crime Fighting

Have you ever imagined how efficient officers would be when responding to a case in an autonomous car? Typically, when officers receive a message to respond to a case, they will immediately drive straight to the scene of the incident. At the same time, these officers are multi-tasking – while driving, they have to remain vigilant and observe their surroundings to keep a lookout for suspects who might be running away. They may need to communicate on the radio set to relay and receive information about the case they are rushing to.

With an autonomous car, the work of these officers would change dramatically. Instead of multi-tasking, officers can focus on sensemaking and preparing for the incident, rather than having to pay attention to manoeuvring and parking their vehicles at the same time.

Reduce in Traffic Collisions

Every year, the Traffic Police enforces and reiterates the importance of safe driving on our roads. With driverless cars, the number of serious traffic collisions could be reduced significantly, resulting in fewer injuries and deaths. These technologically advanced smart

cars would not allow drivers to beat red lights, make dangerous lane changes and other road violations that may cause injury and damage of property. They can also communicate with other vehicles to anticipate the behaviour of other road users, facilitating more efficient and safer transportation.

Fewer Resources in Traffic Enforcement

The invention of smart cars would significantly reduce the number of officers deployed to carry out traffic enforcement. They could then be reassigned to other police duties. These changes could potentially bring about positive impacts for policing, one of which would be doing away with having to identify drivers for offences such as running red lights and other road violations.

The autonomous vehicle has the ability to reduce accidents and offences on our roads and also the way Police officers prevent, deter and detect crimes. Although the smart cars could improve the situation of the roads and free up users and officers, there are many other regulatory considerations that still need to be taken into account, for example, how the law will apportion the degree of guilt and attendant liabilities in a car accident.

PICTURE THIS

An officer sits at the driver's seat and he's recognised by retina scan. Immediately, the seat adjusts itself to the position he desires. Just by keying in or by "telling" the car the location to patrol, it will drive him to his destination.

While the officer is on patrol or on his way to a crime scene, he is able to focus on monitoring the surroundings for any suspicious acts and other related duties that may require attention.

DID YOU KNOW

The Land Transport Authority (LTA) is collaborating with A*STAR to set up the Singapore Autonomous Vehicle Initiative. The testing of the Autonomous Vehicles will take effect from 1 January 2015 on our roads. For a start, One-North was identified to be the first road for the trial.

AT YOUR FINGERTIPS

Autonomous cars are also known as driverless cars or self-driving cars.

These cars are capable of sensing their environment and navigating on their own.

Once you key in a destination, the car will bring you there without you having to man the vehicle. These vehicles are built on existing technologies such as radar, GPS and computer vision.



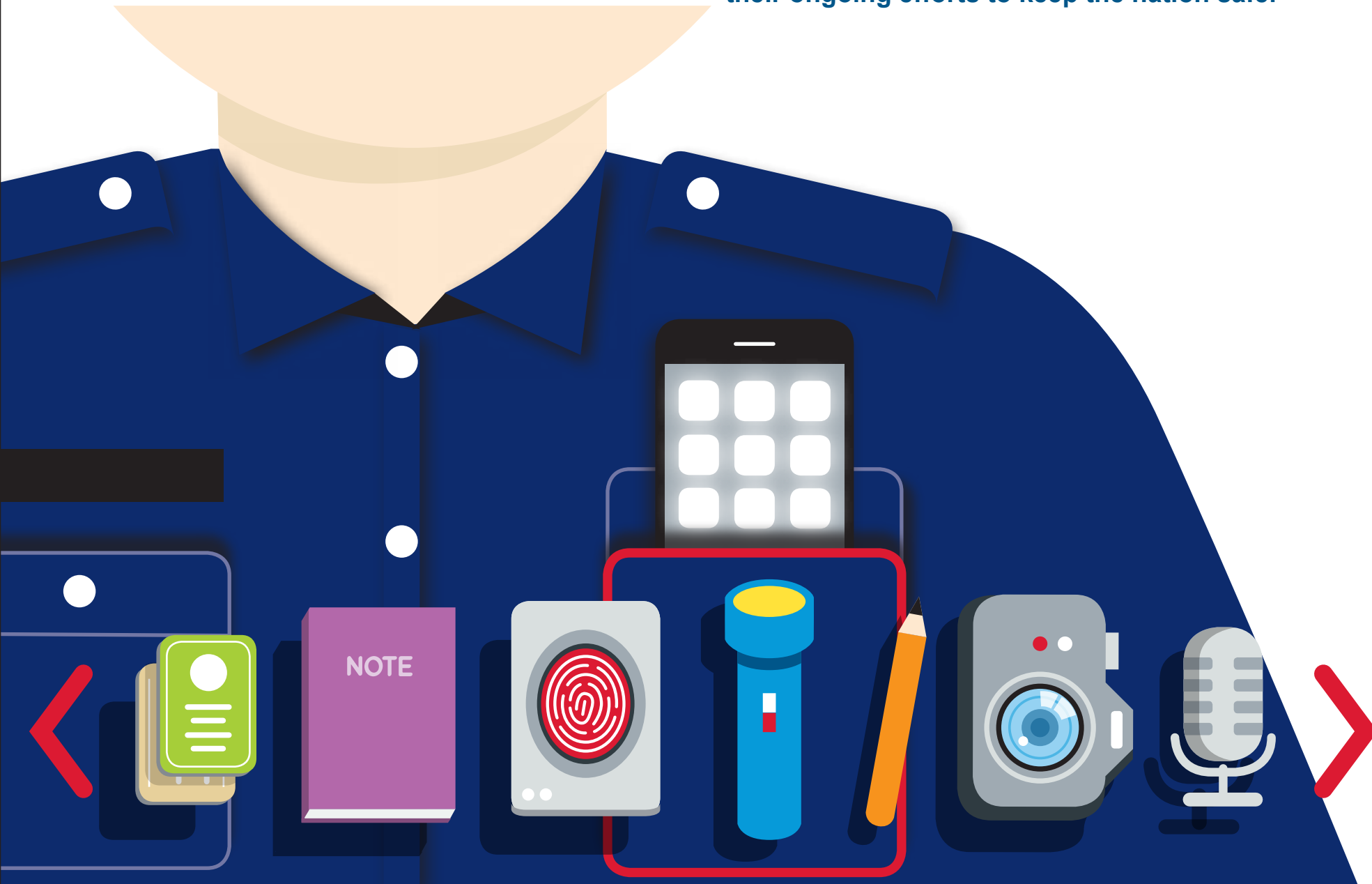
ST Kinetics TERRAV

ST Kinetics had developed this Autonomous Unmanned Ground Vehicle (AUGV) based on Ford Everest Sport Utility Vehicle (SUV) with the goal to achieve autonomous navigation in urban traffic environment with the ability to handle moving vehicles and navigate itself safely in urban traffic environment.

POCKET SIDE-KICK

By SC (NS) Mohamed Feroz Jahan
Public Affairs Department

Smart phones are equipped with so many applications and tools that can aid our officers in their ongoing efforts to keep the nation safe.



Utilities Haven

The smart phones possess a significant number of utilities that exist in material form for our officers, especially those that are crucial for patrolling duties. The torchlight function, available in many phones, is able to emit good quality LED brightness. The Notes function, meanwhile, can replace logbooks for officers and is environmentally-friendly too. Furthermore, with the aid of cloud computing, access to databases in smart phones is seamless. Even passes can be digitally stored in smart phones.

Crime Fighting Companion

The phones can be used as recording devices, in the form of video, audio or still images. As such, they can be used to easily obtain critical information for any criminal activity.

A smart phone can be used to infiltrate for special operations and provide

advance information to officers. Likewise, many more apps are being introduced to aid in policing. One example is the Smart Phone fingerprint scanner used by the South Australian Police Department. A standalone fingerprint capture unit is connected to the smart phone via Bluetooth. The app in the smart phone then captures the fingerprint and cross references with the criminal database, displaying personal, criminal and even behavioural information of the subject. This aids the officers in their investigations, verify identity claims and facilitate searches for missing persons.

Medium of communication

The public needs to be informed of crime incidents, updates on traffic accidents and be provided with crime prevention advice. The smart phones have made all these possible in an integrated manner.

Assistant Director, Police Intelligence Department, Deputy Assistant Commissioner of Police Mr Cheng Khue Boon and 'Find My iPhone' App

The app showed that his phone was in close proximity of the phone, and his son pointed out a man wearing a blue shirt as the person he suspected to have stolen his phone. DAC Cheng got out of his vehicle and started to follow him on foot. The suspect stopped at a bus stop and realised he was being followed. DAC Cheng walked past him while activating a special

feature of the 'Find My iPhone' app that caused a sharp sound to be emitted from his son's phone from inside the suspect's pouch. That confirmed that the suspect was the culprit. DAC Cheng called '999' for more resources to assist him in the scene as he was off-duty. Sounds pretty much like Liam Neeson in the movie, 'Taken', doesn't it?

The Police@SG app also offers interactive content to allow the public to obtain information and have awareness of crime rates and incidents in their neighbourhood district with news feeds, links, videos and useful numbers.

The ever-growing technological platforms such as the dynamic smart phone allow officers to utilise them in crime prevention. This "pocket sidekick" is ever ready for action - just remember to charge the batteries often.

VOICES FROM THE BLUE

DARE TO INNOVATE

By Probationary Inspector Azfer Ali Khan
Public Affairs Department

Station Inspector (SI) Keith Tan loves technology, and works at the forefront of innovation, with devices we previously thought only existed in movies.

A passion that extends into his work

SI Tan fondly recalls when his then Deputy Commander, Deputy Assistant Commissioner of Police Rosalind Khoo at the Clementi Police Division recommended him to join the Skunkworks Special Projects Team (Skunkworks) in January 2012. "She knew I liked technology," he says. "I am thankful for that, because the past year has been quite interesting indeed."

Skunkworks is a small team but important, comprising just three officers, headed by a Senior Officer. Their job is to design and develop next-generation ideas to enhance the technological capabilities of the Singapore Police Force (SPF). The team comprises officers from the Land Divisions because, as the saying goes, only a person from the ground can truly understand what a person on the ground needs.

"My inspiration to innovate comes from observing our officers do their work - sometimes, the users of a particular technology may not notice how certain things can be done in another way," he adds. "So we adopt an objective viewpoint and try to observe how best to make their jobs easier."

When asked to name a project that holds the most meaning for him, he shares the Aegis Shield, an idea for a project that his team fleshed out in just an hour after reviewing footage of the Little India riot in December 2013. He wondered why the SPF should risk an officer holding a bulky video camera to try to communicate on-scene footage back to the command post? As a result, they proposed to build a shield with streaming capabilities that enables the command post to view events as they unfold.

Embracing change

"More often than not, ideas are scrapped. That's how innovation works. The ideas which remain are the ones worth keeping. They are the future," SI Tan explains. "SI Tan is a Project Manager of Skunkworks, and enthusiastically shares about the numerous projects Skunkworks is looking

into, such as 3D printing, driverless cars and wearable technology.

When asked what he loves most about his job and what keeps the team going, SI Tan cheerfully responds, "We look at how to bring new concepts to life, and each successful attempt gives the team immense satisfaction and spurs us to observe and innovate further."

"There will be a lot of changes, because laws regulating these technologies have not yet been introduced. Take, for example, the 3D printer. The cheapest one available on the market today is around \$399. That's just slightly higher than the cost of a normal printer, and we have to be ready when these new devices become common household items."

Real innovation comes from sharing

SI Tan also mentions the importance of sharing information. "We understand that the team can't possibly have all the ideas, and so we are always open to discussing with external vendors, like universities and companies." Moreover, he believes that in this line of work, people should have the guts to try out new ideas because, in his words, "If there is no step forward, how will you ever advance?"

He notes how important it is for them to seek out the opinions of others. For example, the smart watch was an idea brought to the team by ground officers. These officers voiced out their concerns of having to constantly refer to their phones, even while driving, to keep abreast of new information. SI Tan and his team designed the concept of a smart watch, to ensure officers are updated and, at the same time, less distracted from their surroundings.

The Skunkworks team is changing the SPF, one technology at a time. The next batch of officers will come in February 2015, and the team is always looking for officers who want to play a part in being the force behind technological innovation.

“More often than not, ideas are scrapped. That's how innovation works. The ideas which remain are the ones worth keeping. They are the future.”



TIME TO TECH UP!

By SC (NS) Mohamed Feroz Jahan
Public Affairs Department

As technology advances in leaps and bounds, the equipment used by officers of tomorrow will be very different from those used today. We look at a few wearable technologies and innovations that may be standard issue in the future.

GOOGLE GLASS

What it does?

This Google Glass is one of the hottest wearable gadgets today. The integrated Camera is the main feature of the device. The Glass has the capability to send messages, images, videos and news feeds. The structure of the glass easily sits on the face and has a tiny HD screen to show information, capture images, navigate and record videos. It also possesses the ability to have voice and video calls. The Google Glass is compatible with both Android and Apple devices.

How can it benefit Police Officers?

Officers can use this device to capture images, videos and important messages as these might be very crucial evidence in a crime incident. During the screening of a suspect's particulars, the information of the suspect can be transmitted back and forth from the Glass to the officer's Headquarters. The navigation feature could be helpful in reaching the scene of crime in a matter of minutes.

BODYGUARD STUN DEVICE

What it does?

The BodyGuard Stun Device is hands-free as it is gloved onto the arms of the officer. This product was launched in the US and is now used by the Los Angeles Police Department. This product is a non-lethal device in the line of law enforcement. The BodyGuard Stun Device has been a success so far and could be used by many other states in the US and countries around the world soon.

How can it benefit Police Officers?

This gadget is strapped to an officer's arm, unlike the taser device which is placed in a pouch attached to the officers' utility belt. As such, the gadget allows the officers to deploy the electrical charge without delay when needed. This speedy response is definitely crucial especially in violent encounters.



EXOSKELETONS

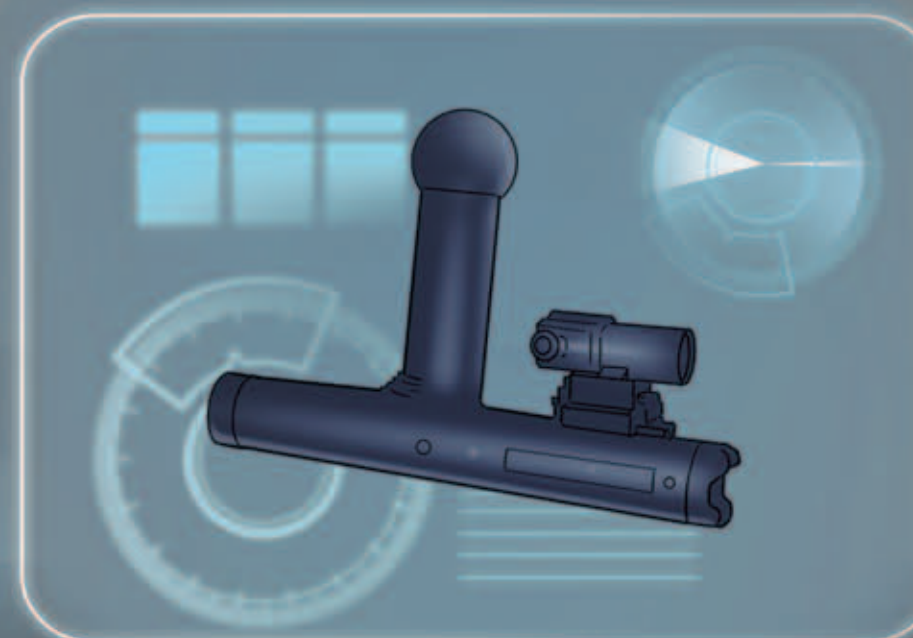
What it does?

The robotic exoskeleton has been in the development since 1990s. In the United States (US), the military and its partners worked towards creating robotic suits.

This exoskeleton could incredibly add to a human's strength, carry superficial loads and dash the battlefield at an unbelievable speed. Today, the US military is looking into creating an Iron Man futuristic-like suit which intensifies the soldiers' mobility and protection.

How can it benefit Police Officers?

Exoskeleton can be advantageous for officers especially in tactical situations. Imagine officers in robotic suits. They would be able to run for approximately 72 hours straight. Besides the ability to run fast and for long, the suit helps muscle strain and it lightens the weight of the officer. This would be highly useful when chasing after or subduing suspects.



MULTI-PURPOSE BATON

What it does?

This item comprises five items that can be used by Police officers. The Multi-Purpose baton consists of the Baton, Optical dazzler, which blinds the offender momentarily, Pepper Spray from the handle of the Baton, Torch and also acts as a stun device.

How can it benefit Police Officers?

Officers can now be more focused in approaching the criminal or subject instead of having to decide on which is the appropriate non-lethal weapon to be used in the situation. It also quite easily relieves the officer from carrying too many items in his utility belt.



SMARTWATCH

What it does?

This watch does more than just displaying the time. It has the ability to capture images, has GPS navigation and even voice call answering and calling functions. There are many varieties in the market that appeal to all consumers ranging from athletes to business executives.

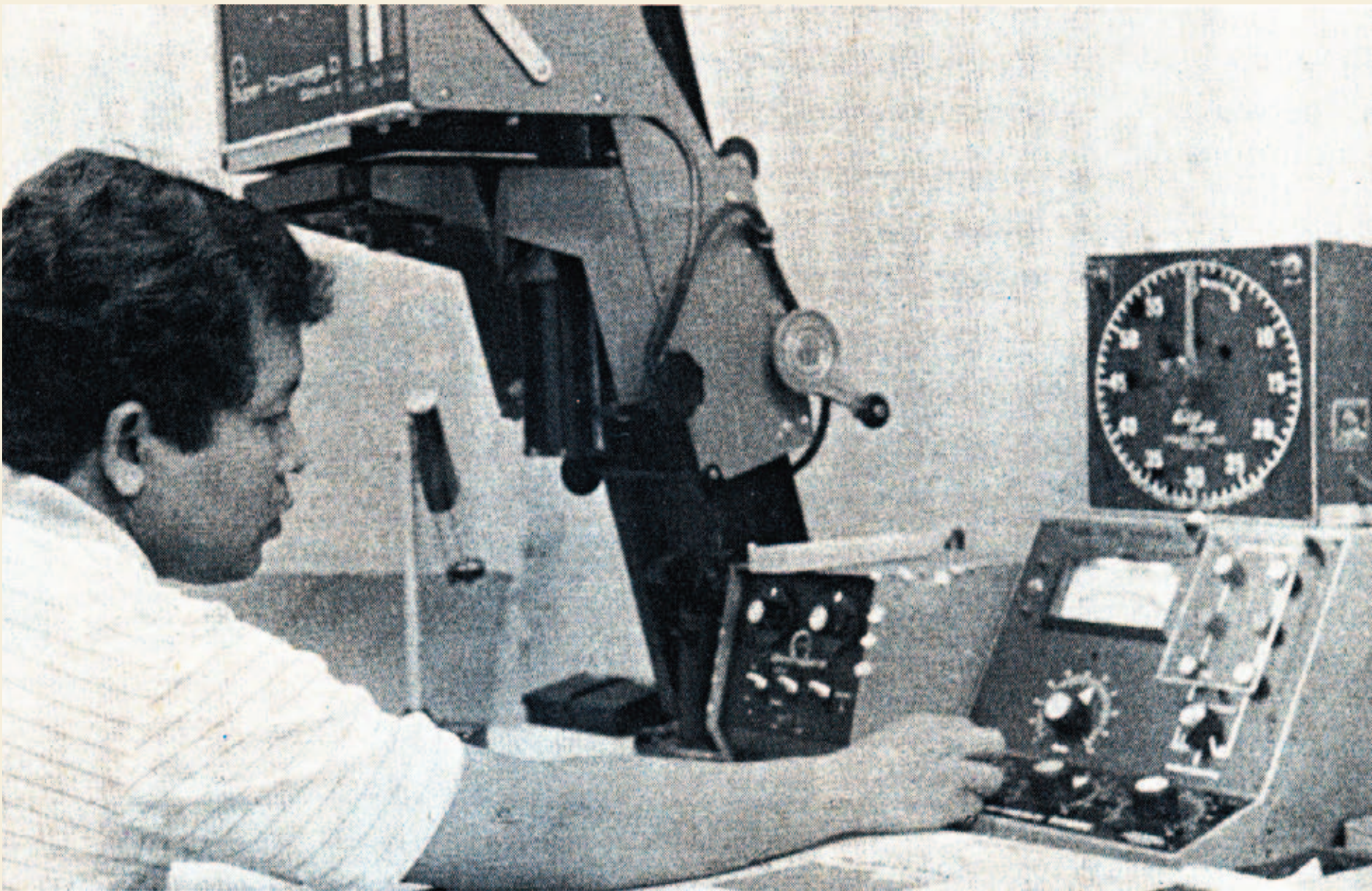
How can it benefit Police Officers?

Similar to Google Glass, it has the ability to capture and store vital information of cases and crimes. Besides facilitating communications, this device can also facilitate 'Blue Force Tracking' such as providing commanders with location information of individual officers on the ground.

HERITAGE

CID COLOUR LABORATORY

Reproduced from *Police Life* 1982



Technologies develop at a rapid rate. What was deemed as cutting edge in those yesteryears often become technology that is commonplace or even integral in our daily lives now. And in a matter of a decade or two, the technology may become obsolete. Let's take a few steps back and look at a "technology" that the Singapore Police Force used in the 70s and 80s to help in investigations.

In a dark room in the Criminal Records Officer Photographic Section, a group of men are busy developing colour photographs. Surprised? Yes, the Police Force has a fully equipped colour laboratory. "There was a dire need to set up a colour laboratory to process colour negatives used, for example for investigations into homicidal cases. We could not send these colour negatives to the studios outside because of the confidentiality of the evidence. Processing colour negatives ourselves also cuts costs and meeting datelines would also pose no problems," says Detective Corporal Makrob who is entrusted with the massive task of running the laboratory. Set up in November 1978 at substantial costs, the laboratory boasts of a variety

of darkroom and production facilities. Today, the laboratory produces colour prints comparable in quality to those produced by commercial firms outside. Working with Detective Corporal Makrob is Detective Low Yong Cheng of the Scene of Crime Unit. Both have undergone a basic course in colour photography at Kodak Singapore Pte Ltd. Overtime and working on weekends are normal to these officers as there is a high demand for colour photographs. Colour prints play a key role in the detection of crime and the identification of criminals. The costs are high (compared to black and white photography) but colour photographs are more effective. In a homicidal investigation for example, a properly

exposed colour photograph gives an accurate picture of the crime scene. Blood for instance, can be distinguished from oil and coffee stains. Injuries appearing on the human body can be easily highlighted. These colour photographs not only "capture" evidence but help in concluding cases in the court of law. Various police departments, including the Crime Prevention Department, Police Academy and Police Headquarters use the laboratory. In addition, other government departments such as the Social Welfare Department and the Singapore Armed Forces also make regular use of the processing, enlarging and printing facilities.

The bulk of workload comes from the Crime Prevention Department and the Scene of Crime Unit. In exhibitions and campaigns organized by the Crime Prevention Department and Traffic Police, colour photographs have been used as an attraction – capturing the mood and imagination of the people, thereby creating indelible impressions. Processing and printing of colour photographs are complex and tedious activities requiring expertise in the handling of chemicals and equipment. Nevertheless, in the words of Detective Corporal Makrob, "it is the most rewarding and enjoyable aspect of photography."

NANOTECHNOLOGY IN POLICING: FICTION OR FACT?

By SC/Cpl Muhammad Alif Bin Sapuan

Nanotechnology is opening up options in the world of policing. For example, fabrics can be modified to withstand knife slashes or thrusts, which are good for protecting police officers in dangerous situations involving knives. Nanotechnology can also provide finer details than the fingerprint powder that is currently used. In countries like the United Kingdom and the United States of America, the use of nanotechnology in policing has received media attention since 2006 when it has been used to convict criminals.

Imagining the Future

Can you imagine seeing our Singapore Police Force (SPF) officers using futuristic technologies to detect crime suspects instantly? What if one day, Singapore will be free from fear of extreme crimes when the Police would be able to immediately detect and arrest suspects who attempt to commit a crime?

SCENARIO

Crime scene investigators are attending to a case of homicide. Searching for evidence at the crime scene, one of them discovers a weapon near the deceased. He uses the DNA nano-test kit to analyse the weapon and the immediate results help in swiftly identifying the suspect.

Solving Complex, Violent Crimes

In Santa Cruz, California in the United States, a 12-year-old girl was found strangled in a park with her hands taped behind her back and masking tape around her neck. Investigators were clueless as to whom the perpetrators were and they hope that technological and scientific advances will be available to uncover leads to solve the mystery.

If technologies such as nanotags were an option for investigators then, it could be used to coat surfaces to capture DNA while infrared nanotechnology could expand the ability to locate suspects and missing people. This was evident when the Federal Bureau of Investigation in the United States started to use nanoscale developer and x-ray sources to emblem fingerprints on a few high profile cases.

SCENARIO

Alert residents notice what seems like an improvised explosive device in a busy town centre. Police officers manage to swiftly defuse the device before it explodes, and they then begin their investigations into the perpetrator

Investigating Explosive Devices

We have watched and read ample cases involving explosive devices in different parts of the world. You may remember for example that a suspected terrorist

SCENARIO



Crime scene investigators are attending to a case of homicide. Searching for evidence at the crime scene, one of them discovers a weapon near the deceased.



He uses the DNA nano-test kit to analyse the weapon.



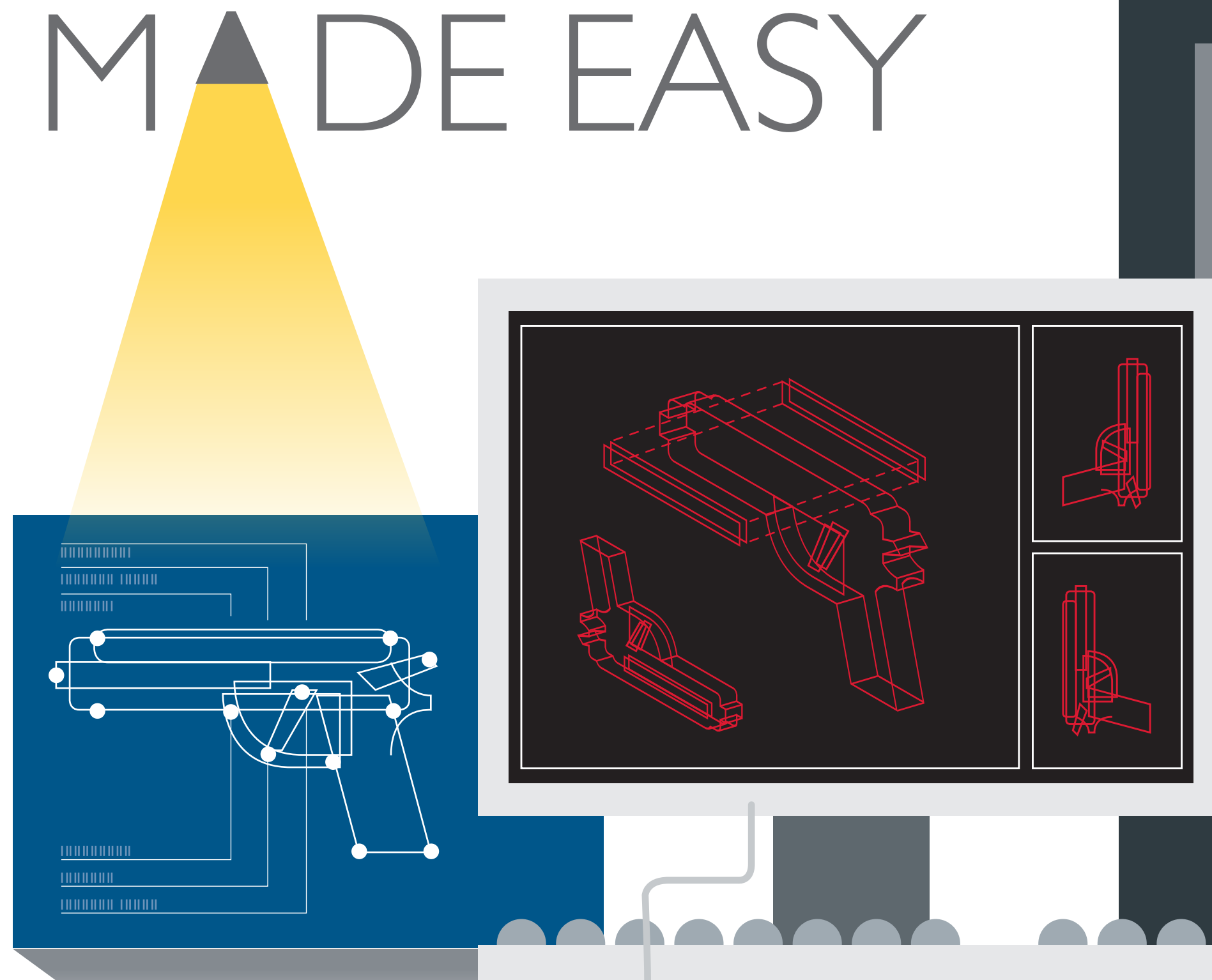
The immediate results help in swiftly identifying the suspect.

abandoned a suspected Vehicle Borne Improvised Explosive Device at New York's Times Square. The identification of suspects in such cases is another area in which nanotechnology can be used. If the arrested suspect had been handling explosives, the contact residues will appear in the fingerprint that was lifted with nanoscale powders.

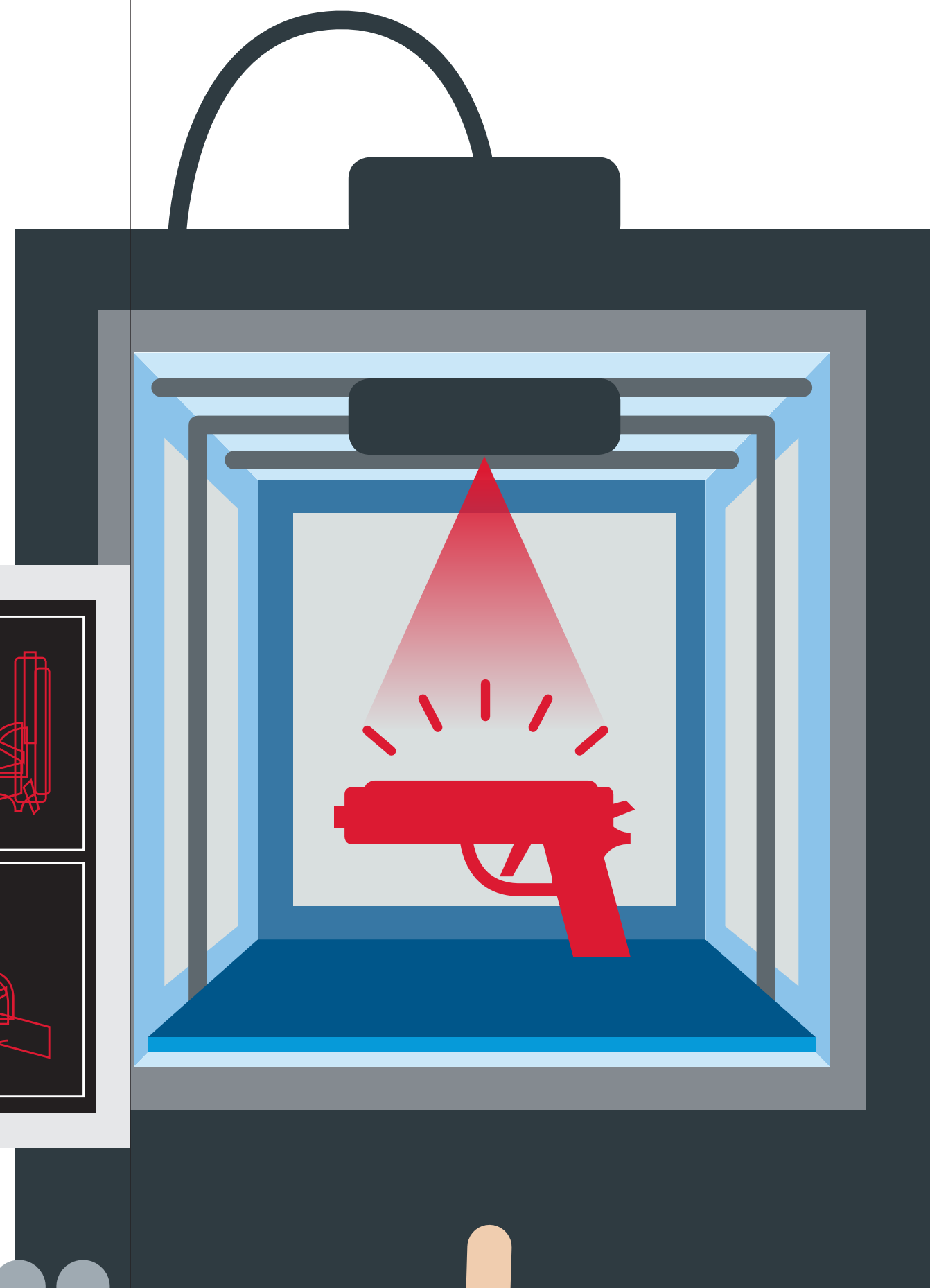
What if the Singapore Police Force were to deploy these technologies? Although these technologies are impressive and may significantly add on to the effectiveness of our officers, there are social and ethical considerations such as civil rights protections. Nevertheless, we think that it is not impossible to imagine the day when SPF has these tools in its arsenal.

PERSONAL MANUFACTURING MADE EASY

By SC Mok Wen Jie



3D printing is the process by which a specialised printer translates the information in a 3D object file (the blueprint of the object), and prints layers of material - be it glass, metal or plastic - to form the object. With its increasing accessibility, 3D printing has not only made commercial manufacturing easier, but has made 'personal' manufacturing a very real possibility today.



Easily Accessible

Once almost exclusively used for industrial and educational purposes, it has become more and more available commercially, with some 3D hobbyist printers costing less than USD\$2,000. The raw material, however, remains pricey, with plastic material starting from USD\$20 per kilogram, and up to USD\$500 per kilogram for industrial level material.

In addition, there are also companies offering such online 3D-printing services. Simply upload the digital model/blueprint, specify the material to print from, and the company will print and deliver the completed item. This expands the easy accessibility of 3D printing services to the typical customer.

A whole world to print

3D printing opens up a whole new world of possibilities with it, as literally anyone who can work with 3D modelling software can basically create anything they want, from furniture, to smart phone accessories, to even jewellery. In 2012, an 83-year-old was implanted with the first ever jaw replacement printed in 3D!

However, just as with any technology, it comes with the danger of being abused by those with criminal intentions. The ability for anyone to print weapons, ranging from simple kitchen knives to firearms, is a very worrying proposition. This was demonstrated last year when the first 3D printed metal gun was successfully test fired by a US weapons company. Weapons aside, criminals can also easily print items such as ATM skimmers, and even duplicate keys to handcuffs.

Manufacturing made too easy?

While bombs, drugs and other complex chemical items still remain difficult to simply print in 3D format, there is still a danger that anyone can manufacture illegal items with criminal intent from their own homes.

Thanks to the relatively high costs and technical know-how still required to design the items, 3D printing remains largely restricted from personal usage. However, as time passes, the technology will become cheaper and easier to use, and the urgency to find solutions to possible problems will increase quickly.

— DID YOU — KNOW

The Singapore Police Force has its very own 3D printer under the Police Technology Department's "Skunkworks" Special Project Team. It is being used to print parts for innovations to be easily and quickly prototyped for testing. It has also been used to identify items that are simple enough to print that could be used by criminals.

WHEN THE DIGITAL WORLD BECOMES REALITY

By SC Mok Wen Jie

What if the walls between reality and science fiction were broken and we could experience unique situations even before we do so in reality?

We are all familiar with movies like 'The Matrix' and 'Star Trek', and games like 'Assassin's Creed'. They all share elements of virtual reality technology, which is being hailed as the next global game changer. While the immersion presented in such media may not seem likely in the immediate future, components of such an experience already exist today, ranging from creative use of digital monitors and screens, 3D glasses, virtual worlds in games and simulators, and even the new Google Glass.

Pre-emptive training through simulation

Virtual simulation has existed since the early 1980s, and is used for a variety of purposes. The ability to allow users to experience situations, particularly dangerous or sensitive ones, has made the technology especially useful for military or safety training purposes.

One example is the use of boat simulators by the Police Coast Guard (PCG). Called the Integrated Tactical Training Centre, it provides for a full integration of PCG's policing and maritime training on a single platform, allowing the crew to train their firearms, navigation, communications and boat-handling skills. This enables decision-making training to be carried out in a controlled environment where errors can be made and corrected without exposing lives and property to danger.

From fun and games to serious business

Facebook helped propel virtual reality technology into the public limelight when it bought Oculus VR, a virtual-reality-headset company, for US\$2 billion in March 2014.

A key product of Oculus VR is its Oculus Rift headset. Basically a pair of digital screens, it acts like a pair of goggles and gives the user an immersive visual experience of the software he or she is running.

Originally developed for video games, it is now undergoing testing for various purposes. One such purpose is to give military personnel carrier drivers the ability to have a full 360 degree view of their surroundings, by connecting the headset to cameras attached outside the vehicle. This would be a vast improvement compared to the narrow view they have via the standard vision slit or camera image.

This concept, combined with current simulator technologies, could potentially improve training for the Singapore Police Force (SPF). It could allow officers to conduct various types of individual or group training, simulating potentially life-threatening situations so that officers' responses can be assessed safely.

Blurring the lines between Reality and the Virtual World

As technology and understanding of the human brain progresses, the lines between the real and virtual world also becomes blurrier. Already, social media and e-commerce are important in our daily lives.

This however, is a double edged sword, as while the benefits to training for the SPF are quite clear, there will be those who will use it for criminal purposes. Such technology could allow criminals or even terrorists to practice or train in realistic simulated environments or locations, then perfect their plans based on what they've learnt from the simulation.

'The Matrix' is still a distant prospect, and while the current limited availability of virtual reality technology has restricted its use to mainly military and law enforcement agencies, we must be prepared to deal with the benefits as well as dangers that its future holds.



IF ONLY YOUR PHONE COULD DETECT SCAMMERS

BUT IT CAN'T



A SIMPLE PHONE CALL CAN TURN OUT TO BE A SCAM.

- ⚠ Always be wary of phone calls from strangers. Before asking you for money, they will try to convince you into believing they are some government official or someone whom you know.
- ⚠ Do not transfer any money via remittance agencies, banks or any other means to anyone whom you do not know.
- ⚠ Contact the Police immediately should you be a victim of phone scam.

PENALTIES FOR CHEATING

JAIL TERM OF UP TO 10 YEARS AND LIABLE TO A FINE



SINGAPORE POLICE FORCE



NATIONAL
CRIME PREVENTION
COUNCIL