KEYNOTE SPEECH BY DEPUTY PRIME MINISTER AND COORDINATING MINISTER FOR ECONOMIC POLICIES MR HENG SWEE KEAT AT THE 3rd SINGAPORE DEFENCE TECHNOLOGY SUMMIT ON 13 OCTOBER 2021

Ladies and Gentlemen,

1. Good evening to all of you.

a. A warm welcome to the Singapore Defence Technology Summit 2021, including those attending virtually.

b. This is the third Summit, since the inaugural one in 2018. It is a valuable platform for the defence technology community to exchange ideas and build relationships.

c. I hope that over the next two days, you will continue to share your views, especially amidst the disruptions confronting us.

Reshaping How the Defence Sector Operates

2. The most urgent disruption to all societies now is COVID-19, which continues to rage around the world.

a. More than 4.5 million lives have been lost globally, surpassing the death toll of most major armed conflicts in history.

b. Countless livelihoods have been thrown into disarray.

3. COVID-19 has also accelerated broader shifts that will outlast the pandemic.

a. One key shift is digitalisation, which will reshape all facets of human society in the years to come.

b. Another is the greater emphasis placed on sustainability, as the world focuses on a green recovery.

4. Amid the pandemic, the strategic competition between the US and China has also sharpened.

a. While the US defence budget had declined for some years, it has risen more recently. China has also invested considerably in growing its defence capabilities.

b. But it is not just the US and China that are spending more. Globally, defence spending is once again on the rise, nearing almost US$2 trillion last year.

c. With such vast resources poured into defence at a time that the global economy is facing headwinds, the question is how we can make the most of each defence dollar and adapt to the changing operating context.

d. I would like to share my thoughts on four key shifts in how the defence sector can think and operate in the years ahead.

e. If we are able to do this well, these shifts provide an opportunity to build a safer, more resilient, and greener world.

“Dual use as a two-way street”

5. The first shift is that “dual use is increasingly a two-way street”. Let me explain.

6. The defence sector has always placed great emphasis on technology and innovation.

a. It is a key force multiplier, allowing armed forces around the world to do more with less.

b. In Singapore, this has allowed us to build up a credible SAF, despite our limited manpower and resources.

c. Our defence industry colleagues, many of whom are here with us today, have contributed significantly to the development of the defence sector. We thank them for their strong partnership.

7. Around the world, there is a long list of “dual-use” innovations catalysed by the defence sector that have found their way into civilian application.

a. For example, in the 1920s, the first infrared-sensitive camera was invented by a Hungarian scientist to provide thermal imaging capabilities for anti-aircraft defence. Today, this technology is widely used in commercial and civilian applications, such as temperature screening.

b. More recently, in 2013, the US Defense Advanced Research Projects Agency, or DARPA, funded a start-up called Moderna to develop mRNA therapeutics, then an unproven idea. The mRNA vaccine has truly been a gamechanger during this pandemic.

c. The positive spill-over effects of these innovations have changed the world for the better, raising living standards, and literally saving lives.

8. But increasingly, the defence sector will also have to harness the innovative capacity of the private sector.

a. In the past, governments were the key driver of R&D spending, with the military and space exploration being key drivers of expenditure.

b. But research and innovation in the private sector is growing by leaps and bounds.

c. Take the US for example. The private sector's share of R&D more than doubled from 33% to 71% between 1960 and 2019. And the private sector plays a similarly important role in many other countries.

d. In many key technologies that will reshape the world, such as AI, internet-of-things, 5G or even 6G – the private sector is now leading the way.

9. Governments everywhere, including the defence sector, are increasingly tapping on this deep vein of cutting-edge innovation and enterprise in the private sector.

a. Take space travel. While this used to be largely driven by government programmes, commercial players are now pushing the frontiers.

b. NASA now sends equipment into space using the private company SpaceX. NASA has also selected SpaceX to develop the first commercial human lander to carry astronauts to the surface of the moon.

c. Also, companies like Tesla in the US and BYD in China are driving rapid innovation in electric cars, from battery technology to electric motors and control systems. This raises the possibility for the deployment of autonomous electric vehicles in both the civilian and military domains in the future.

d. From the UK's Defense and Security Accelerator to Australia's Defence Innovation Hub, defence communities are partnering with the private sector to develop deep tech innovations for defence missions.

e. In Singapore, our Defence Science and Technology Agency makes early-stage investments in deep tech companies through its strategic investment arm, CapVista. CapVista's portfolio of investments include Atomionics, a deep tech startup which develops quantum sensors that enable navigation without GPS.

10. To fully harness the potential of the private sector, the defence sector will need to find new ways of working.

a. We will need clear criteria in deciding when to buy and adapt, and when to invest and develop in-house.

b. We will also need new private-partnership models to harness such innovations. For example, sandboxes can provide a useful way to test-bed and incubate emerging technologies.

c. Overall, a nimble acquisition and development framework will enable us to achieve more.

Expansion of Asymmetric Threats

11. Second, as technology advances, we are witnessing an expansion of asymmetric threats.

a. With increasing digital connectivity and the Internet of Things becoming more pervasive in daily living, cyberspace has become the new frontier for potential “grey zone” conflicts.

b. In many ways, a cyberattack on a country’s energy grid, utility networks and communications systems could disrupt lives and the economy as much as traditional methods of warfare.

c. Yet at the same time, the barriers to access are very low, as hostile actors can easily hire the services of “hackers-for-hire”, or purchase malware tools and exploitable codes online.

12. To address these threats, we need a “whole-of-nation” effort – involving private businesses, the research community, and individuals.

a. In Singapore, we have expanded our concept of Total Defence, the national defence framework, to include a new pillar on digital defence.

b. We have set up the Cyber Security Agency to protect our critical information infrastructure.

c. The CSA has recently refreshed our national Cybersecurity Strategy. The focus is on growing a robust cybersecurity workforce and a vibrant cybersecurity ecosystem, to strengthen the security of our digital infrastructure and enable a safer cyberspace.

13. Cyber threats do not respect national boundaries. So nations need to collaborate, to develop international norms and frameworks in tandem with technological innovations.

a. There have been ongoing discussions at the United Nations on how the Law of Armed Conflict or International Humanitarian Law should apply during an armed conflict in cyberspace.

b. In this region, a new Cybersecurity and Information Centre of Excellence will be set up in Singapore to promote information-sharing and research among ASEAN defence establishments. This will help us develop a deeper shared understanding of cyber malware, and misinformation and disinformation threats.

c. Beyond cyber, there have also been debates over the ethical use of fully autonomous lethal weapons, or how to regulate conflicts in outer space.

d. The defence technology community plays a critical role in working with governments, militaries and the public to develop new norms, rules, and principles to govern the use of such technologies.

Building Adaptive Capacity for Disruptions

14. The third shift is the need to build greater adaptive capacity to respond to disruptions in a more complex world.

15. COVID-19 has given the world a wake-up call that we must prepare far better for disruptions.

a. The pandemic has not just been a public health emergency.

b. It has also exposed fragilities in many other aspects of how the world is organised.

16. One example is supply chain disruption.

a. Early in the outbreak, there was a global rush for critical supplies, such as ventilators and surgical masks. This led many producing countries to impose export controls, which worsened shortfalls everywhere else.

b. Global production capacities also suffered as countries went into sporadic lockdowns.

c. The Ever Given incident in the Suez Canal is a stark reminder of how a single event can have “ripple” effects on global transportation networks.

17. For the defence sector, resilience has always been a key consideration.

a. Stockpiling and catering to redundancies is part of the military planner’s DNA.

b. For example, NATO through its Pandemic Response Trust Fund, was able to lean forward with its stockpile of medical equipment and supplies. It provided ventilators, PPE and disinfectants, to allies in need.

18. But as supply chains become even more complex, it will become more challenging for the defence sector to build resilience.

a. It may not always be possible to fully anticipate where the next disruption would come from, and put in place the necessary contingency plans and stockpiles.

b. Even if possible, the cost of anticipation could be prohibitive and there could be other practical limitations.

19. We will need more innovative ways to build adaptive capacity in the defence eco-system.

a. One way is to partner with civilian operators and learn from cutting-edge practices that leverage on technology to build supply chain resilience. For example, to improve supply chain visibility, companies are using AI and internet-of-things to develop better real-time tracking of the entire supply chain.

b. Additive manufacturing can also provide another source of adaptive capacity. 3D printing of spare parts or other critical components can help to mitigate supply chain risks. For instance, Russia held a successful flight test last year for a 3D-printed gas turbine engine. In Singapore, 3D-printed metal parts were used for the Army's Hunter Armoured Fighting Vehicle.

20. More broadly, beyond supply chain resilience, the defence community will also need to build adaptive capacity to tackle crises that may fall outside of its traditional remit.

a. During this pandemic, many governments mobilised their militaries to support their fight against the virus.

b. In Singapore, the SAF played a key role in contact-tracing operations, setting up community care and recovery facilities, and most recently, in supporting those who are recovering at home.

c. The DSO National Laboratories has also partnered A*Star to develop the Resolute PCR test kit, which was a vital addition to our testing capacity.

21. The disruptions of tomorrow will likely be different from the crises of the past.

a. We must be realistic that it is not possible to anticipate all sources of potential disruption.

b. But by enhancing our adaptive capacity, staying nimble and working together, we can be more resilient to disruptions.

Disruption of Climate Change

22. The fourth shift is the “greening” of the military.

23. Green in military terms often refers to the colour of camouflage.

a. But “green” today also refers to environmental sustainability.

b. Until recently, this was less of a consideration for militaries.

24. But climate change’s far-reaching impact will not leave the defence sector untouched.

a. Climate change has already heightened inter- and intra-state tensions and competition over limited resources.

b. There are also increased demands for militaries to engage in humanitarian assistance and disaster relief efforts in response to extreme weather events.

c. It is thus a collective responsibility for all countries and militaries to fight the common enemy of climate change.

25. We are seeing signs of progress.

a. In June this year, NATO committed to work with its members to achieve a net-zero carbon goal for its troops and installations by 2050.

b. Militaries have also been switching to sustainable fuel derived from biofuels.

(1) The US, India, the Netherlands and the UK are amongst those experimenting with biofuel blends for military platforms.

(2) Some countries are also stepping up the use of sustainable fuel in fighter jets and helicopters, which can reduce life-cycle emissions by up to 80%.

26. In Singapore, the SAF is also doing its part as well.

a. The SAF will be making major moves to reduce carbon emission growth by 66% by 2030.

b. This will involve transiting to a fully electric Army administrative vehicle fleet, with charging infrastructure to be built in camps and bases.

c. We will also equip newer ships such as the Littoral Mission Vessels with green technologies including energy-efficient LED lights, and use green aviation fuel for some F-16s.

d. A SAF Sustainability Office has been set up to drive the planning and compliance of these sustainability efforts.

PARTNERSHIPS

27. A common thread that runs through these four key shifts is the importance of collaboration and partnerships.

a. Militaries will need to continue to partner the defence industry to drive disruptive military innovation.

b. At the same time, the defence eco-system will need to extend cooperation beyond its traditional partners.

c. This will require the defence community to work more closely with private companies and the research community.

28. Each nation has the responsibility to safeguard its sovereignty and the security of its citizens.

a. But this need not be a zero-sum game.

b. All nations face common threats that can severely disrupt lives and livelihoods – such as pandemics, climate change, and terrorist attacks.

c. To address these threats, we should build greater trust and confidence, and strengthen partnerships.

d. In that regard, I am glad that the US and China have expressed a desire to work together on some of these issues.

29. To foster greater collaboration amongst defence technology communities around the world, we established this Summit in 2018. It is also why we decided to convene the Summit this year despite COVID-19.

a. Forums such as these bring together diverse stakeholders from across the entire defence technology ecosystem.

b. Over the next two days, I hope you make full use of this platform to exchange ideas, build trust, and forge collaborations to tackle our common threats.

CONCLUSION

30. In conclusion, the world is undergoing rapid changes and disruptions.

31. The defence technology community too will have to respond to key shifts in your operating context. This will involve -

a. Harnessing the full force of technology from the private sector and academia, so that “dual-use is a two way street”;

b. Countering new asymmetrical threats;

c. Building more adaptive capacity in our defence eco-system;

d. And “greening” our militaries to cope with climate change.

32. While we each set out to defend our way of life, there is much more that we have in common.

a. Let us collectively confront our common challenges and improve lives.

b. This way, we can build a safer, more resilient, and greener world.

33. I wish everyone a fruitful Summit. Thank you.

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