28th ARF HDUCIM — SUB-THEME 1

NAVIGATING THE TECHNOLOGICAL HORIZON: BALANCING INNOVATION, RISK, AND LEADERSHIP IN PAN-DOMAIN OPERATIONS BY LT GEN DATUK WIRA ARMAN RUMAIZI BIN HJ AHMAD, VICE CHANCELLOR, NATIONAL DEFENCE UNIVERSITY OF MALAYSIA (NDUM)

SLIDE 1: Title — Navigating the Technological Horizon

1. Distinguished heads of delegation, colleagues, good morning.

2. I am Lt Gen Datuk Wira Arman Rumaizi bin Hj Ahmad, the Vice Chancellor of the National Defence University of Malaysia, located in Kuala Lumpur. I am deeply honoured to represent the National Defence University of Malaysia at this 27th ASEAN Regional Forum Heads of Defence Universities/Colleges/Institutions Meeting. On behalf of NDUM, I extend our sincere appreciation to the Canadian Defence Academy for hosting this important gathering and for its exemplary leadership in bringing us together to address one of the most pressing challenges in contemporary security studies.

3. My presentation this morning addresses Sub-theme 1: assessing the opportunities and risks of emerging technologies in defence, under the title 'Navigating the Technological Horizon: Balancing Innovation, Risk, and Leadership in Pan-Domain Operations.' Over the next few minutes, I will share NDUM's perspective on how our region's defence institutions can harness frontier technology while safeguarding the human judgment that must remain at the centre of command.

SLIDE 2: The Pan-Domain Shift

4. Armed forces across the globe are pivoting toward Pan-Domain and Multi-Domain Operations, i.e. the seamless integration of land, sea, air, cyber, space and the information environment into a single strategic effort.

5. This is being driven by the rapid convergence of artificial intelligence, autonomous robotics, the Internet of Things, big data analytics and quantum capabilities. But NDUM's central thesis, which will run through this entire presentation, is simple: enduring advantage is not won by software and hardware alone.

6. It demands educated, adaptive, and ethically grounded military leaders who can command confidently under uncertainty. Technology enables; leadership decides.

SLIDE 3: Opportunities: Decision Advantage and Domain Integration

7. Let me first address the opportunity side of the ledger. AI-assisted decision-support tools and big data analytics dramatically accelerate command decision cycles, synthesising real-time intelligence from satellites, uncrewed sensors and open sources into evidence-informed decisions under conditions of friction.

8. This gives commanders comprehensive domain awareness, a coherent picture across every operational sphere. At the same time, Internet of Things architectures and autonomous robotic systems — uncrewed aerial, surface and sub-surface platforms — allow us to conduct high-risk surveillance, mine countermeasures and reconnaissance without placing personnel directly in harm's way.

9. For a region defined by vast maritime zones and critical sea lines of communication, this translates into continuous, scalable monitoring and stronger national defence postures, all while maintaining operational efficiency.

SLIDE 4: Systemic Vulnerabilities and Ethical Risks

10. But every one of these opportunities carries a corresponding risk, and NDUM believes this region must weigh both with equal rigour.

11. First, the erosion of human oversight: the absence of meaningful human judgment in target identification or automated kinetic response introduces severe risk under International Humanitarian Law, and can trigger rapid, uncontrolled escalation during a crisis.

12. Second, algorithmic systems remain susceptible to machine-learning bias, data poisoning, and false correlation, any of which can lead commanders to misread strategic indicators.

13. Third, hyper-connected pan-domain architectures dramatically expand our attack surface, inviting cyber intrusion, electronic spoofing, and information manipulation from adversaries employing hybrid and grey-zone tactics.

14. And finally, over-reliance on brittle technological systems without resilient manual back-ups creates single points of failure that can paralyse a force the moment it is contested. These are not reasons to reject emerging technology; they are the case for deliberate, disciplined leadership development, which brings me to my next point.

SLIDE 5: Leadership Competencies for Pan-Domain Operations

15. Operating in a pan-domain battlespace requires a redefinition of what we expect from military leaders. Two competencies stand out as essential.

16. The first is technological literacy and data fluency. Our future commanders do not need to be computer programmers, but they must understand the logic, boundaries and limits of AI, autonomous systems and sensor networks well enough to interrogate algorithmic recommendations critically; never to accept machine output on blind confidence.

17. The second is cognitive agility and moral resilience. Decision-makers in pan-domain environments face overwhelming, simultaneous inputs under severe time pressure, and must filter noise from signal while weighing diplomatic, economic, legal and public-perception factors.

18. Above all, they must retain moral responsibility — exercising ethical judgment precisely where automated systems lack human nuance and strategic intuition.

SLIDE 6: The NDUM Framework I — Fusing Science, Strategy and Moral Leadership

19. So how does NDUM cultivate these competencies? As Malaysia's premier defence university, we fuse rigorous academic education with professional military training from the Malaysian Armed Forces' Military Training Academy, resting on two integrated pillars.

20. The first is technical: computer engineering, cybersecurity, defence technology and maritime systems, with ethical system design and cyber resilience built directly into the curriculum.

21. The second is strategic and legal: strategic studies, international law and defence management, with modules on algorithmic warfare and autonomous-systems ethics woven throughout the command and strategy programmes.

22. The result is that our student officers never examine emerging technology in isolation. They study it within its full geopolitical, legal and operational context, anchoring innovation firmly in moral clarity, national responsibility and institutional integrity.

SLIDE 7: The NDUM Framework II — Simulation, Wargaming and the Triple-Helix

23. Instruction alone is not enough; competencies must be tested under pressure. NDUM places high strategic priority on advanced synthetic learning and wargaming environments, where multi-domain simulation labs immerse student officers in complex, realistic pan-domain scenarios.

24. Critically, we deliberately expose officers to technological failure, i.e. cyber blackouts, GPS spoofing, degraded communications, forcing them to command under electronic disruption and algorithmic uncertainty. This builds the cognitive resilience and problem-solving agility to revert seamlessly to tactical initiative the moment technology fails.

25. Beyond the classroom and the simulator, NDUM also bridges academia, government and the defence industrial sector through the Triple-Helix Model outlined in Malaysia's National Defence Industry Policy, or DIPN — a whole-of-society approach to building national resilience and technological innovation together.

SLIDE 8: The ASEAN Imperative — Trust, Diplomacy and Collaborative Governance

27. Finally, none of this can be pursued by any single nation in isolation. Technological adoption in our region must be aligned with ASEAN Centrality, non-alignment, dialogue, mutual trust and the peaceful settlement of disputes, ensuring emerging technology strengthens regional stability rather than provoking new arms races or strategic friction.

28. Defence diplomacy is central to this: forums such as ARF HDUCIM, the ASEAN Defence Ministers' Meeting, and ADMM-Plus allow us to engage in open dialogue, build transparency, and prevent misunderstandings over military technology deployments.

29. Regional defence universities have a particular responsibility here — to serve as collaborative engines for confidence-building, co-developing shared ethical norms governing the military use of AI and autonomous platforms.

30. Joint research, faculty exchanges and combined wargaming seminars among ARF defence colleges can harmonise our terminology and our risk-assessment protocols, turning technological modernisation into a force multiplier for our collective security.

SLIDE 9: Conclusion — Navigating the Technological Horizon, Together

31. In closing: frontier technologies present transformative opportunity and complex operational risk in equal measure, and enduring security will depend on educated, adaptive and ethically grounded leaders; not on technology alone.

32. The National Defence University of Malaysia remains committed to academic education and Professional Military Education that fuses technical competence with strategic wisdom and moral responsibility.

33. And we believe that through continued regional dialogue, shared ethical norms, and cooperative frameworks such as this Forum, the members of the ASEAN Regional Forum can together navigate this technological horizon and safeguard peace, stability and prosperity across the Indo-Pacific.

34. Terima kasih. Thank you, and I welcome your questions.