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Future Military Leadership

Volume 6 | Number 1 | Spring 2021



NATO ALLIED COMMAND TRANSFORMATION

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OPEN Publications (2021) Future Military Leadership

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¹ Dr Markos Trichas contributed to the discussion on new technologies specifically on space, missiles and cyber.

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1. Introduction

We live in a world which is in a state of flux and in which the “power balances are shifting and disruptive behaviour is becoming the norm².” Western countries face common problems, which, if not dealt with in a timely fashion, will get more difficult to resolve³. Adversaries of the West succeed at achieving political goals by using all levers of national power. This is due partly to their ability to think creatively and set long-term targets unfettered by liberal democracy's demands and short-term election cycles. In addition, in more illiberal states, strategy and policy decisions are often taken by small groups (or even individuals), allowing for greater political and strategic agility. As a result, the West risks being out-thought by its geopolitical adversaries.

Furthermore, emerging technologies have the potential to be "game-changers" in military and strategic affairs⁴. The proliferation of new technology is seen as not only a challenge to the long-term foundations of western military supremacy but it presents western military organisations and its leaders with a question on how they will be able to successfully harness the new technologies. Military technology will undoubtedly affect how states fight and win wars, but it will also present leaders with never-before-seen leadership challenges.

In practice, military leadership is said to have two characteristics: task (transactional leadership) and change (transformational leadership). The following discussion on military leadership perspectives will demonstrate that transformational leadership appears to be the most relevant to rely on in the twenty-first century. Transformational leaders have been proven to be more effective in both military and commercial settings than leaders who depend mainly on transactional leadership styles.

When it comes to motivating troops, empathising with people and cultivating talent, humans have a significant comparative advantage. New technologies will certainly provide invaluable input to leaders of organisations but it will need a human touch and a specific type of

² See, Freedman L., “Britain Adrift. The United Kingdom’s Search for a Post-Brexit Role”, *Foreign Affairs*, May/June 2020, p. 130, pp. 118-130.

³ Moustakis F, Mourtos G., & German T., “The Dominance of Strategy and the Deficit of Strategic Thinking”, *Naval Review*, Vol, 108, Issue 4, Autumn 2020, p.483.

⁴ For example see Brimley, Shawn, et al., “Game Changers: Disruptive Technology and US Defense Strategy”, Washington, DC: Center for a New American Security September 2013, pp.1-28.

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leadership to turn this understanding into messages that resonate with the people that comprise the organisations.

2. An Overview of New Technologies in Military and Strategic Affairs

Before delving into the investigation of the future of military leadership, it will be constructive to assess the role and impact of new technologies in military and strategic affairs. Contextualising machine-made decisions is expected to become an important tool in the armoury of tomorrow's military leaders and its effective use will determine and shape the most appropriate military leadership style in the twenty first century.

According to the Oxford Living Dictionary, Artificial Intelligence (AI) is defined as:

“The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages”⁵. At the organizational level, AI, is a “cognitive technology” which will “enable organizations to break prevailing trade-offs between speed, cost, and quality,” increasing efficiencies and output⁶. On a strategic level, the application of AI could enable emerging powers (China) to displace existing military powers such as the United States.

AI does not refer to just one technology, but rather to a collection of them. Most of these technologies are loaded with latent military potential⁷ and techniques such as Machine Learning (ML), Deep Learning (DL), Natural Language Processing (NLP), robotics, speech, computer vision, supervised learning and unsupervised learning (for more information see Table 1).

⁵ Marr B. “The Key Definitions of Artificial Intelligence (AI) that Explain its Importance”, Forbes. 14 February 2018
<https://www.forbes.com/sites/bernardmarr/2018/02/14/the-key-definitions-of-artificial-intelligence-ai-that-explain-its-importance/#5b0977914f5d> (accessed 29 April 2021).

⁶ Jensen B., et al, “Algorithms at War: The Promise, Peril, and Limits of Artificial Intelligence”, *International Studies Review*, 22, 2020, pp.526–550.

⁷ Davis Z., and Nacht M., eds., “Strategic Latency: Red, White and Blue, Managing the National and International Security Consequences of Disruptive Technologies”, Berkeley, CA: Lawrence Livermore National Laboratory, pp.71-87, 2018.

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Table 1: Key applications in AI

Deep Learning	The most complex forms of ML involve <i>Deep Learning</i> , or neural network models that comprise many levels of features or ‘variables’ that can predict outcomes. This machine learning-based approach utilises a logic structure similar to the brain called neural ‘networks’ to recognise and discriminate patterns such as speech, image and video. ⁸ While most ML programs can work with small data sets that are organized and labelled, DL programs are most effective when applied to large volumes of raw and unstructured data. ⁹ DL techniques are also increasingly being used for speech recognition and, as such, this form of analysis is becoming embedded in NLP systems.
Natural Language Processing	This refers to the application of computational techniques aimed at analysing and synthesising natural language and speech; and includes applications such as speech recognition, text analysis, translation and other goals related to language. The objective of NLP is not only to establish the structure between words in a text (syntax), but to also to understand the meaning (semantics) and the context meaning (pragmatics). ¹⁰
Machine Learning	Machine learning is a statistical technique for fitting models to data and to ‘learn’ by training models with data. It is one of the most common forms of AI and includes various technologies such as DL, supervised learning, unsupervised learning, and reinforcement learning. ML uses computer algorithms that learn from structured and unstructured data to identify hidden patterns, make classifications and predict future outcomes.

At this point, it is important to differentiate between weak and strong AI applications. Weak AI refers to problem-solving tools that are designed to perform particular narrow tasks. The term "strong AI" refers to a collection of technologies aimed at simulating and recreating human brain functions¹¹. The weak AI still relies on humans to program it, and currently dominates the current world.

Cyber space is the global domain within the information environment consisting of the network of information technology infrastructures and data, including the Internet, the World Wide Web Information System, telecommunications networks, computer systems and

⁸ Properzi F, Taylor K, Steedman M, Ronte H & Haughey J., “Intelligent Drug Discovery”, AI. Deloitte Centre for Health Solutions. 2019.

⁹ Mollica L, Decherchi S, Zia SR, Gaspari R, Cavalli A & Rocchia W. “Kinetics of Protein-Ligand Unbinding via Smooth Potential Molecular Dynamics Simulations”, Nature Scientific, Sci Rep. 6 May 2016, <https://www.nature.com/articles/srep11539> (accessed 7 June 2021).

¹⁰ Rueda JD, Cristancho RA & Slejko JF. “Is Artificial Intelligence the Next Big Thing in Health Economics and Outcomes Research”? HEOR Articles. Value and Outcomes Spotlight. March/April 2019 https://www.ispor.org/docs/default-source/publications/value-outcomes-spotlight/march-april-2019/vos-heor-articles---rueda.pdf?sfvrsn=18cb16f5_0 (accessed 30 April 2021).

¹¹ See Davis Z., “Artificial Intelligence on the Battlefield”, PRISM , Vol. 8, No. 2, pp. 114-131, 2019.

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embedded processors and controllers.¹² In today's world, cyber space transcends geographical and geopolitical boundaries and is critical for commerce, governance, and national security. Along with the physical domains of air, ground, maritime, and space, cyber space is one of the five interdependent spheres of human operations. Modern operations in the air, on land, and at sea depend on information technology infrastructures and computers, as well as the information that flows and is processed in cyberspace. Furthermore, all space domain operations are inextricably connected with cyberspace, and certain cyberspace operations cannot be carried out without the assistance of the space domain (e.g. satellite applications and communications).

The value of space as a medium of warfare was first recognized in the 1930s when the German engineers Werhner von Braun and Eugen Sanger first suggested the possibilities of intercontinental space bombers and missiles. However, military in the countries that would form NATO were very slow to realize the potential of space power. The first US proposition for military satellites came in a 1946 study entitled "Preliminary design of an Experimental World-Circling Spaceship"; however, more than 10 years had to pass for any significant progress to occur. The launch of Sputnik-1 in 1957 by the Soviet Union, acted as a catalyst in changing the view about the importance of space power in the US and the other NATO countries. Since the launch of Sputnik 1 in 1957, the space nations have researched, designed and built space vehicles capable of performing a wide variety of roles ranging from space reconnaissance, telecommunication and PNT (Position, Navigation and Timing) to space science and exploration missions.

During the 1960s the importance of space for national security was widely recognized. The words of John F. Kennedy encompass the military utility of space during the peak of the Cold War, "If the Soviets control space they can control the Earth, as in past centuries the nation that controlled the seas dominated the continents"¹³. Between 1960s and 1980s both NATO and Soviet Union had launched numerous military missions to address requirements for space reconnaissance, telecommunications, navigation, weather monitoring, command and control while simultaneously greatly developed their offensive intercontinental ballistic missile

¹² "Cyberspace Operations", US Military Joint Publication 3-12R, 5 February 2013, p. 1&2 www.dtic.mil/doctrine/new_pubs/jp3_12R.pdf (accessed 30 September 2017)

¹³ See Clinton Ezell EC and Ezell LN, "Competition Versus Cooperation: 1959-1962", NASA documents, <https://history.nasa.gov/SP-4225/documentation/competition/competition.htm> (accessed 9 May 2021).

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(ICBM) capabilities and their space infrastructure, symbolized by the Program Apollo and the numerous Space Stations from both sides.

Despite all the Cold War developments, space never dominated the theatre of operations until Gulf War in 1991, the first ever “Space War”. Global Positioning System (GPS) would change the warfare and space based navigation, imaging and communications would become indispensable assets for all warfighters. In the three decades after the Gulf War, we have seen the establishment of new corps like the US Space Force and the UK Space Command, the establishment of mass production lines for satellites (e.g. Airbus OneWeb Satellites) but we have also seen a dramatic increase of overt testing of anti-satellite weapons. The destruction of the Chinese defunct Fengyun-1C on January 2007 by a Chinese anti-satellite weapon was an event that opened the Pandora’s Box. Since then, the US, Russia and India have conducted tests and also have conducted Rendezvous and Proximity Operations (RPO), which could be interpreted as a test run for possible military action.

The risk to spacecraft in orbit, hence the ability of NATO warfighters to operate safely and efficiently, has grown significantly over the last decade. NATO needs to understand the risks in order to prepare to deal with the double threat of orbital debris and suspicious behaviour. Whilst individual NATO countries are leading efforts to tackle these issues, the lack of a clear NATO strategy bringing coherence across NATO governments is required. NATO based space industry will be fundamental in supporting this effort.

What is clearly obvious is that there are many challenges and concerns associated with the proliferation of new technologies and the issues they raise. Since military technology will shape how states and non-state actors will fight and win wars, evaluating the implications of new technologies for 21st century battlefield is important to be addressed.

3. The Implications of New Technologies for 21st Century Battlefield

AI will be utilised for processing the massive amounts of intelligence, surveillance, and reconnaissance (ISR) data involved in modern operations. Furthermore, the military

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applications of AI will be manifested in the development of autonomous vehicles¹⁴. AI-based guidance systems will support space and undersea platforms, while the so-called drone swarms, will also be driven by AI¹⁵. AI it is anticipated that will enrich battlefield simulations and war games to explore dynamic conditions (weapons, allies, etc) and their impact on decision-making, analyse games and gather intelligence via satellite, drones and cyber domain¹⁶. One however should not underestimate the fact that western rivals such Russian and China will also have the potential to change the strategic calculus with the use of AI in military domains as well¹⁷.

Despite the impending incorporation of AI into an array of future military missions, AI systems according to Cathy O’Neil, may be impacted by erroneous data inputs, which can lead to unintended consequences¹⁸.

Hypersonic missile threats have the potential to alter military operational environment shifting the balance of power, creating new forms of insecurity, and changing military doctrine and war operational conduct. They have the potential to make current defence systems outdated and provide a new and more effective military capability for potential adversaries. These missile systems are particularly concerning due to their high speeds, which are typically in excess of Mach 5¹⁹. There are two types of hypersonic missiles:

- Hypersonic Cruise Missiles (HCM)
- Hypersonic Glide Vehicles (HGV)

¹⁴ Prepared by Olson S., “Autonomy in Land and Sea and in the Air and Space, Proceedings of a Forum”, National Academy of Sciences, 2018. <http://nap.edu/25168>, (accessed 25 May 2021).

¹⁵ For more information see “[Counter-Unmanned Aircraft System \(CUAS\) Capability for Battalion-and-Below Operations](https://www.nap.edu/catalog/24747/counter-unmanned-aircraft-system-cuas-capability-for-battalion-and-below-operations)”, Abbreviated Version of a Restricted Report (2018), <https://www.nap.edu/catalog/24747/counter-unmanned-aircraft-system-cuas-capability-for-battalion-and-below-operations> (accessed 29 May 2021).

¹⁶ Reddie et al, “Next Generation War games” Science, Science, Vol. 362, Issue 6421, December 21, 2018, pp. 1362-1364.

¹⁷ For more information see Crosston M., “Cyber Colonization: The Dangerous Fusion of Artificial Intelligence and Authoritarian Regimes, Intelligence”, Cyber, Intelligence and Security, Volume 4, No. 1, March 2020, pp: 149-171.

¹⁸ For more information see O’Neil K., “Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy”, New York: Broadway Books, 2017.

¹⁹ Speier, R. H., Nacouzi, G., Lee, C.A., Moore, R.M., “Hypersonic Missile Non-proliferation: Hindering the Spread of a New Class of Weapons”, RAND Corporation, 2017, https://www.rand.org/pubs/research_reports/RR2137.html (accessed 1 June 2021).

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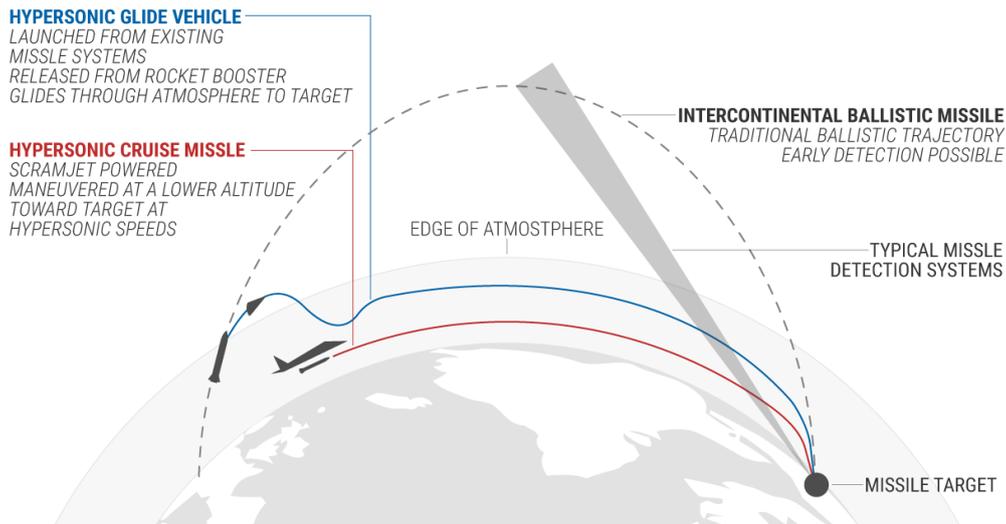


Figure -1: Illustration highlighting the issues with response time compression due to the point of detection of a hypersonic missile ²⁰.

Hypersonic cruise missiles are different to typical ballistic missile threats as they are powered throughout their flight and are of a non-ballistic trajectory. HCMs are typically launched from an aircraft or ship with a conventional rocket booster to accelerate the missile to Mach 4-5. Examples of these missile threats are the BrahMos-II (Russia/India)²¹, Kh-47M2 Kinzhal (Russian)²² and 3M22 Zircon (Russian) ²³.

²⁰ Ibid.

²¹ Hypersonic BrahMos Missile to fly by 2028, defenceworld.net. https://www.defenceworld.net/news/27721/Hypersonic_BrahMos_Missile_to_fly_by_2028#.YJQP5ehKg2w (accessed 4 May 2021); BrahMos-2 Multi-Role Hypersonic Cruise Missile, GLocalMilitaryReview.com. <http://globalmilitaryreview.blogspot.com/2013/02/brahmos-2-multi-role-hypersonic-cruise.html>, (accessed 4 May 2021).

²² Kh-47M2 Kinzhal, Missile Defence Advocacy Alliance. Accessed here: <https://missiledefenseadvocacy.org/missile-threat-and-proliferation/todays-missile-threat/russia/kh-47m2-kinzhal-dagger/> (accessed 5 May 2021); Russia's Lethal New Kinzhal 'Carrier Killer' Hypersonic Missile Set to Bring Renewed Foreign Interest in MiG-31 and Tu-22M as Launch Platforms for Maritime Strike Role, Military Watch, Aug 2018, <https://militarywatchmagazine.com/article/russia-s-lethal-new-kinzhal-carrier-killer-hypersonic-missile-set-to-bring-renewed-foreign-interest-in-mig-31-and-tu-22m-as-launch-platforms-for-maritime-strike-roles> (accessed 5 May 2021).

²³ Saylor, K. M., "Hypersonic Weapons: Background and Issues for Congress", Congressional Research Service, 2020. Military and Security Developments Involving the People's Republic of China (2013), Office of the Secretary of Defence. https://web.archive.org/web/20150113120816/http://www.defense.gov/pubs/2013_china_report_final.pdf (accessed 5 May 2021).

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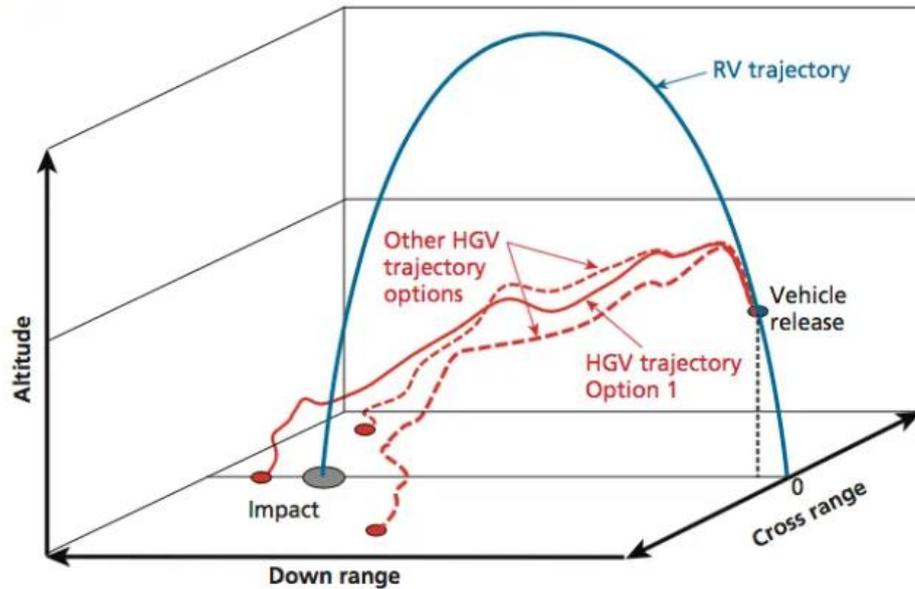


Figure-2: Illustration of ballistic re-entry vehicle (RV) compared to the trajectory of a hypersonic glide vehicle ²⁴.

Hypersonic glide vehicles are missiles that are launched up to the edge of the Earth's atmosphere with traditional booster rockets. The flight profile illustrated in **Figure-2** highlights the issues the best BMD systems can have with a HGV due to their degree of manoeuvrability. Furthermore, due to a HGVs low glide altitude they are detected later than conventional ballistic missiles, ultimately reducing the time available for a response, this is shown in **Figure -1**. Examples of these missile threats are Avangard (Russia), DF-ZF (China – in development)²⁵.

Threats to Space Assets

Manmade space threats typically fit into four domains: Kinetic Physical, Non-Kinetic Physical, Electronic and Cyber.

Kinetic physical threats aim to strike directly, detonate a warhead near a satellite or ground station or physically interfere or destroy a satellite intentionally. A direct-ascent anti-satellite (ASAT) weapon would attempt to strike a satellite using a trajectory that intersects the target

²⁴ Ibid, Speier et al.

²⁵ DF-ZF Hypersonic Glide Vehicle, Missile Defence Advocacy Alliance. Accessed here: <https://missiledefenseadvocacy.org/missile-threat-and-proliferation/todays-missile-threat/china/df-zf-hypersonic-glide-vehicle/>, (accessed 5 May 2021).

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satellite without placing the interceptor into orbit. A possible variation of this would be to have the missile disrupt in the orbital path of the target satellite leaving behind debris that will destroy the target. It is possible to use modified ballistic missiles and missile defence interceptors to act as direct-ascent ASAT weapons, provided they have sufficient energy to reach the target satellite's orbit. The majority of kinetic physical attacks have catastrophic and irreversibly effects on the satellites and ground stations targeted.

Non-kinetic physical threats, such as those using the electromagnetic spectrum or particle-beam and chemical weapons, can have physical effects on satellites and ground stations without making physical contact. High powered lasers can be used to damage or degrade critical satellite components, such as solar arrays or payload sensors, by delivering high-levels of energy onto the surface of the target. The either gradual or rapid absorption of this energy leads to several forms of thermal damage.

Radio Frequency (RF) weapons include both ground- and space-based threats that fire an intense burst of radio energy at a satellite which can disrupt a satellite's electronics, corrupt data stored in memory, cause processors to restart and, at higher power levels, cause permanent damage to electrical circuits and processors. These types of weapons are usually split into two groups: High-Powered Microwave (HPM) weapons and Ultrawideband (UWB), or video pulse, weapons. Electronic attacks target the means by which space systems transmit and receive data by jamming or spoofing RF signals.

Fortunately, the majority of electronic attacks are reversible and have a reasonable degree of attributing the aggressor. Furthermore, there is not a great chance that the attacker will know if their attack has been successful with awareness of a successful attack generally only noticed by the satellite operators.

Cyber

The difference between electronic attacks, which interfere with the transmission of RF signals, cyberattacks target the data itself and the systems that use this data. This aim of a cyberattack is to corrupt data, intercept and monitor data and seize control of the satellite.

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A cyberattack can target any point of a data transfer system. This includes the antennas on satellites and ground stations, the landlines that connect ground stations to terrestrial networks and the user terminals that connect to satellites. By accessing the data flow at these points it is possible to monitor, gaining intelligence, and insert false or corrupted data.

Specifically, a cyberattack on space systems can result in data loss, widespread disruptions and possibly the permanent loss of a satellite by the adversary seizing control – much like as discussed in the electronic threats.

Although cyberattacks required a high degree of understanding of the system being targeted and technical knowledge by the attacker, they do not necessarily require significant resources to conduct. It is even possible to contract out to private groups or individuals. This opens the doors to many nations that otherwise lack cyber capabilities. Although all but the seizure of control are reversible, it can be difficult to accurately attribute a cyberattack in a timely manner. This is due to the attackers being able to use a variety of techniques to hide their identity, such as using a hijacked server to launch an attack.

As the contours of new technologies become increasingly clear over time, the question on how military leaders will be able to adapt and embrace these technologies remains to be seen. People are an organization's most valuable asset, and the most successful companies are those in which the leadership drives and utilizes human capital most effectively and efficiently. The expertise, skills, experience, and education that each employee possesses and applies inside the organization determine the value of this human capital. Today's leaders should diligently work to determine how to merge new technologies, human resources, and human capital for the advancement of their organisations. This realisation points to a specific type of leadership characteristics which can be identified as the transformational type and will be assessed in the following sections.

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4. Mapping Military Leadership Key Characteristics

Aristotle, one of the greatest ancient Greek philosophers, acknowledged that the three basic characteristics of effective rhetoric, ethos, pathos and logos can help a leader to gain trust and be effective in accomplishing his goals. Ethos pertains to the credibility that a speaker possesses which makes him acceptable to the audience, pathos refers to the emotions the speaker intentionally generates to the audience while he engages with them, and logos applies to the reasonable arguments used to persuade the audience. It is therefore, not a surprise that these three appeals have been considered by some academics necessary for leaders who are seeking to persuade and bring together a group of individuals²⁶. Leaders need to appeal to their audience exercising some ethos, some logos, and pathos to be successful²⁷.

The most widely accepted concept among academics and theorists appears to view leadership as a social process in which one person influences the attitudes, values, and, most importantly, actions of one or more other people²⁸. The seminal work of Bass & Stogdill's "Handbook of Leadership" which was published in 1990, attempts in more than 1,000 pages to define the concept of leadership as well as to reflect the growth and changes in the study of leadership. Bass and Stogdill set the standards for the serious inquiry on the leadership theory and demonstrate that leadership is a multi-faceted developed skill that comprises a complex blend of attributes and experience²⁹. Other academics such as Conger consider leadership as a function of specific leadership behaviour³⁰, while influencing other individuals, group dynamics, and activity goals are three fundamental elements of leadership, according to Bryman³¹.

²⁶ Mshvenieradze, Tamar. "Logos ethos and pathos in political discourse." *Theory and Practice in Language Studies*, vol. 3, no. 11, 2013, p. 1939.

²⁷ Dal Santo, Megan , "Ethos, Pathos, and Logos in a Leader," *ESSAI: Vol. 15 , Article 15*, 2017, pp:1-4.

²⁸ It is important to highlight, that there is a large body of literature that examines the variations and similarities in leadership in particular contexts and from different perspectives. While there is no universal definition of what constitutes leadership. For more details, see Yukl, G., "Leadership in Organizations, 8th ed.", Pearson Education Inc, Upper Saddle River, 2013.

²⁹ Bass B & Stogdill RM, "Bass & Stogdill's Handbook of Leadership: Theory, Research, and Managerial Applications", Simon and Schuster, 1990.

³⁰ Conger, J.A,"The Charismatic Leader: Behind the Mystique of Exceptional Leadership", Jossey-Bass, San Francisco, CA, 1989, p.36.

³¹ Bryman, A, "Charisma and leadership in organizations", London: Sage, 1992, 198 pages.

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Although the type of training programme varies by company or sector, leadership development has become increasingly important for businesses and organisations of all sizes³² including militaries. Military leadership³³ is a distinct theoretical and operational discipline from civilian leadership. The framework that defines military leadership is, primarily a military organization's core duty, which is to provide security. Members of the armed forces are therefore, given the authority to use force for this reason³⁴. Military leadership is severely influenced by the combat and security missions it performs. Military organisations are also known for their 'totality', in which regulate nearly every part of their members' lives, while another key characteristic of the military organisation is that military forces aim to accomplish their objectives through a hierarchical structure. Because of their size, Commanders' decisions and actions have a significant effect on a considerable number of subordinates.

In addition to the organisational context, a study of the operational theatre in which military leadership currently acts as well as the major social, cultural, and technological changes that characterise it, is needed for an understanding of military leadership³⁵. Today's modern militaries are dealing with a 'spectrum of operations and confrontations' which makes it imperative that they must have the ability to function efficiently in environments that quickly shift from peace to outright war. For example, military forces in Iraq and Afghanistan³⁶ had to operate and fight in urban environments, as well as to provide humanitarian assistance almost simultaneously. In this ever more complex and unpredictable environment, military leaders must be trained to carry out a variety of operations. They must be able to instantly assess the environment, take actions, devise strategies, and adapt to unexpected outcomes. It is not then a surprise, that versatility, agility, adaptability, flexibility, ingenuity, and the drive and ability to participate in continuous learning are all necessary skills for success in today's

³² For more information see Hotho S, & Dowling M., "Revisiting Leadership Development: The participant Perspective", *Leadership & Organization Development Journal* 31(7), September 2010, pp.609-629.

³³ See Table 2.

³⁴ For more details see Kark R., Tair Karazi-Presler and Sarit Tubi, "Paradox and Challenges in Military Leadership", *Leadership Lessons from Compelling Contexts Monographs in Leadership and Management*, Publisher: Emerald Group Publishing, 2016, (pp.159-187).

³⁵ Morath, R. A., Leonard, A. L., & Zaccaro, S. J., "Military leadership: An Overview and introduction to special issue", *Military Psychology*, 23:5, 2011, pp.453-461.

³⁶ For more information on this topic see Konaev M., "The Future of Urban Warfare in the Age of Megacities", *Focus Strategique*, No: 88, Ifri, March 2019, <https://www.ifri.org/en/publications/etudes-de-lifri/focus-strategique/future-urban-warfare-age-megacities>, (accessed 20 May 2021).

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(and tomorrow's) operational environments, according to current US Army leadership doctrine³⁷.

Since the position of a military leader is based within a hierarchical structure, military leaders are largely responsible not only for the success of their own organisation, but also have responsibility for the entire society in which their organisation is part of. Society, like all members of the armed forces, expects a military leader to be efficient while also caring for his or her troops. Military leaders are often viewed as members of the entire political system, they give a face and voice to a military institution and determine/establish the dominant leadership culture by their leadership actions³⁸.

When a military leader's level of command rises, so does the complexity of his or her decision-making. As a result, data must be extrapolated and synthesised into assumptions and different choices. According to studies, people's adherence to decisions and their implementation increases significantly when military leaders enabled skilled subordinates to engage in the decision-making process³⁹.

While desirable leadership traits have evolved over time, the basic formula for leadership success has remained relatively unchanged for the past 2,000 years (See Table 2). The method for instilling, encouraging, and maintaining the required leader attitudes, on the other hand, has yet to be determined⁴⁰. The connection between theory and practise is crucial.

³⁷ Morath, op.cit, 2011.

³⁸ For more information on the foundations of US Army leadership, the different echelons of leadership (direct, organizational, and strategic), and the core leader competencies expected of all leaders across all levels and cohorts, see Army doctrine publication (ADP) 6-22, "Army Leadership and the Profession", 31 July 2019, https://armypubs.army.mil/ProductMaps/PubForm/Details.aspx?PUB_ID=1007609, (accessed 20 May 2021).

³⁹ For more details on best approach to understanding the leadership decision making process see Ejimabo NO., "An Approach to Understanding Leadership Decision Making in Organisation", European Scientific Journal April 2015 edition vol.11, No.11, pp.24.

⁴⁰ See Walter F. Ulmer Jr., "Military Leadership into the 21st Century: Another Bridge Too Far", Parameters, Vol 40, No: 4, Winter 2010, p.138.

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Table 2: Key Characteristics of Military Leadership

<i>Discipline</i>	Military leadership is a distinct theoretical and operational discipline from civilian leadership, which includes both normative and context-specific elements.
<i>Mission Context</i>	Military leadership is severely influenced by the combat and security missions it performs.
<i>Regulation</i>	Military organisations are also known for their ‘totality’, in which regulate nearly every part of their members’ lives.
<i>Hierarchy</i>	Military forces aim to accomplish their objectives through a hierarchical structure.
<i>External environment</i>	Operational theatre in which military leadership currently acts as well as the major social, cultural, and technological changes that characterise it.
<i>Decisiveness</i>	Leaders must have the ability to function efficiently in environments that quickly shift from peace to outright war.
<i>Versatility</i>	Leaders must be able to instantly assess the environment, take actions, devise strategies, and adapt to unexpected outcomes.
<i>Value of Education</i>	Leaders must be able to participate in continuous learning initiatives.
<i>Social Responsibility</i>	Leaders are largely responsible not only for the success of their own organisation, but they bear responsibility for the entire society in which their organisation is part of it.

5. Military Leadership in 21st Century: A new Paradigm?

It has been argued that in practice military leadership encompasses two features (see Table 3) – task (transactional leadership) and change (transformational leadership)⁴¹. The 1978 book "Leadership" by James MacGregor Burns is considered a useful starting point for the introduction of a new leadership paradigm⁴². According to Burns, the basic role of leadership is to bring the leader's and subordinates' goals and objectives together in order to achieve a higher vision. This way of thinking implies the possibility that people do not have to agree on anything, but that their shared vision and goals must bring them together.

⁴¹ See Meerits A. & Kivipõld K., “Leadership competencies of first-level military leaders”, Leadership & Organization Development Journal, September 2020, available on Emerald Insight at: <https://www.emerald.com/insight/0143-7739.htm> (accessed date 29 April 2021). The authors argue that military leadership in 21st century is also carried by a third dimension (the relational).

⁴² For more details see Burns, J. MacGregor, “Leadership”. Harper & Row Publishers, New York, 1978.

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Table 3: Transactional V Transformational Leadership

Categories	Transactional	Transformational
Leader's source of power	Rank, position	Character, competence
Follower reaction	Compliance	Commitment
Time frame	Short term	Long term
Rewards	Pay, promotion, etc.	Pride, self-esteem, etc.
Supervision	Important	Less important
Counselling focus	Evaluation	Development
Where change occurs	Follower behaviour	Follower attitude, values
Where "leadership" found	Leader's behaviour	Follower's heart

(Source Management Training Specialists⁴³)

Burns's core premise was to distinguish between two types of leadership, (the transactional and transformational styles⁴⁴). The most common form of leadership is a transactional leadership. It is centred on mutual activity, which occurs when a leader approaches a subordinate to share something, but it is important in transactional leadership that the leader seeks to achieve organizational goals and objectives by controlling his subordinates. However, transformational leadership is more challenging and useful than transactional leadership⁴⁵. A leader considers and focusses on the wishes and demands of potential subordinates in this case. Furthermore, a transformational leader seeks to understand his subordinates' motivations, to meet their needs and secure their commitment. The best-case scenario is a positive and supportive partnership in which the leader and subordinates' interests are aligned, and leaders can become advocates and managers of their subordinates' intellectual growth.

⁴³ See "What Is The Difference Between Transactional and Transformational Leadership?", Management Training Consultants, <https://www.mtdtraining.com/blog/what-is-the-difference-between-transactional-and-transformational-leadership.htm>, (accessed 5 May 2021).

⁴⁴ For a comprehensive understanding of these two forms of leadership see McCleskey J.A., "Situational, Transformational, and Transactional Leadership and Leadership Development", *Journal of Business Studies Quarterly* 2014, Volume 5, Number 4, 2014, pp.117-130.

⁴⁵ It is worth mentioning that charisma is considered by many academics as part of transformational leadership; see Diaz-Saenz, H. R., "Transformational leadership", in A. Bryman, D. Collinson, K. Grint, B. Jackson & M. Uhl-Bien (Eds.), "The SAGE handbook of leadership. Thousand Oaks, CA: Sage, 2011, ", pp. 299-310; See Conger, J. A. "Charismatic leadership", in A. Bryman, D. Collinson, K. Grint, B. Jackson & M. Uhl-Bien (Eds.), "The SAGE handbook of leadership", Thousand Oaks, CA: Sage, 2011, 86-102.

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Interestingly, some key activities of the transformational leader such as the interest for his subordinates' personal development coincides with the current discussion in military training about values and the value of education⁴⁶ in the armed forces. Studies have also identified the necessary skills for 21st-century leaders that can be applied to various sectors including the military. They have usually included the ability to cope with cognitive uncertainty, intellectual agility, a significant degree of self-awareness, and a better understanding of the relationships between organisational sub-systems. These characteristics can be added to the classic qualities of a leader: honesty, energy, bravery, and adherence to institutional ideals⁴⁷.

In our quest for answers on how to develop modern leaders, one come across the idea of "best practise". In industries, the idea of "best practice" is regularly revised and defined but what is ultimately best for all businesses is not obvious. Given the disparities between civilian and military organisations, but also mindful of the shared characteristics that all big, complex organisations share, one can identify the following important elements that are important in the development of military leadership in 21st century.

One is that attracting, motivating, and developing high-quality leaders needs a welcoming, fair work environment. Another is that the principles, knowledge, and attitudes of the organization's senior leadership have a significant impact on organisational climate and cohesion.⁴⁸

Military leaders, more than political and business leaders, are confronted today with an unprecedented complex warfare environment. In addition to the leadership challenges presented by the complexity and ambiguity of modern warfare⁴⁹, the wars in Iraq and Afghanistan demonstrated the need for cultural awareness⁵⁰. To make matters worse,

⁴⁶ For more information on US military's leadership development programs, see Kirchner M. & Akdere M., "Military leadership Development Strategies: implications for training in non-military organizations", *Industrial and Commercial Training*, Vol. 49, No. 7/8 2017, pp: 1-8.

⁴⁷ Walter F. Ulmer Jr, op.cit, p.138.

⁴⁸ For a comprehensive analysis on these issues one should read Jans N., with Schmidtchen D., "The real C-cubed : culture, careers and climate and how they affect military capability", Australian National University. Canberra papers on strategy and defence; no. 143, 2002, pp:1-204.

⁴⁹ For information on hybrid warfare see, Frank G. Hoffman, "Conflict in the 21st Century: The Rise of Hybrid Wars", Arlington, VA: Potomac Institute for Policy Studies, 2007, <https://potomac institute.org/reports/19-reports/1163-conflict-in-the-21st-century-the-rise-of-hybrid-wars>, (accessed 20 May 2021).

⁵⁰ Avolio, B., " Pursuing authentic leadership development". In N. Nohria & R. Khurana (Eds.), "Handbook of leadership theory and practice: A Harvard Business School centennial colloquium", Boston, MA: Harvard Business School Publishing, 2010, pp.739-768. Avolio notes that the future of authentic leadership development will likely incorporate more consideration of contextual influences.

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alliance and coalition partners' cultures can also differ to varying degrees and might have a significant impact on the outcome of multinational operations. It does not then come as a surprise that the US Army makes sure that soldiers are trained to perform in any *volatile, uncertain, complex, and ambiguous* (VUCA) situation⁵¹.

Even though military leaders today face a variety of challenges and responsibilities, some of which are enduring and some of which are novel, there are certain leadership roles that are pertinent and vital for a 21st century military leader. *Warrior-Leader* (officers and non-commissioned officers) must continue to lead men and women into danger. They must plan, prepare, and lead their units in a variety of missions. *Caretaker /Guardian*, the twenty-year war in Afghanistan together with the significant coalition losses in Iraq have put a tremendous strain on forces and their families. Military leaders must ensure the physical and mental well-being of service members and their families. *Caretaker/Guardian of Institution*; Leaders are committed to developing conditions that promote the learning, growth, and retention of service members in time of war and peace. *Technical Experts*: leaders must acquire and retain the technological and tactical skills needed to lead across an ever-broadening spectrum of missions and operational environments. As they lead this highly dispersed army, leaders must also be skilled in the use of communication technology⁵². The advancement of technology has become one of the most powerful drivers of transformation in the military operating environment. The NATO countries (as well as potential western foes and rogue states) have significantly improved their capabilities thanks to technological developments in military equipment and systems⁵³.

Ultimately, military leadership is similar to leadership in any other profession or occupation in terms of priorities and the need to complete tasks. There are differences in terms of context

⁵¹ For more details on the term VUCA see Lawrence, James A. and Earl N. Steck, "Overview of Management Theory", Carlisle Barracks, PA: U.S. Army War College, 1991. See also Yarger, Harry R. "Strategic Theory for the 21st Century: The Little Book on Big Strategy", Carlisle Barracks, PA: U.S. Army War College, Strategic Studies Institute, 2006.

⁵² DuBois RF, Gerstein DM, and Keagle JM., Science, "Technology, and U.S. National Security Strategy: Preparing Military Leadership for the Future", (CSIS Reports) Paperback – 10 April 2017. This report examines ways to develop a cadre of technologically competent officers with the requisite leadership and operational skills.

⁵³ Mc Donald J., "Remote warfare and the legitimacy of military capabilities", Defence Studies, 2021, DOI: 10.1080/14702436.2021.1902315.

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– where the leadership takes place⁵⁴. Military leaders are planning for or working in serious and extreme conditions marked by difficulty and ambiguity, which may include using or being attacked by lethal force⁵⁵.

From the above analysis and the point of view of military leadership, the type of transformational leadership seems to be the most relevant to lean on in the 21st century⁵⁶. In both military and commercial environments, “transformational” leaders have been found to be more successful than leaders who rely heavily on transactional leadership style⁵⁷. Furthermore, academics such as Burns argue that transactional leadership activities lead to short-term trading relationships between followers and the leader. These relationships are characterised by superficial, intermittent exchanges that often result in dissatisfaction among the participants⁵⁸. A number of academics also criticise transactional leadership theory for taking a generic, one-size-fits-all approach to leadership theory development that ignores situational and contextual variables that affect 21st century military operations and organisations⁵⁹. While empirical support for transactional leadership usually incorporates both transactional and transformational behaviours⁶⁰.

⁵⁴ Chan, K.-Y., Soh, S. and Ramaya, R., “Military Leadership in the 21st Century”, Science and Practice, Cengage Learning Asia, Singapore, 2011.

⁵⁵ Wong, L., Bliese, P. and McGurk, D., “Military leadership: a context specific review”, *The Leadership Quarterly*, Vol. 14, pp. 657-692, 2003, doi: 10.1016/j.leaqua.2003.08.001.

⁵⁶ For more information on these roles see Nissinen V., “Military Leadership: Critical Constructivist Approach to Conceptualizing, Modelling and Measuring Military Leadership in the Finnish Defence Forces”, National Defence College, Helsinki, 2001, pp: 67-69.

⁵⁷ Bass B., and Avolio B., “Improving Organizational Effectiveness through Transformational Leadership”, Sage Publishers, 1993.

⁵⁸ Burns, J. M., “Leadership”, New York, NY: HarperCollins, 1978.

⁵⁹ Beyer, J. M., “Taming and promoting charisma to change organizations”, *The Leadership Quarterly*, 10(2), 307-330, 1999, doi:10.1016/S1048-9843(99)00019-3. Yukl, G., & Mahsud, R., “Why flexible and adaptive leadership is essential”, *Consulting Psychology Journal: Practice and Research*, 62(2), 81-93, 2010, doi:10.1037/a0019835

⁶⁰ Gundersen, G., Hellesoy, B. T., & Raeder, S., “Leading international project teams: The effectiveness of transformational leadership in dynamic work environments”, *Journal of Leadership & Organizational Studies*, 19(1), 46-57, 2012, doi:10.1177/1548051811429573

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6. Training for Future Military Leadership

New technology has changed 21st century warfare and the dramatic developments in technology and the speed with which they have occurred will challenge leaders, soldiers, and decision makers⁶¹. The rise of hybrid threats⁶² as well as the proliferation of low-threshold regional conflicts (Libyan conflict of 2011 and Syria) and ongoing asymmetric warfare engagements (such as the ongoing operations in Afghanistan, Mali, or against global extremist movements such as Daesh), would all have a major effect on western military leadership. To this end, we believe that effective modern military leaders should acquire one or more of the attributes mentioned below.

Leaders must be culturally aware and able to successfully communicate with foreigners as well as international partners. Leaders at all levels must recognise, appreciate, and accommodate cultural differences in order to build long-term relationships and cooperation that are beneficial to the mission.

Since technological systems provide an unprecedented amount of information to units and commanders at all levels, leaders should be trained to sift through a constant stream of data to find and synthesise the relevant facts into a coherent picture of the situation.

On one hand, a leadership training program based on transformational leadership requires that each military leader strive for personal development and growth while on the other hand, military operations become ever more complex, and the need to instil a *culture of innovation, adaptability and agility of decision-making* in the training of future leaders will be unavoidable if not a panacea. Modern military organisations should aim to inculcate an atmosphere of education and learning with:

- More development of negotiation/coaching and mentoring at lower levels and
- Commitment to personal and professional development from an early point to last throughout career. For example, the US gives appropriate language training to assist

⁶¹ For more information on how future technology will alter every aspect of war see, Latiff R., "Future War: Preparing for the New Global Battlefield", Alfred A Knopf, 2017, 208 pages, <https://rk1bukz.cf/book.php?id=Ftr1DQAAQBAJ> (accessed 1 June 2021). For a comprehensive study of the future of warfare see, Cohen et al, "The Future of Warfare in 2030", Rand Corporation, 2020, https://www.rand.org/pubs/research_reports/RR2849z1.html (accessed 20 May 2021).

⁶² Fleming, Brian P. "Hybrid threat concept: contemporary war, military planning and the advent of unrestricted operational art", Monograph, US Army Command and General Staff College, 19 May 2011.

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in better understanding regional targets and both Ratings and Officers are routinely sponsored to degree and post-graduate qualifications in appropriate subjects (cryptology, international affairs, strategic studies, etc).

The 'free-thinkers' do not get promoted because they are not conventional enough. This is not helped by the requirement to do specific jobs/roles prior to promotion for certain amounts of time. A risk adverse culture has been grown in militaries⁶³. There needs to be more incentives for officers to think 'outside the box'. We train and educate military people to be risk adverse (i.e. engineering officers); they therefore lose their agile thinking.

Adopting the transformational leadership model requires militaries to meet the challenges of the twenty-first century by educating, engaging and utilising their general officers' attitude, knowledge and critical thinking skills⁶⁴. A good example of this approach can be demonstrated by the United States Army, which in 2010 formally adopted the idea of 'design' to address the 'fog of war' scenarios into its operational planning doctrine⁶⁵. The idea stemmed from a growing awareness that the traditional planning process had not delivered the level of understanding needed in the contemporary operational context, and that the why-to-what component of operational planning required more systematic review. The idea of design was instigated prior to the planning of major military operations, a design team was to be constituted in order to properly understand the dynamics of:

- i) the operational environment;
- ii) the problem at hand;
- iii) the potential operational approaches available.
- iv) Once those dynamics had been understood, the commander might then synthesise a concept of operations that could be handed down to the planning

⁶³ Findings of the Hybrid Warfare Conference organised by Dr Fotios Moustakis at Commando Training Centre Royal Marines (CTCRM), Lympstone, UK, March 2016.

⁶⁴ For more information on the importance of strategic thinking and critical skills see, Moustakis F, Mourtos G., & German T., "The Dominance of Strategy and the Deficit of Strategic Thinking", *Naval Review*, Autumn 2020, Vol, 108, Issue 4, pp.478-485.

⁶⁵ Design is a methodology for applying critical and creative thinking to understand, visualize, and describe complex, ill-structured problems and develop approaches to solve them" (FM 5-0 The Operations Process, Department of the US Army, March 2010, 3-1).

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team, where it would inform their planning of subsequent force generation, manoeuvre, fires, logistics, etc. Utilising the subordinates' critical thinking skills, knowledge, desire to participate in the mission, will only benefit the organisation and its members.

Those who will be responsible for operational integration of these new technologies must remember the human element of training and education. Training should not merely be an afterthought but it should be integrated into development.

Space, Cyber, Hypersonics will require both academic but also industrial training to understand the nature of these systems. Universities and defence industry have significant experience with these technologies and they need to work very closely with the future military leaders to make them aware and educate them on these new technologies.

In addition to standardised training, these new capabilities must be continuously integrated into war games, exercises and demonstrations to improve not only the operators' performance but also the ability of the military leaders to incorporate these capabilities into campaigns. Demonstrations and simulations are critical to evaluate the functionality, requirements but most importantly to get a sense of what is needed in terms of further training requirements. Ideally, these simulations need to incorporate operational concept demonstrators where the military leaders and the armed forces will be able to evaluate these capabilities in the real theatre of operations.

In the complex/hybrid environment of the 21st century, the military requirement will be for more agility, forward deployment, better situational awareness, fully integrated information operations, and persistence. Achieving those things will involve more devolution of command and control, better-integrated information systems at the alliance and joint levels and well-educated officers.

7. Conclusion

The paper has demonstrated that leadership needs to evolve to adequately meet the transformations in the military environment. The impact of emerging technologies will

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challenge the ability of military leaders to function effectively in a dynamic and fluid future battlefield. Understanding the effect of the new technologies on future operations will allow western leaders to adapt, organise and plan for their future endeavours. As leaders continue to learn how to lead and serve the members of their organisations, new technologies are pushing them to retool. The insights of the national and allied armies gained during the recent operations in Iraq, Afghanistan, Syria and Libya should also be used to revise national strategies for military leadership.

As the paper pointed out a leadership-training program based on transformational leadership will require that each military leader strive for personal development and growth. At the same time, the need to instil a culture of innovation, adaptability and agility of decision-making in the training of future leaders will be unavoidable if not a panacea.

The new paradigm of military leadership in 21st century should embrace officers desire to further themselves. Conflicts and wars take place between people. People are influenced in two ways by leadership training: directly and indirectly. We have the potential to shape our leadership culture because a military institution has the ability to educate its leaders. Only learning organisations will thrive in the world of change and innovation.



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Russia’s Lethal New Kinzhal ‘Carrier Killer’ Hypersonic Missile Set to Bring Renewed Foreign Interest in MiG-31 and Tu-22M as Launch Platforms for Maritime Strike Role, *Military Watch*, Aug 2018, <https://militarywatchmagazine.com/article/russia-s-lethal-new-kinzhal-carrier-killer-hypersonic-missile-set-to-bring-renewed-foreign-interest-in-mig-31-and-tu-22m-as-launch-platforms-for-maritime-strike-roles> (accessed 5 May 2021).

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