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Message from the Chief Patron



It gives me immense pleasure to introduce you all to the new 35th Issue of DSCSC Journal “MIRPUR PAPERS”. For almost thirty years, this esteemed journal – one of the oldest in the armed forces- has been dedicated to shedding light on the sphere of cognition. This rich history connects us all to a long-standing tradition of knowledge dissemination. I believe this Journal will become an invaluable source for researchers, academicians and students who wish to do further research and contribute to the body of knowledge. I hope the articles published in “MIRPUR PAPERS” will encourage all its readers to write new articles on various topics.

I appreciate the editorial board for another fascinating volume of “MIRPUR PAPERS” comprising ideas on security and military studies. I am also happy to announce the journal as a bi-annual peer-reviewed journal from the last 34th Issue, encompassing national, international and professional matters. We are delighted to blend this journal with the write-ups of course participants, faculty members, and DSCSC alumni.

I hope this journal is going well and expect it to have a certain appeal to readers. It will generate interest among scholars and practitioners with renewed vigour and motivation. I encourage all to share feedback and suggestions to help us improve and better serve the needs of our readers.

I sincerely appreciate all who have worked behind this publication in different capacities to make the “MIRPUR PAPERS” (Volume Number 30, Issue Number 35, September 2024) a reality. I extend my heartfelt gratitude to the authors, reviewers, and all those who have contributed their time and expertise to this issue. Your efforts have enriched this journal, and I look forward to your continued support.

**Major General Chowdhury Mohammad Azizul Haque
Hazary, OSP (BAR), SGP, ndc, psc, M Phil
Commandant
Defence Services Command and Staff College**

Editor's Note



Dear Readers

The Defence Services Command and Staff College in Mirpur, Bangladesh, has once again published the MIRPUR PAPERS, continuing its tradition from previous years. This journal primarily features articles written by Command and Staff Course participants. Additionally, it includes contributions from the college's faculty members and alumni. The latest edition contains eleven articles on various topics, ensuring that our readers will be intellectually engaged.

The first article of this publication, titled 'In the Shadow of Giants: China, India, Myanmar's Strategic Interplay, and Bangladesh's Geopolitical Calculus,' explores the complex geopolitics of South Asia, emphasising the strategic roles of China, India, and Myanmar, as well as the implications for Bangladesh. The paper argues that Bangladesh must navigate the increasing influence of China and India, especially in light of Myanmar's internal conflicts and the Belt and Road Initiative. This study is significant as it highlights Bangladesh's delicate balancing act and underscores the necessity for strategic diplomacy in a rapidly changing regional landscape.

The second article, 'The Changing Character of Contemporary Land Warfare: How the Bangladesh Army Can Adapt to Changes,' discusses warfare's evolving nature due to technological advancements and the emergence of new strategies such as hybrid and non-contact warfare. The article emphasises the need for the Bangladesh Army to modernise its doctrine and training to navigate the contemporary operational environment effectively. This topic is intriguing as it underscores the shifting landscape of military operations and the importance of adapting defense strategies.

The third article argues that the Bangladesh Armed Forces must improve their joint cyber warfare capabilities to ensure national security in the face of rising cyber threats, as demonstrated by the Russia-Ukraine conflict. Key lessons highlight the need for a unified strategy and better coordination among military branches to address vulnerabilities effectively.

This topic is particularly relevant given the growing significance of cybersecurity in modern military operations and Bangladesh's unique challenges in this digital age.

The fourth article, 'Of Hills: The Promises and the Perils,' examines the difficulties of conducting field training in hilly and mixed-topography environments. It emphasises the need for specialised forces and improved operational strategies. The author argues that despite technological advancements, historical lessons about terrain control remain significant. The paper also highlights Naikhongchhari's rich military history and the importance of preserving institutional memory, making it an engaging read due to its combination of practical military insights and cultural heritage.

The fifth article, 'Military Diplomacy for Bangladesh in the Context of the New World Order,' discusses the importance of military diplomacy for Bangladesh in securing national interests and strengthening its position on the global stage. The paper highlights the need to develop bilateral and multilateral relationships through joint military exercises and defense dialogues. It provides valuable insights into the challenges and opportunities associated with military diplomacy, highlighting its strategic significance within a complex geopolitical landscape. This makes the article particularly relevant for policymakers and scholars alike.

The sixth article, titled 'Application of The Theories of Center of Gravity: Perspective on the Global War on Terror' by Commander M. Rafiqul Islam Khokan, argues that the Center of Gravity (CG) concept remains relevant in addressing non-conventional threats such as terrorism. The paper emphasises that a systematic deconstruction of CG can uncover the critical strengths of insurgent groups despite the challenges presented by intangible factors. This perspective is intriguing as it reconciles traditional military theories with the complexities of modern warfare, highlighting the adaptability of CG analysis in evolving conflict landscapes.

The seventh article, 'Developing Saidpur Airport as a Regional Air Cargo Hub: An Effective Way to Boost the National Economy,' argues that transforming Saidpur Airport into a dedicated cargo hub could significantly enhance Bangladesh's economy by stimulating trade and improving regional connectivity. The research highlights the existing deficiencies in air cargo transportation and emphasises the urgent need for improved infrastructure. This intriguing topic addresses a critical gap in Bangladesh's transportation strategy and outlines the potential economic benefits.

The eighth paper discusses the shortcomings of the Bangladesh Navy's current Sailors' Assessment system, which does not accurately reflect sailors' performance. The study underscores the need for more comprehensive evaluation methods to ensure fair and objective assessments. By addressing various challenges, the research offers a pathway towards improved organisational efficiency and better career development opportunities for sailors within the Navy. This topic is significant because it addresses organisational efficiency within the Navy and emphasises the crucial connection between assessment accuracy and human resource management.

The ninth article, titled 'Naval Gunfire Support in the 21st Century: Relevance vs Requirements,' authored by Commander A. T. M. Rijwanul Jannat, examines the changing significance of naval gunfire support (NGS) in contemporary warfare, particularly in amphibious operations. The paper argues that while NGS remains vital, it faces challenges from advanced anti-access and area-denial threats and the proliferation of precision-guided munitions. Key lessons emphasise the necessity of integrating modern weaponry with traditional tactics. The discussion is insightful, highlighting plausible ways to meet future NGS requirements of smaller navies.

The tenth article, titled 'The Impact of GIS in Modern Warfare: A Historical Analysis and Future Implications,' is authored by Lieutenant Colonel Md. Faizul Kabir. It explores how Geographic Information Systems (GIS) have transformed military operations by improving situational awareness and decision-making. The paper highlights key historical milestones and discusses future possibilities, particularly integrating GIS with artificial intelligence and big data. It underscores the significance of accurate spatial data for military commanders. This research is compelling as it reveals the crucial role of GIS in modern warfare and offers insights for future military strategies.

The final article in this publication 'Grading Consciousness vis-à-vis Cognitive Development of Junior Officers: Causes, Effects and Ways Forward' by Major Md Ahteshamul Haque Niaz argues that grading consciousness hinders effective learning and cognitive development in Junior Officers, fostering a culture of materialistic learning over critical thinking, creativity, and problem-solving—key traits for modern warfare. The organisational culture within Bangladesh Army, limitations in the training institutions, and individual psychology all contribute to this issue. This research is significant as it proposes a few organisational approaches, along with shaping individual psychology, encompassing both command and institutional responsibility, aimed at enhancing the cognitive development of junior officers of the Bangladesh Army.

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In the Shadow of Giants: China - India – Myanmar’s Strategic Interplay and Bangladesh’s Geopolitical Calculus

Lieutenant Commander Sk. Mahmud Hasan, (G), BCGM, psc, BN

Abstract

This study explores the intricate geopolitics of South Asia, focusing on the strategic interplay between China, India and Myanmar and its implications for Bangladesh’s foreign policy. The research employs a qualitative method, analysing primary and secondary sources, including official documents, policy briefs and academic literature, to uncover the dynamics of regional power politics. The study is structured into three parts. First, it examines China’s Belt and Road Initiative (BRI) and its growing economic and military presence in Myanmar and Bangladesh, comparing it against India’s Act East Policy and broader regional aspirations. Second, it assesses Myanmar’s internal conflicts, such as the rise of the Arakan Army and its role in shaping Myanmar’s strategic alignment between China and India. Lastly, the paper evaluates Bangladesh’s geopolitical positioning, highlighting its efforts to maintain a balanced foreign policy to maximize economic and security benefits while addressing transnational security challenges emanating from Myanmar. The research underscores the necessity for nuanced and proactive diplomatic strategies to navigate these complexities. It concludes that fostering regional stability requires a coordinated international response and strengthened bilateral and multilateral engagements, positioning Bangladesh as a pivotal actor in South Asia’s evolving strategic landscape.

Introduction

Myanmar holds major geopolitical importance because its natural resources are vast as well as because it is strategically positioned between South Asia and Southeast Asia. Its vast natural resources act ambiguously since they are sources of both prosperity and conflict (Adamson & Friedman, 2013). This study mainly explores China’s involvement with Myanmar through its ambitious Belt and Road Initiative (BRI) aimed at promoting connectivity and enlarging its global influence (Schottli, 2022). As such, Myanmar provides China with a gateway to the Indian Ocean by its geographic location.

At the same time, India's involvement cannot be ignored in Myanmar which ties in with the Act East Policy because it sees the nation as a critical ally in its struggle to increase regional interconnectivity and check growing influence of China. Act East Policy was launched in 2014 as part of India's strategic pivot towards deepening dynamics with Southeast Asia into Spherical trigonometry among other regions. (Mohan, 2020). India needs Myanmar as a passageway to South-East Asia to make the new strategy effective. The improvement of economic links with Myanmar is an integral part of the current policies being pursued by India. In addition, India wants to improve connectivity in the states located in its north-eastern part crossing the territory of Myanmar. Projects such as the India-Myanmar-Thailand Trilateral Highway and Kaladan Multimodal Transit Transport Project reveal India's initiatives to establish efficient transport corridors that do not involve China (Lian, 2023).

The foreign policy formulation in Bangladesh remains challenging at the junction of these regional power plays. On the contrary, the growing strategic engagement of China and India with Myanmar has presented a number of security concerns for Bangladesh (Brewstar, 2022). This includes apprehension over the possible militarisation of the border that separates Myanmar from India and China. Thus, the big concerns that will drive the adjustments in Bangladesh's military strategies as comprehended are: the risk of strategic encirclement with China's maritime ambitions in the Bay of Bengal and deepening China-Myanmar military ties. The suffering of the Rohingyas and other possible refugee inflows, turning into a proxy playground of regional powers, and the orientation taken by the infrastructure projects of the Chinese BRI in Myanmar set the tone for deep development in the economic and security landscape of Bangladesh. These challenges therefore need careful reassessment to adopt a new approach for Bangladesh in order to ensure its security among the evolving regional power dynamics through diplomatic engagements and regional cooperation efforts.

This journal delves into the intricate dynamics of regional geopolitics involving China, India, and Myanmar, with a focus on their implications for Bangladesh. It begins by examining the strategic interests and policies of China and India in Myanmar, followed by an analysis of Myanmar's internal challenges and their regional spill-over effects. The discussion then shifts to Bangladesh's unique positioning within this geopolitical framework, addressing the security, economic and diplomatic challenges it faces. Finally, the paper offers strategic recommendations for Bangladesh to navigate these complexities and ensure national security and development amidst the evolving power dynamics in South Asia and beyond.

Historical Context and Geopolitical Background

- a. **China - India Rivalry:** The Sino-Indian connection is one of the peak and most intricate bilateral ties in Asia. It has been underpinned by the agitations of history and contemporary power dynamics of a country. The rivalry between Sino and India can be traced to the middle of the 20th century when the two nations came out from colonial rule. The biggest conflict, the Sino-Indian War of 1962, was based on border disputes along the Himalayan region.
- b. **Modern-Day Power Dynamics:** Over the last few decades, China and India have proclaimed rapid economic growth that catapulted them to greater global and regional influence. Such economic growth has engineered strategic rivalry for regional supremacy. Taken against this backdrop, China's Belt and Road Initiative and investments in infrastructure projects in South Asia are events dearest to the hearts of Pakistan, Sri Lanka and Myanmar have been viewed as strategic encirclement by India. India has therefore been strengthening regional initiatives in the Act East Policy and, more importantly, reaching out to the United States, Japan, and Australia for strategic alliances in the form of Quad.
- c. **Myanmar's Role in Regional Politics:** The geopolitical importance of Myanmar lies in the fact that it lies at the junction of China, India and Southeast Asia. This country has always balanced itself between these major powers and has been playing a balancing act to woo them for economic and military aid. Moreover, Myanmar's strategic importance is further enhanced by way of access to the Bay of Bengal and the prospect of its turning into a transit hub between South and Southeast Asia. For China, Myanmar provides an important route to the Indian Ocean bypassing one of the strategic chokepoints in the world, the Strait of Malacca. This is being underpinned through China's investments in Kyaukpyu deep-sea port and China – Myanmar Economic Corridor (CMEC). A further such case is that of India, in which Myanmar serves as a gateway to the Northeastern States and is decidedly significant in light of its Act East Policy aimed at strengthening connectivity and cooperation with South-East Asia more broadly.

Geostrategic Involvement of China

China desires to have a route for the Indian Ocean, and this would come through projects such as the Kyaukphyu Deep Sea Port, bypassing the Strait of Malacca and contributing to energy security. The deep-water port—the \$7.3 billion project—and the related \$2.7 billion Boost for Industry Area in an SEZ are all parts of the project (Poling, 2018).

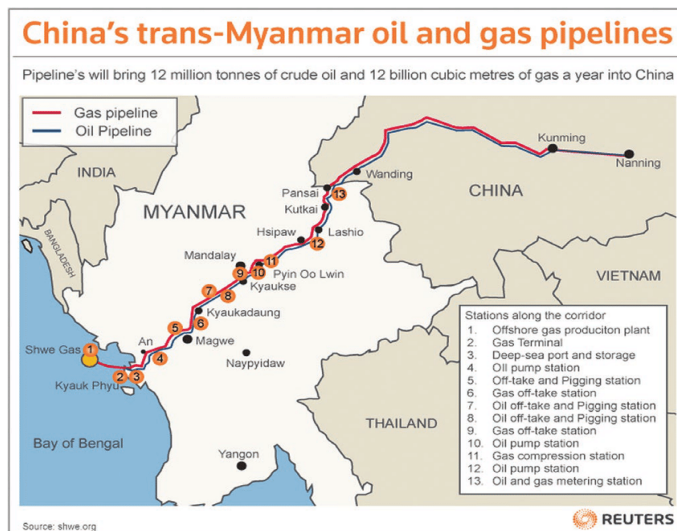
Figure-1: One Belt and One Road Initiative by China



Source: <https://asia.fes.de/news/riding-the-silk-road-discord-and-cooperation-along-the-maritime-route.html>

a. **Securing Energy Supply Routes:** Geographically, Myanmar provides alternative routes for energy importation, making it easier for China to bypass maritime chokepoints and thus diversifying its energy supply routes. For this purpose, the Kyaukphyu Deep Sea Port is said to provide Beijing with an alternative route skirting the South China Sea for oil imports. It is also ‘a major part’ of the 1,700 km China-Myanmar Economic Corridor (Zhou, 2023).

Figure-2: China’s Trans-Myanmar Oil and Gas Pipelines



Source: https://www.researchgate.net/figure/The-cross-border-China-Myanmar-oil-and-gas-pipeline-from-Kyaukpyu-to-Kunming-through_fig3_323760627

b. **Belt and Road Initiative (BRI) Projects in Myanmar:** Myanmar is strategically located in regard to the China-proposed Belt and Road Initiative, which provides an important corridor for enhancing connectivity between China and the Indian Ocean. The BRI was announced by Chinese President Xi Jinping in 2013 to promote infrastructure development, trade and economic cooperation on the ancient Silk Road routes. Geographically, Myanmar connects the southwestern provinces of China with the Indian Ocean; thus, it becomes a focal point for BRI projects not only in this region but for the overall presence (Myers, 2020).

Kyaukphyu Deep Sea Port

The Kyaukphyu Deep Sea Port is one of the hallmark infrastructure development projects of China under its BRI in Myanmar. This will be a port situated in Rakhine State on the Bay of Bengal and has strategic value since it lies along major maritime trade routes and was—should the need arise—to become a major transshipment hub in the Indo-Pacific (Network, 2024).

Figure-3: Bird's Eye View of Kyaukpyu Port in Myanmar



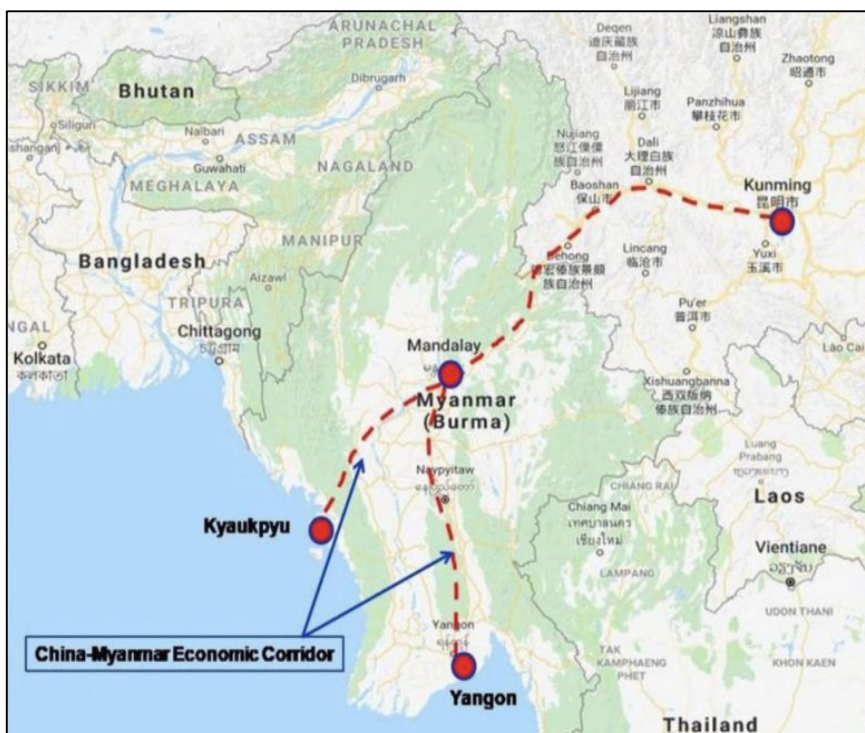
Source: <https://www.csis.org/analysis/kyaukpyu-connecting-china-indian-ocean>

China-Myanmar Economic Corridor (CMEC)

The Construction of the China-Myanmar Economic Corridor (CMEC) is one of the important projects in the Belt and Road Initiative aimed at increasing connectivity and economic cooperation between China and Myanmar. Several infrastructure projects such as highways, railways, industrial zones and energy pipelines which covers trade,

investment and regional integration are brought together under CMEC. From Yunan province in China all the way to Mandalay and Yangon which are Myanmar's main economic cities, this path provides essential infrastructural connections that will aid in bilateral business transactions and inflow of money (Anand, 2019). The CMEC's main purpose is to improve connectivity—by way of roads, railways and logistic infrastructure—between all of China's southwestern provinces, especially Yunnan, with Myanmar's major economic centers: Mandalay and Yangon. This means constructing highways, railways, and logistic infrastructural facilities, allowing for the smooth flow of goods, services and people across these borders. (CGTN, 2017)

Figure-4: China-Myanmar Economic Corridor (CMEC)

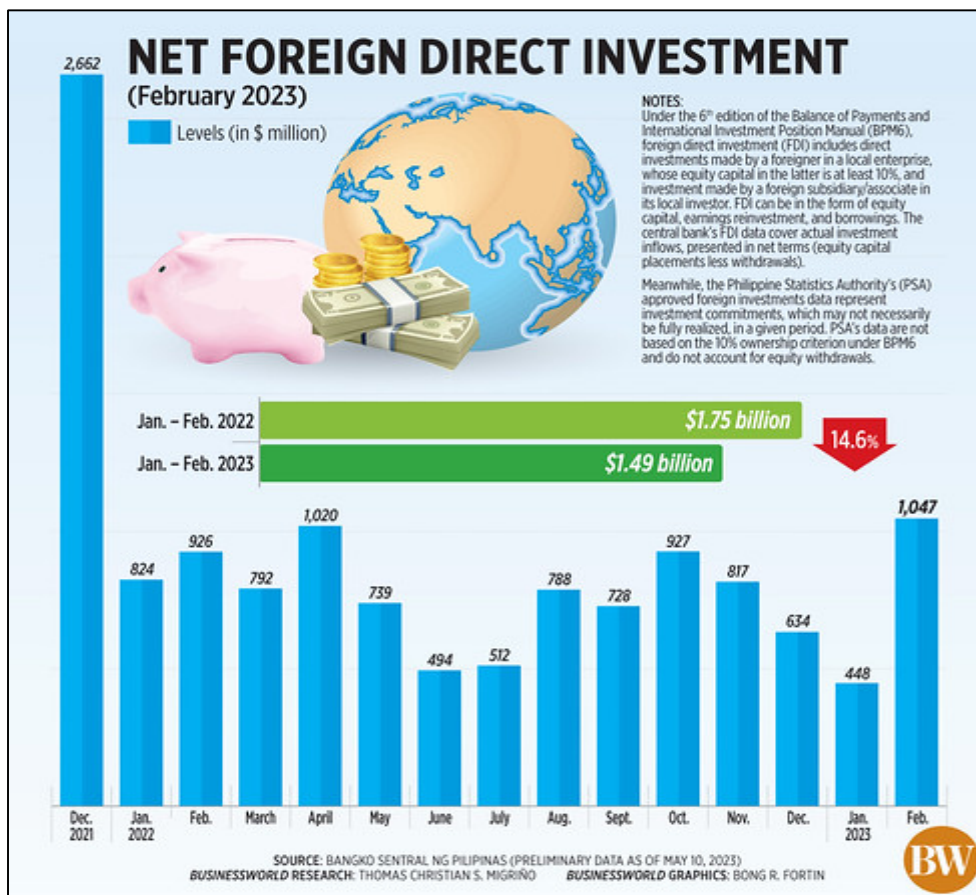


Source: <https://asiatimes.com>

Bilateral Trade Dynamics

China has been the biggest trading partner for Myanmar, and trade figures run into billions of dollars annually. Demand from China has contributed enormously to the elevation of exports from Myanmar, specially connected with natural resources like minerals, timber etc. Conversely, China supplies Myanmar with manufactured goods, machinery, and consumer products to satisfy both the domestic demand of its infrastructure and demand for consumer goods (Admin, 2024).

Figure-5: Net Foreign Direct Investment



Source: www.bworldonline.com

India's Geostrategic Involvement in Myanmar

India's geostrategic involvement in Myanmar reflects its broader strategic interests in the Indo-Pacific region and its desire to enhance connectivity, promote economic cooperation and strengthen regional stability. The historical context of India-Myanmar relations, coupled with India's "Act East" policy, underscores the significance of India's engagement with Myanmar in shaping regional dynamics.

India's "Act East" Policy and its Significance

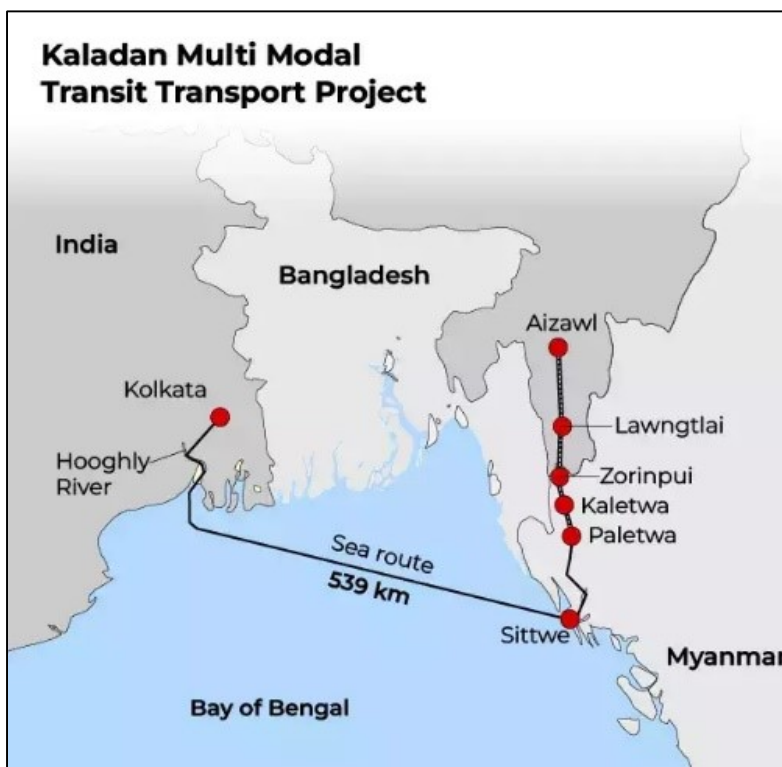
India's "Act East" Policy represents a strategic shift in its foreign policy toward proactive engagement with Southeast Asia and the broader Indo-Pacific region. The policy aims to deepen economic integration, enhance connectivity and strengthen strategic partnerships with East and Southeast Asian countries. The "Act East" Policy

is an extension of the 1990s India's "Look East" Policy expanding its focus and ambition to deal with changing geopolitics and economic necessities. At the heart of India's "Act East" Policy is the endorsement of economic inclusion and trading cooperation with the nations in the East and South East Asia zone (Tiwari, 2024).

Kaladan Multi-Modal Transit Transport Project

One such major infrastructure initiative being pursued by India to overcome the negligible connectivity and foster greater economic integration between the Indian northeastern state of Mizoram and Myanmar's Rakhine State is the Kaladan Multi-Modal Transit Transport Project. The project's aim is to develop a multi-modal transport corridor, including a road route, a river route and a sea route, which would be helpful in trading or transporting goods between India's North East and Southeast Asia. The project will avoid the current land route through the thin Siliguri Corridor, also known as Chicken's Neck and the choked sea route via the Strait of Malacca (Laskar, 2021).

Figure-6: Kaladan Multi-Modal Transit Transport Project



Source: www.iasgyan.in

India-Myanmar-Thailand Trilateral Highway

The India-Myanmar-Thailand Trilateral Highway as an infrastructure project will help build connections among India, Myanmar and Thailand for economic growth. The road which is also known as IMT Highway or East-West Economic Corridor stretches 1,360 kilometers linking the northeastern Indian States such as Assam, Manipur, and Nagaland with Myanmar and Thailand. Envisioned in the project is the setting up of a strategic transport link between South Asia and Southeast Asia to help trade, investment, and people-to-people exchanges (Delhi, 2019).

Figure-7: India-Myanmar-Thailand Trilateral Highway



Source: <https://pib.gov.in>

Potential Impacts on Bangladesh

Many areas of China's and India's involvement in Myanmar have a geostrategic origin, with potential impacts on Bangladesh at economic, security and geopolitical levels. These need to be understood if the country is to master and navigate such complex regional power dynamics and chalk out effective strategies for securing its

national interests. The possible impact on Bangladesh in this regard would be as follows:

a. **Investment Dynamics:** Large investments in its infrastructure and industries by China and India in Myanmar may alter the regional dynamics of investment. For example, on the positive side, Bangladesh can get spillover effects in terms of increased FDI and technology transfers. However, on the negative side, Myanmar can be given preference as an ideal strategic investment hub, which may drain out investments that would otherwise have come to Bangladesh.

b. **Energy Security:** By securing Myanmar's energy supply routes, China may be able to cut its costs and risks for energy transportation through the Malacca Strait. This will affect regional energy prices and availability and will relate to the costs energy security and in Bangladesh.

c. **Maritime Security:** Off the Bay of Bengal, more so through projects like the Kyaukphyu Deep Sea Port, the Chinese presence may change the outlook of maritime security, which perhaps may build up the naval activities and strategic competition around the region. As a result, it may challenge Bangladesh's maritime sovereignty and security interests.

d. **Border Security and Insurgency:** Improved connectivity and infrastructure development along the India-Myanmar border is quite likely to be bound to affect the dynamics of cross-border insurgency. While better infrastructure may control and manage borders more effectively, it may well facilitate the movement of insurgents and other illicit goods and thus complicate Bangladesh's border security.

e. **Regional Influence:** The growth in the influence of China and India over Myanmar is likely to further change the role and influence of Bangladesh within regional institutions like BIMSTEC and SAARC. Now more than ever, this might be the time for Bangladesh to readjust its strategy in the gameboard of diplomacy if the country is to hold on and improve its regional position.

Bangladesh's Geopolitical Calculus

Geographic location and economic potential underline the strategic importance of Bangladesh. It is located at the juncture of South and Southeast Asia and hence acts as an umbilical cord for regional connectivity and trade routes. The proximity of the country to the big economies like India and China adds to its strategic value.

Economically, Bangladesh has become an integral contributor to the world's textile industry and is basically on a spree of rapid economic growth, serving as a boost to its geopolitical importance.

a. **Foreign Policy Objectives:** The foreign policy of Bangladesh is marked with caution in balancing its relations with its immediate neighbours, China, India, and Myanmar. A close relationship is sought to be developed with India, the largest trading partner, on the one hand, and with China, which can substantially provide investments in support of infrastructure development on the other. The Myanmar situation is grave because of the Rohingya refugee issue, and so diplomacy is required to win regional stability. In Bangladesh, hence, foreign policy is guided by the emerging necessities of capitalizing upon the relations for economic growth, national security, and regional cooperation. The balancing act therefore helps Bangladesh sail through the complex geopolitical scene with finesse.

b. **Economic Diplomacy:** Bangladesh utilizes economic diplomacy in pursuit of the key trade relationships and sustenance that would benefit the country and favourably enhance its economic development. It had built good trading relationships with large economies such as the United States, the European Union, and China. Before, economic policies were framed in the direction of expanding export markets and promoting foreign direct investments as well as building infrastructure. The participation of Bangladesh in regional trade agreements and initiatives such as South Asian Free Trade Area and Belt and Road Initiative shows its interest in economic diplomacy.

c. **Security and Military Cooperation:** The country's defense strategies and alliances come out as more or less quite fundamentally in conformity with the national security of Bangladesh and stability in the Asian region. It has been under way with various modernization programmes to boost its militia and acquired state-of-the-art pieces of defense equipment. This is through security cooperation with neighbouring countries and other world superpowers in joint exercises, training programmes, and intelligence sharing. Bangladesh has also been an active contributor to the United Nations peacekeeping missions, another factor that raises its international standing and security expertise.

Limitations and Challenges for Bangladesh in Navigating the Competition between China and India in Myanmar

a. **Dependency on Textile Exports:** The economy of Bangladesh is highly reliant on the textile and clothing sector, which occupies a significant share of its GDP and export earnings (Das, 2022). The industry employs millions of workers. Most of them are women, and it is a robust indication of its commitment to economic development and social improvement. This, however, also puts Bangladesh in an extremely vulnerable position in terms of global market shocks and evolving trade policy.

b. **Trade Deficits:** The challenge of perpetual trade deficits and imbalanced trade relations with such major economic powers as China and India have remained a threat to attaining economic stability within Bangladesh. All of these have been the results of various factors, among which most important are limited export diversification, high dependence on imports for essential goods, and competitive disadvantage in various sectors. It imports commodities ranging from raw materials for its textile industry to consumer electronics, with very few products exported to China. Concerning India, there is substantial importation in consumer goods, machinery, and raw materials, which results in a large trade deficit. Such imbalances reduce foreign exchange reserves, worsen debt burdens, and diminish bargaining power in regional negotiations for Bangladesh.

c. **Economic Diversification:** One serious limitation to Bangladesh exploiting fully the new opportunities which arise from these regional connectivity projects of China and India is the lack of economic diversification. Though the textile industry dominates the economy, other sectors like agriculture, manufacturing, and services have not been developed enough to provide alternative sources of income generation and employment (Das, 2022).

d. **Political Turmoil:** Periodic political turmoil in Bangladesh and issues relating to governance are contributors to problems in effective policy implementation and discourage foreign investment. The domestic political unrest more often than not manifests in the form of violent street protests, strikes called hartals and clashes between different political parties at the domestic level, bringing economic activity to a close, paralyzing people's daily lives, and creating an uncertain environment for locals as well as foreign investors.

e. **Resource Management:** Environmental degradation and mismanagement of related resources are major concerns in Bangladesh, along with concerning water security. Poor management of the country's natural resources can enhance the effect of water scarcity and pollution, both in agricultural and urban areas. This is of particular importance when considering that most of Bangladesh's water resources are shared with the neighboring country of India. Water rights and the manner of its use have severe disputes that could cause tension, complicate bilateral relations, and environmental degradation.

Suggested Strategies for Bangladesh to Manage Regional Power Dynamics.

a. **Diplomatic Balancing:** Under the present conditions, Bangladesh will have to enhance diplomatic relations with both China and India to retain a balanced and effectively influencing position in the region. Regular dialogues at the highest level will increase mutual understanding between them on problems related to regional security, economic growth, and cultural interchange. These dialogues, in addition to the joint working groups' work on specific issues, would further deepen bilateral cooperation in all respects and ensure sustained engagement. Moreover, bilateral visits of the heads of state and other high-level dignitaries, duly scheduled and chalked out with agendas, help in developing close personal rapport and thus trust, which can support strong diplomatic relationships.

b. **Investment Attraction:** Bangladesh needs to attract investments from diverse countries, other than just China and India, to avert economic overdependence on any single country and to sustain a resilient economic landscape. Actively welcome FDI from various international sources, and Bangladesh can capture a broader spectrum of expertise, technology transfer and capital inflows to foster a more solid, dynamic economy. Apart from this, steps with respect to infrastructure development, regulatory reform, and ensuring political harmony have to be taken for making an attractive investment climate.

c. **Trade Agreements:** Full-fledged trade agreements with a number of regional and global partners would enable the sharing of gainfully the fruits of market access and minimizing vulnerability arising from geopolitical tension. These could provide new markets for Bangladeshi products and services, enhance export opportunities, and develop better conditions for international trade. An aggregating network of trading partnerships will not only help Bangladesh accelerate its current economic growth through greater stability by cushioning against external economic shock but also strengthen the position.

d. **Strengthening BIMSTEC:** Active participation in the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation has been strongly needed to strive towards regional integration and collective economic growth. Under the support of BIMSTEC, strong Bangladesh would be capable of engaging its member countries in sectors from commerce to technology, energy, and infrastructure development. This might foster resource sharing, knowledge exchange, and joint projects between member nations.

e. **Reinvigoration of SAARC:** There has to be advocacy made toward the reinvigoration of SAARC so that regional cooperation finds a meaningful shape and there is an effect on regional challenges. Through the revival of SAARC, Bangladesh would work toward overcoming political and economic imperfections that hampered the progress of this association. This can be attained through the process of consultations, consensus building on highly debated issues, and the interactive and cooperative efforts done with regard to the regional problems and concerns faced by the member states, such as poverty, terrorism, climate change, and health crises.

f. **Connectivity Projects:** Outlay in infrastructure projects that expand connectivity with neighboring states is of paramount importance for the economic growth and regional integration of Bangladesh. The roads, railways, sea ports, and energy pipelines will connect Bangladesh with India, China and Southeast Asia. Better connectivity will reduce the cost of transportation, increase efficiency, and be more attractive to foreign direct investment by creating an easily accessible and business-friendly environment.

g. **Special Economic Zones:** A developmental step in securing inflows of FDI to drive industrial growth in Bangladesh is the creation of special economic zones. They can also set up regional trading cum manufacturing business hubs wherein investors will have conducive conditions in terms of tax incentives, easier compliance conditions, and robust infrastructure.

h. **Military Modernization:** Modernization of the military will help Bangladesh face any regional security challenge. This modernization should be in terms of equipment upgrading in advanced weapon systems, surveillance systems, and communication technology. In addition, adequate training programs for military personnel have to be tuned for better preparation with the handling of modernized equipment and updated tactics. More importantly, such international cooperation on defense can facilitate

helpful knowledge-sharing processes, procurement of the latest technological expertise, and strategic partnerships.

j. **Leveraging Geostrategic Position:** Maritime Security Modernization of maritime security capabilities assumes a prime position in protecting Bangladesh's interests in the Bay of Bengal. Acquiring modern naval vessels, surveillance systems, and facilities for coastal defence infrastructure will be required to secure maritime borders and resources. Cooperative ties with regional navies assume great significance in ensuring the security of sea lanes—critical for trade and energy supplies. Joint patrols, sharing of intelligence, and coordinated operations would have much potential to deter piracy, smuggling, and other forms of maritime threats. Strengthening maritime security not only safeguards the economic and strategic interests of Bangladesh but also aids in ensuring regional stability, and security of Bay of Bengal.

k. **Geopolitical Alliances:** Strategic alliance with like-minded countries is of paramount consideration for Bangladesh so that the overwhelming influence of major powers in regional activities gets offset. The alliances with ASEAN countries and other middle powers can make Bangladesh an influential player geopolitically in ensuring a multipolar balance of power. Ties can be forged in areas like trade, defence and technology cooperation where mutual benefits and shared interests will accelerate links. Such links can further be consolidated through participation in multilateral forums and regional organizations, which will afford opportunities for collective action in regional issues.

Conclusion

Bangladesh will have to adopt an effective and balanced approach towards regional power dynamics that China and India are involved in over Myanmar. It is strengthening diplomacy with both China and India, as this will allow seeking maximum economic benefit while maintaining regional stability. Such active mediation and cultivations of good relations with both powers would raise the standing of Bangladesh in terms of its diplomacy and positive influence on regional outcomes. Furthermore, the idea of acting as a neutral moderator on regional conflicts can build trust with the neighbouring countries and increase its power in the field of regional diplomacy.

Economic diversification or regional cooperation is highly needed for strategic positioning for Bangladesh. Such economic dependency upon any single country will

be diminished as soon as Bangladesh establishes investments from a variety of sources and seeks out diversified trade agreements. These regional initiatives would help ensure collective economic growth and greater regional integration for the country. These would be the places that would bring together mutual interests, such as facilitation of trade, infrastructure and poverty alleviation.

These would facilitate foreign investment and industrial growth that can turn the SEZs into regional trade and manufacturing hubs. They will offer a business-friendly environment inclusive of several incentives for foreign investors, create a huge number of jobs, and be engaged in technological development. Economic diplomacy would, therefore, play a very important role in Bangladesh's active involvement in the formation of key trade partnerships and the promotion of economic strategies for sustainable development. At this point, there is a need to diversify export markets and extend trading relations with countries outside the immediate region to reduce further economic vulnerabilities and ensure continuous economic advancement.

The strengthening of security and defence cooperation is imperative for Bangladesh to safeguard its national security and the stability of the regional security architecture. The modernization of the military, with the latest defence acquisitions and related technology, will leave it better poised to defend itself. Joint military exercises with China, India and other regional powers will create interoperability and strong defense ties. This kind of cooperation will be in an effective way to work on all security aspects that may arise, be it terrorism, piracy, or even regional conflicts. In addition, an active contribution by Bangladesh to the United Nations peacekeeping missions will add international stature and experience in security-related matters, which once again will reaffirm the commitment toward global peace and security.

Bangladesh has also to reap benefits from its geostrategic location to boost its regional influence. Development of maritime security capabilities to protect Indian interests in the Bay of Bengal, including the protection of trade routes and maritime resources. Joint maritime security initiatives with regional navies shall go a long way in securing the sea lanes for commerce and ensuring counter-piracy missions. In this respect, strategic alliances with like-minded nations, which also include ASEAN member countries and other middle powers, would be important for Bangladesh to offset the usual major power influence and gain regional stature.

Finally, such a multidimensional approach—diplomatic balancing, economic diversification, regional cooperation, security enhancement, and environmental sustainability—will help Bangladesh effectively hedge against the complex regional dynamics that result from the involvement of China and India over Myanmar.

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Brief Biography



Lieutenant Commander Sk. Mahmud Hasan, (G), BCGM, psc BN was commissioned on 01 June 2010 in the Executive Branch of Bangladesh Navy. He has undergone several professional courses both at home and abroad. He attended Coastal Defence Missile Officers Basic Course in NAEI, China and Long Specialization Course on Gunnery in INS DRONACHARYA in India. The officer underwent Officer's Military Police Course (OMPC-50) in CMPC&S, Dhaka. He is a graduate from Defence Services Command and Staff College (DSCSC), Mirpur.

He served various ships of Bangladesh Navy in different capacities. As Commanding Officer, he commanded three Patrol Crafts. In 2016, he was appointed as a peacekeeper in MONUSCO, D R Congo. Lt Cdr Mahmud is blessed with one daughter.

The Changing Character of Contemporary Land Warfare: How Bangladesh Army Can Adapt to Changes

Colonel Muhammad Sharif Ul Alam, afwc, psc

Abstract

Though the enduring nature of war remains unchanged, the ‘ways’ and ‘means’ of warfare change continuously over time. A study of ongoing and recent wars indicates that the operational environment of military forces is transforming rapidly. Today, technology-driven domains like cyber, space, information etc. significantly influence the operational environment. New means of warfare like drone, weapon system with directed energy, artificial intelligence etc. are becoming key features of modern land warfare. Innovative strategies like hybrid warfare, non-contact warfare, warfare in cognitive domain are significantly changing the character of land warfare. As the operational environment is considerably more different now than it was even few years ago, fighting and winning wars in future will demand new strategies and operational art. To operate effectively in the emerging operational environment Bangladesh Army needs to adapt with the new ‘ways’ and ‘means’ of land warfare by adjusting its doctrine, training, and weapons system. It also needs to develop capability jointly with sister services to compensate each other’s capability gaps and make effective use of the niche capability of a particular service. From that perspective, a well-planned capability development in conceptual (the ideas behind how to fight), physical (the means to fight), and human resource (preparing soldiers for future war) domains would enable Bangladesh Army to cope with the challenges and take the opportunity contemporary operational environment.

Introduction

Warfare has evolved over time in parallel with changes in society, economy, environment, technology, and politics. Though the enduring nature of war remain unchanged over time, the ‘ways’ and ‘means’ of warfare are changing continuously; according to Clausewitz these changes reflect the spirit and character of that time.¹ This transformation over time is defined by Clausewitz as the changing character of warfare.² Clausewitz further argued that all military planning must consider the character of the war of that era. A study of ongoing and recent wars indicates that the contemporary operational environment (COE) in which land forces conduct operation is transforming rapidly. Today, technology driven domains like cyber, space,

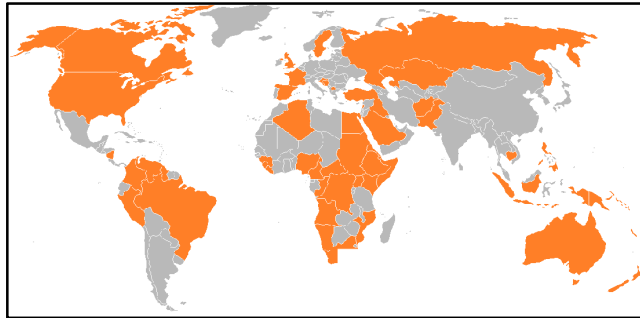
information etcetera significantly influence the conduct of land warfare.³ New means of warfare like drone, weapon system with artificial intelligence (AI), and directed energy etcetera are becoming key features of modern land warfare.⁴ Innovative strategies like hybrid warfare, non-contact warfare, and warfare in the cognitive domain are shaping the conduct of land warfare. As the COE is drastically different now than it was even ten years ago, fighting and winning wars in future will demand new strategies and operational art.⁵

Across the globe, militaries are adapting to the COE by modifying their doctrine, training, and weapon systems.⁶ Bangladesh (BD) Armed forces is no exception in this regard. BD Army is presently undergoing through its modernization programme named 'Forces Goal-2030'. However, the exponential growth of military technology and rapid evolving COE demand a continuous transformation in doctrine, training, leadership approach, organization and weapon system of an army to keep pace with the changes. At this backdrop, the article will first analyze the key characteristics of COE and salient features of contemporary land warfare. Then it would suggest few ways forward for BD Army to cope with the emerging trends of land warfare.

Key Characteristics of Evolving COE

A COE is a composite of the conditions, circumstances, and influences that affect the employment of capabilities and the decisions of the commander.⁷ It consists of both the physical and non-physical dimensions. The evolving COE has a significant effect on the way land operations are conducted. Following are few of the key characteristics of COE:

- a. **Rapid Urbanization:** There had been tremendous growth of urban areas in last few decades. Bangladesh is no exception in this case. The presence of civilians and the complexity of the urban terrain influence means and ways of land operation. Ongoing Russia-Ukraine war and Syrian war have vividly demonstrated the challenges of urban warfare as well as the advantages it offers when effectively utilized by the defender.
- b. **Influx of Private Armies and Non-State Actors:** At the end of the Cold War, geopolitical developments led to a new wave of instability across the globe; internal conflicts increased in many weak and newly independent states. Unconventional wars increased, and conventional wars decreased significantly.⁸ The use of 'Private Army' or 'Mercenaries' for war started to become a new trend since then. The following figure displays the footprint of Private Armies across the globe:

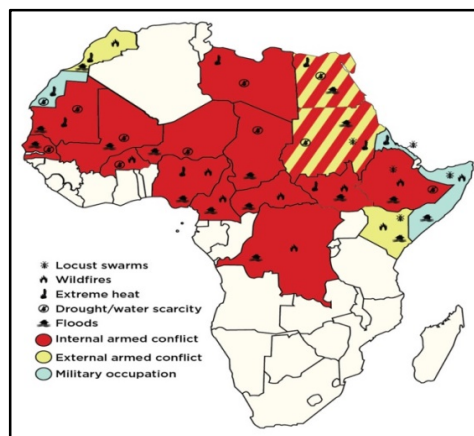
Figure-1: Footprint of Private Armies Across Globe

Source: Singer, 2003⁹

These forces are not limited to international agreements or the Geneva Conventions.

c. **Influence of 4th Industrial Revolution:** In 2016, Klaus Schwab, founder of the World Economic Forum, defined the present time as the era of the ‘4th Industrial Revolution’.¹⁰ Today’s technological innovation in the fields of AI, robotics, nanotechnology, unmanned aerial system (UAS) and communication technologies are merging the physical, digital and biological worlds; these have enormous effects on the COE.¹¹ Today, war dynamics are changing as AI and advanced technology can influence social media like Facebook, Twitter, and other forms of electronic communication and mobilise the people behind any cause.¹²

d. **Effect of Climate Change:** The adverse effect of climate change has caused resource scarcity, refugee crisis and internal conflict in many states. Figure 2 indicates that the effect of climate change is a key driver of war in Africa.

Figure-2: Linkage between Climate Change and War

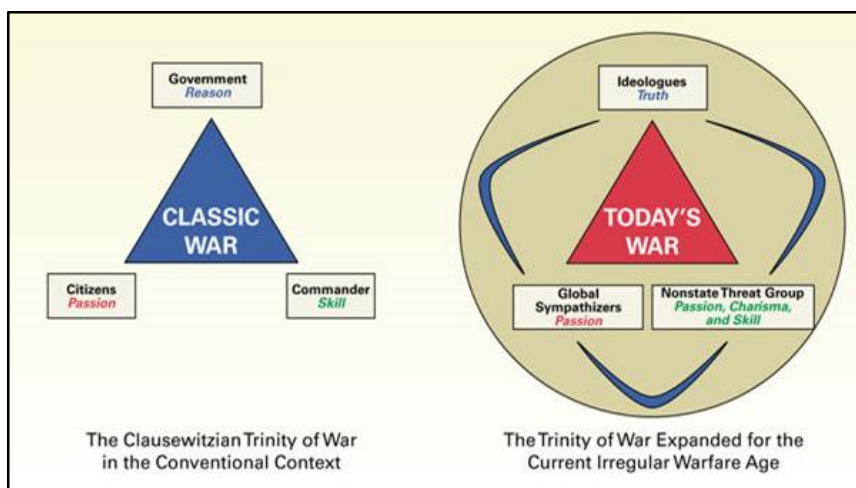
Source: Earth.Org Research Article¹³

Almost all the wars in the African continent have a linkage with the adverse effects of climate change.

e. **Non-Physical Operational Environment:** Cyber and space are identified as the 4th and 5th dimensions of COE. Attack in the cyber domain has been identified as one of the biggest threats to the economy, public safety and national security; Cyber has become a major area of power projection.¹⁴ Similarly, military use of space has increased manifold in recent times. It is one of the focused areas of development for many militaries across the globe.

f. **Volatility, Complexity, Uncertainty, and Unpredictability:** Today, belligerents wage war using a mix of conventional, unconventional, and irregular methods to achieve their war objective.¹⁵ Clausewitz's classical trinity of 'Government', 'Citizen' and 'Commander' can no longer explain the phenomenon of present-day warfare. Rather, in today's context the idea of 'Government' has been replaced by 'Ideology', 'Citizen' is replaced by 'Global Sympathizers' and 'Commander' is being replaced by 'Mercenaries and Private Armies'.¹⁶

Figure-3: Clausewitz's Trinity and Contemporary Warfare Context



Source: Sebastian, 2010¹⁷

Key Features of Contemporary Land Warfare

An in-depth study of contemporary wars unveils the following key characteristics of contemporary land warfare:

a. **Cognitive Warfare:** The human mind or cognition is the most important domain and battlefield of belligerents in today's context. With the

development of AI, neuroscience, and digital applications like social media, it is possible to influence and affect human cognition directly.¹⁸ By effectively launching cognitive warfare a weaker opponent can win a war bypassing the traditional battlefield. In the ongoing Russia-Ukraine war belligerents are making extensive and well-planned use of social media, digital and other means of communication to influence the outcome of the war.¹⁹

b. **Hybrid Warfare Strategy:** Russian General Gerasimov conceptualized the importance of combining a wide range of political, information, cyber, propaganda, irregular, and conventional methods to facilitate the attainment of war objectives, widely known as hybrid warfare strategy.²⁰ The strategy is extensively utilized by belligerents in contemporary wars. In 2014 Russia used hybrid warfare strategy so skilfully that Crimea was annexed without firing a single bullet.²¹

c. **Innovative and Creative Use of UAS:** Modern and sophisticated UAS are becoming key battle winning factor in modern battlefield. In the Nagorno-Karabakh war (2020), Azerbaijan's Bayraktar TB2 armed UAS led assault played key role for the decisive victory of Azerbaijan forces.

Table-1: Azerbaijan UAS Effectiveness against Armenian Weapon System

Weapon System	Total in Battlefield	Total Destroyed	Destroyed by UAS	Destruction by UAS in Percentage
Tanks	287	143	101	71%
Other AFVs	69	42	21	50%
AA Guns and Missile Launchers	73	65	54	83%
RADAR	13	13	13	100%
B Vehicles	252	236	157	67%

Source: Hecht, 2022²²

Table-1 displays that approximately 70% of Armenian battle casualties were caused by Azerbaijan UAS. Traditional weapon systems and tactics are ineffective against UAS.²³ The war also brings out important lessons that UAS, not tank is the most effective antitank weapon of present time.²⁴

d. **Cyber Warfare:** Cyberspace has become the new battleground in modern day warfare. It can disrupt critical infrastructure such as power and communication systems and cripple the nation even without using kinetic force.²⁵ Following table-2 expresses cyber activity of Russia in last few of its wars and its effect:

Table-2: Summary of Russian Cyber Activity in Contemporary Wars

Wars	Military Activity	Cyber Activity	Effect
Georgia 2008	Russian invasion of South Ossetia commencing the Russo-Georgian War	Distributed Denial of Service (DDoS) attacks	Georgia was cyber-locked, unable to communicate with the public and international partners during the war
Crimea 2014	Russian invasion and annexation of Crimea	DDoS attack; radio jamming	Crimea was cut-off from the rest of Ukraine, unable to communicate with anyone
Ukraine 2021	Russian troop buildup near Ukrainian border	Spear-phishing to inflict government networks with malware	Ukraine faced threats in both cyber and physical domain, weakening its capability to respond in the early stage of the war.

Source: Internet²⁶

How the BD Army Can Adapt to the Changing COE

A well-planned capability development in conceptual (the ideas behind how to fight); physical (the means to fight) and human resource (preparing soldiers for future war) domains would enable BD Army to cope with the challenges of COE:

Conceptual Component: It is essential to develop concepts in response to the changing character of land warfare that is not well covered in existing doctrine. Following measures in conceptual dimension may facilitate BD Army to navigate through the fog, friction, and uncertainty of emerging COE:

- a. **Cognitive Superiority:** Cognitive superiority implies higher knowledge and comprehension as well as skill of application, analysis, synthesis, and evaluation of any issue. The cognitive aspect of war has been emphasized for centuries. In the words of Sun Tzu, “The supreme art of war is to subdue the enemy without fighting”.²⁷ A well thought out education system and scheme that generates intellectual curiosity and critical thinking capability among the military leaders is essential for developing cognitive superiority. When development in the physical dimension of an Army is constrained by the

economy of a country, cognitive superiority can offset many limitations imposed in the physical dimension of an Army's fighting strength.

b. **Doctrinal Developments:** It is essential to evaluate, test and hypothesize how the changes in COE affect current doctrine. Land warfare today is a blend of conventional, non-conventional, hybrid, and other form of non-contact warfare like cyber, EW, IW etcetera. These new dimensions of modern warfare need to be emphasized in doctrine; besides personnel need to be trained and appropriate institutional capability may be developed on those new dimensions.

c. **Innovation and Creativity in Operational Art and Tactics:** A relatively smaller force can achieve operational success through innovation and creativity in operational art and tactics. Innovative and creative use of weapon systems like UAS has changed the battlefield dynamics in recent times. The BD Army may encourage innovation and creativity in the doctrine, education, and training to cope with the challenges of COE.

d. **Robust Research in Bangladesh Army Context:** When developments in military affairs are happening at an exponential rate, those developments need to be contextualized in the geographic, demographic and geopolitical reality of BD Army through robust research. A deliberate and systematic study on the current and emerging operational environment and its effect on current land warfare doctrine would be able to bridge the theory and reality. New dimensions of modern warfare like cyber, space, AI, robotics, micro engineering etcetera need robust research to reap the benefit of the current trend.

e. **Workshop, Seminar, Study Period and War Game on New Dimensions of Modern Warfare:** Evolving ideas, concepts and developments in land warfare tactics and strategy often include layers of buzzwords and jargon that need to be decluttered and contextualized in BD Army perspective. A systematic and detailed study programme may be of use to contextualize those in BD Army perspective. The initial exploration of those ideas, theories and strategies may be explored through workshops and study period. Subsequently, the findings may be augmented by seminars, wargames and exercises.

Physical Component: The current transformation of the Indian Armed Forces is only structural and not capabilities-based.

a. **Agility, Mobility and Technological Prowess:** Contemporary wars have demonstrated that agility, mobility and technological prowess are key features of effective land forces. BD Army's future developments may be focused on transforming its units more agile, mobile and technologically advanced.

b. **Enhanced Air Defense and Operational Fire Capability:** Modern and technologically advanced air defence for all field formations may be a focused area of the BD Army's modernization programme. At the same time BD Army's operational fire capability may be enhanced through induction of modern and sophisticated missile system.

c. **Robust Sustenance System:** Logistics is the lifeblood of military power.²⁸ A robust logistics enhance resilience and agility of forces that are prerequisites of contemporary land warfare. BD Army may boost the capability of indigenous defense industry to enhance its logistics sustenance capability.

d. **Modern ISR Capability:** ISR is one of the most notable technical areas that has been vital to battlefield success. To support intelligence gathering, planning and execution of the BD Army's operational plan a robust and technologically advanced ISR system is essential. The BD Army may continue its effort to develop capabilities in communication intelligence, electronic intelligence, interception, jamming, and deception.

e. **Capability in Non-Kinetic Warfare:** EW, Information Warfare (IW), cyber and psychological operations are critical battle-winning factors in contemporary land warfare. These are critical enablers and force multiplier. BD Army's capability in IW, EW and cyber domain are still at a nascent stage. To be effective in emerging land warfare the BD Army may develop technologically advanced IW, EW and cyber warfare capability.

Human Resource Component: Trained and skilled human resource is the greatest strength and most important asset of an army. BD Army may adopt following measures to prepare its human resources for future warfare:

a. **Developing Trained, Educated and Empowered Leaders for Future Warfare:** In the words of General Hugh Shelton (retired) former Chairman of the Joint Chiefs of Staff, US Army:

“Transformation is first and foremost an intellectual exercise, requiring the brightest minds actively engaged in taking armed forces to new and higher levels of effectiveness. The road to transformation begins with a strong program of education and leader development.”²⁹

The rapidly changing character of war in the 21st Century demands deliberately trained, educated, and empowered leaders to face the challenges as well as take the opportunity it offers. A durable program of education and

leadership development is essential to impart the skills, values, and intellectual agility to fight and win the wars of tomorrow.

b. **Robust Second Echelon Forces:** In doctrinal parlance blending conventional and unconventional warfare is a key force multiplier and also a tool to deter potential adversaries. From that perspective, unconventional warfare forces and paramilitary forces need to develop their capability to perform the assigned roles emphasized in the doctrine. A whole of government approach may be adopted to prepare, train, and equip those forces for their operational role.

c. **Investing in Subject Matter Expert:** New developments in the land warfare realm like cyber, space, social communication networks, AI, and robotics demand specialists and subject matter experts to reap the best benefits of it. The technical expertise of individuals is central in the employment of modern military hardware. It requires a deep understanding of the technology to operate and maintain the modern military hardware. BD Army may invest in subject matter experts to accept, absorb, and operationalize cutting edge technology for future warfare.

Conclusion

Canadian Prime Minister Justin Trudeau in his speech of World Economic Forum (Davos, 2018) commented that ‘The pace of change has never been this fast, yet it will never be this slow again’.³⁰ So is true in case of changes in military operational environment and military technology also. Organizations and people who can adapt rapidly and effectively are more likely to succeed in future. The exponential growth of military technology and rapid evolving COE demand a continuous transformation in doctrine, training, leadership, and organization to keep pace with the changes.

To cope with the challenges of COE and the trend of modern land warfare BD Army may adopt a well-planned capability development in conceptual, physical, and human resource dimensions. The new dimensions of modern warfare like cyber, EW, IW etcetera may be emphasized in doctrine, personnel may be trained, and appropriate institutional capability may be developed to cope with the present trend of land warfare. The BD Army may encourage innovation and creativity in the military doctrine, education, and training. The BD Army’s combat readiness may be developed along with the capabilities of sister services and the land warfare concept may be well synchronized with naval and air operation concept.

BD Army’s future developments may be focused on transforming its units more agile, mobile and technologically advanced. BD Army’s future developments may be

focused on transforming its units into more agile, mobile, and technologically advanced. Modern and technologically advanced air defence, ISR, operational fire would provide BD Army an edge in the battlefield. BD Army may boost the capability of indigenous defense industry to enhance its logistics sustenance capability. Developing trained, educated, and empowered leaders for future warfare may be a key endeavor. A durable program of education and leader development is essential to impart the skills, values, and intellectual agility to fight and win the wars of tomorrow. A whole of government approach may be adopted to prepare, train, and equip second echelon forces. In a joint force environment, BD Army should be able to draw on the strengths of all services, while compensating for potential weaknesses and avoiding duplicate efforts. Finally in the words of General Charles G Krulak (ret'd), Former Commandant US Marine Corps:

“The Chinese have a saying that ‘change is a dragon’. If you try to ignore him or control him, he will eat you. But if you can ride the dragon of change, you can survive, even prosper...”

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Brief Biography



Colonel Muhammad Sharif Ul Alam, afwc, psc was commissioned with 43rd BMA Long Course in the Regiment of Artillery on 26th November 2000. He commanded 27 Field Regiment Artillery. As an instructor, he served as a Directing Staff in Defence Services Command and Staff College (DSCSC), Mirpur and Instructor Gunnery in School of Artillery, Halisahar. He participated in counter-insurgency operations at Chattogram Hill Tracts. As a staff member, he was an aide de camp to General Officer Commanding 66 Infantry Division, Brigade Major of 55 Artillery Brigade, Assistant Military Secretary in the Army Headquarters, and GSO-1 Trg at DSCSC. Besides different courses at home, he attended an Intelligence Staff Course in India. He is a graduate of Defense Services Command and Staff College (DSCSC), Mirpur and Royal Brunei Armed Forces Command and Staff College, Brunei. He completed his Armed Forces War Course from National Defence College, Mirpur. He completed his Masters in International Security from Massey University, New Zealand, with distinction and Masters in Peace Conflict and Human Right Studies from Bangladesh University of Professionals. He participated in the UN Peace Operation in Ivory Coast (UNOCI in 2010-11). Presently, he is serving as a Senior Instructor at DSCSC.

Joint Cyber Warfare Capability of Bangladesh Armed Forces: Challenges and Way Forward

Commander Al Imran Tanvir, (ND), PBGMS, afwc, psc, BN

Abstract

Cyber warfare has become an essential domain of modern military. Therefore, Bangladesh Armed Forces (BDAF) must develop a joint cyber warfare capability to encounter potential threats. This paper explores challenges in developing joint cyber warfare capability for Bangladesh Armed Forces (BDAF) and proposes a strategic roadmap for future enhancement. The primary objectives of the paper are to identify critical gaps in cyber defense, evaluate vulnerabilities in current infrastructures and this paper also recommend integrated strategies to strengthen coordinated cyber operations among the BDAF. A qualitative research methodology was employed by combining policy analysis, case studies and expert interviews with military personnel and cyber security specialists. Data were gathered from published reports, survey responses and focus group discussions to assess both individual service capabilities and the overall joint operational readiness of BDAF in the cyber domain. Results reveal that lack of a centralized cyber command and a unified doctrinal framework significantly undermines effectiveness of BDAF's cyber defense. The study identifies deficiencies in cyber hygiene, technological infrastructure and inter-service coordination as key vulnerabilities. Additionally, reliance on external technology vendors and outdated policies exacerbates the risk of cyber-attacks. Based on these findings, the paper outlines a five-step roadmap emphasizing the development of a joint cyber warfare doctrine, infrastructure modernization, enhanced training and awareness programs, integration with national cyber security strategies and regular capability reviews. Strengthening the joint cyber warfare capability of BDAF is essential to safeguard national security and ensure resilience against evolving cyber threats in an increasingly digitized battle space.

Introduction

Bangladesh has embraced modernization and digitalization in all sectors at an unprecedented rate. The entire country is now connected to the internet. BDAF has also digitalized its various platforms and connected them to the internet. Though this modernization has provided a wide range of advantages, it has also exposed us to

cyber warfare. Despite the vulnerability posed by the cyber domain, BDAF will continue to acquire modern network-based technology to remain prepared for fighting technology-based warfare in the future. However, such technology-based capability is likely to expose BDAF to threats in the cyber domain. The recent Russo-Ukraine war is a clear testimony to this fact. Considering the massive use of cyber-attacks in the Russo-Ukraine war, it is evident that present and future warfare will see a vast engagement of the belligerents in the cyber domain. Therefore, BDAF is likely a target by our potential adversaries, leaving it highly vulnerable to cyber threats.

Currently, the cyber capability of BDAF is relatively modest. Instead of a unified approach, each service within BDAF is enhancing its cyber warfare capabilities independently. However, a collective effort is essential for a significant impact in the cyber domain. Unfortunately, BDAF does not have a joint organization to oversee, regulate, and coordinate the individual service's efforts. This lack of supervision and coordination leaves various tri-service institutions and organizations vulnerable to cyber-attacks. Therefore, the absence of a joint cyber warfare organization in peacetime presents significant challenges during wartime.

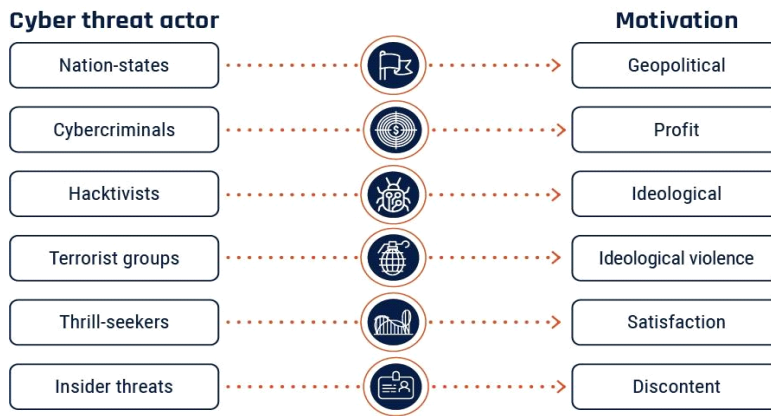
At this critical juncture, the absence of a unified cyber organization within BDAF poses a significant cyber security threat. The lack of coherence among the services leads to duplication of effort and incompatible cyber combat capabilities in a joint environment. It is imperative to enhance BDAF's cyber warfare capability in coherence, as this unity will be a key to neutralizing potential cyber threats.

Evolving Cyber Threat: Global, Regional and Bangladesh Perspective

As the world advances technologically, the threat of cyber-attacks looms large. The growing dependence on technology has made individuals, organizations, and nations vulnerable to cyber threats. The global landscape of cyber threats is evolving rapidly, and it is essential to understand the current scenario to anticipate the nature of cyber warfare.

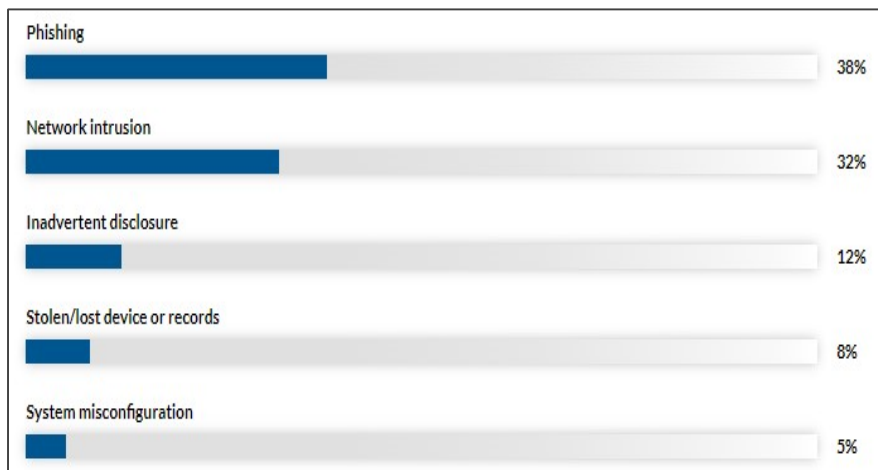
Global and Regional Trends in Cyber Security

21st century has seen a rise in cyber-attacks globally, with projected annual costs of cybercrime reaching over \$6 trillion by 2021, up from \$3 trillion in 2015.¹ This alarming trend highlights the potential for evolving cyber threats to be utilised by both state and non-state actors, which is visible in the Russia-Ukraine War. These threats are exploited by various actors, both state and Global cyber threat analysis shows actors with specific motivations, including state actors, cybercriminals,

Figure-1: Cyber Threat Actors and Motivation (Tailor, 2020)

Source: <https://www.cyber.gc.ca/en/guidance/introduction-cyber-threat-environment>

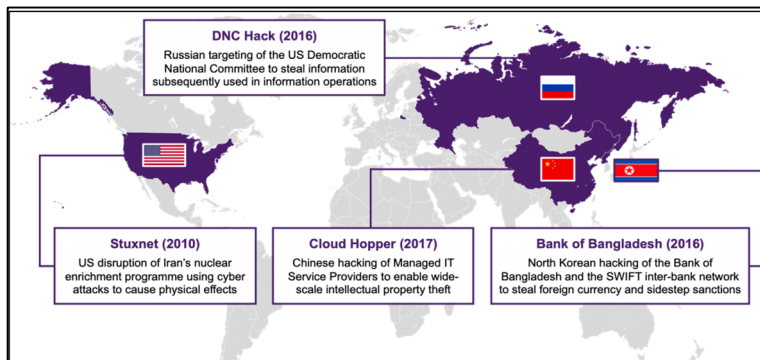
terrorist groups, and thrill-seekers (Figure-1). In a 2020 survey by Baker Hostetler, the most common cyber attacks on U.S. companies were phishing (38%), network intrusion (32%), inadvertent disclosure (12%), stolen or lost devices (8%), and system misconfiguration (5%).

Figure-2: Most Common Cyber Attacks Experienced by the US Companies

Source: <https://essentials.news/ai/cybersecurity/article/emerging-cybersecurity-challengesget-ready-2022-bb6522d19a>

In February 2023, the pro-Russian hacking group Killnet claimed responsibility for DDoS attacks against NATO networks, disrupting earthquake aid communications. Additionally, CISA and the FBI reported a Vietnamese espionage group targeting a U.S. federal agency between November 2022 and January 2023 (CSIS, 2023).

Figure-3: Significant Cyber Attacks of the World



Source: <https://wavellroom.com/2020/09/22/cyberwarfare-since-2010>

Figure-3 outlines critical findings from notable cyber incidents, such as Stuxnet (2010), DNC Hack (2016), Cloud Hopper (2017), and the Bank of Bangladesh Hack (2016). These cases highlight how offensive cyber operations enable espionage by accessing and stealing data. Operation Cloud Hopper targeted Managed IT Service Providers to steal intellectual property, and North Korea targeted financial institutions in the 2016 Bank of Bangladesh hack. These incidents underscore the critical role of cyberspace in modern conflicts, where offensive cyber operations offer significant advantages, and defensive failures lead to vulnerabilities (Florian J Egloff, 2021). Security professionals, policymakers, and organizations must focus on defensive cyber operations to mitigate these threats.

Cyber Landscape of South Asia

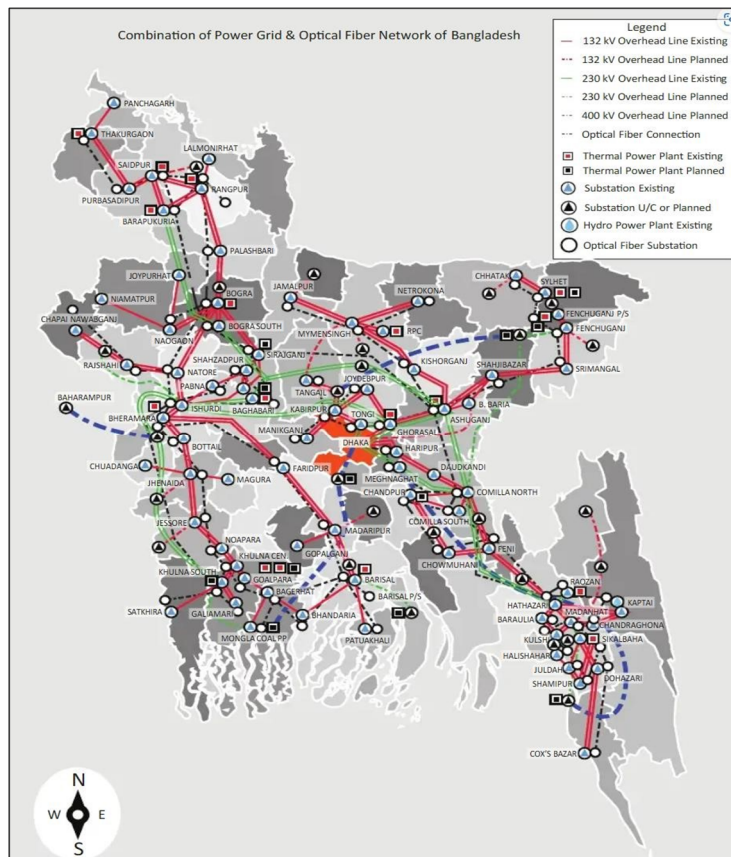
The rapid expansion of cyberspace has created a new battlefield in South and Southeast Asia. Despite being populous, South Asia has low cyber technology penetration and inadequate cyber security awareness (Statista, 2023). Geopolitical tensions in the region have been exacerbated by cyber tools, increasing the risk of conflict. Both regional powers and smaller states face cyber security challenges, pressured to avoid becoming cyber confrontation sites. Notable incidents include the 2020 cyber attack on Mumbai's power grid, likely linked to India-China tensions, and the SWIFT heist involving Bangladesh's Central Bank (Statista, 2023). India has enhanced its cyber capabilities with frameworks like the National Cyber Security Policy and initiatives like Cyber Swachhta Kendra. It established a tri-service Cyber Command in 2018 and developed cyber weapons like Netra malware. The Indian Armed Forces train personnel in cyber operations through centres like the Defence Cyber Agency. Pakistan is also developing its cyber warfare capabilities through a dedicated Cyber Command and a National Cyber Security Policy, engaging in cyber espionage and international collaborations. Southeast Asia's cyber security landscape is complex. Myanmar faces significant challenges due to political instability and outdated technologies, making it vulnerable to cyber threats. In contrast,

Singapore has invested heavily in cyber security, establishing comprehensive strategies to protect its infrastructure. Despite efforts, the region continues to face frequent and sophisticated cyber-attacks, such as ransomware and phishing (Raska, 2018).

Global and Regional Trends in Cyber Security

In recent years, cyber warfare has become increasingly prevalent globally, with countries investing in cyber capabilities for defence and offense. Cyber attacks are becoming more frequent and sophisticated, notably with a significant rise in ransomware attacks causing widespread disruptions and financial losses. Different industries face specific cyber security challenges: healthcare is targeted for patient data, while financial services are attacked for financial gain. Satellites are at risk from cyber attacks, as well as electronic warfare, microwave weapons, and laser-dazzling (Davis, 2019). The threat to satellites expands the scope and risk of counter-space threats. As reliance on digital technologies grows, cyber warfare is expected to remain a significant global and regional trend.

Figure-4: Combination of Power Grid and Optical Fiber Network in Bangladesh



Source: https://www.academia.edu/10970426/Power_Grid_and_Optical_Fiber_Grid_of_Bangladesh

Bangladesh's Preparation against Cyber Threats: Cyber threats are increasingly alarming for Bangladesh, with over 100 million internet users making its digital economy a prime target. The 2016 Bangladesh Bank hack, which stole \$81 million (Zetter, 2016) and North Korean attacks on financial institutions, including the Bank of Bangladesh, highlight this threat. The Bangladesh Armed Forces have also faced cyber attacks aimed at stealing sensitive information. These attacks can disrupt critical infrastructure like communication networks, financial systems and power grids.

Bangladesh has implemented strategic measures involving government agencies, private sector organizations, academia, civil society groups, and the military to counter these challenges. The Bangladesh Computer Incident Response Team (BDCIRT) monitors cyber incidents, and the Cyber Security Act of 2018 criminalizes cybercrime. A National Data Centre was also established to secure government data. However, more efforts are needed. Many organizations and individuals lack the resources and expertise for adequate cyber security. Bangladesh must continue developing its cyber warfare capabilities through a whole-of-government approach to protect its national interests.

Cyber Vulnerability Analysis – BDAF

Cyber Vulnerability

Cyber vulnerability refers to the susceptibility of assets and systems to unauthorized access, exploitation, or disruption by malicious actors (Intellipaat, 2024). To assess BDAF's cyber vulnerability, it is essential to study critical assets and systems, such as command and control systems, communication networks, weapons systems, and databases, to identify weaknesses that could be exploited.

Critical Assets/Systems

To understand its cyber vulnerability, BDAF must examine critical assets and systems such as military infrastructure, networks, and information sources. Experts identify potential vulnerabilities in areas like Core Internet Infrastructure, Data Links, Data Centres, Weapon Systems (e.g., Air Defence Systems), Transmission Networks, Domain Name System Servers, and Local Networks. Although these systems are still developing, future joint warfare requirements will necessitate their interconnection. Integrating BDAF's sophisticated military assets into a vast networked infrastructure will improve efficiency but also increase cyber vulnerability, as depicted in Table-1.

Table-1: Vulnerability Map for BDAF

Vulnerable Sectors	Affected Entity	Remarks
Air Defence (AD) System	Individual and Tri-Service	Physical Attack /Remote access
Data Centres	Individual and Tri-Service	Physical Attack /Remote access
Transmission Network (IP based Communication System)	Individual and Tri-Service	Physical Attack /Remote access
Domain Name Service (DNS) Servers	Individual and Tri-Service	All websites with 'mil.bd' domain name
Local Networks (Intranet)	Individual and Tri-Service	Physical Attack /Remote access
Personnel devices and social networking	Individual and Organisation	<ul style="list-style-type: none"> • Social Engineering • Worms Coupled with a Denial of Service Payload. Denial of Service payload can completely disable a large internal network (Welton, 2004)

Source: Author's Self Construct

Possible Cyber Threats

Cyber threats to the armed forces are diverse and significant. State-sponsored actors may seek strategic advantages by compromising data or disrupting systems, while non-state actors and hacktivists might exploit vulnerabilities for political or disruptive purposes (NATO, 2021). Cybercriminals may target the armed forces for financial gain or to undermine national additional risks. As military reliance on technology grows, so does vulnerability to cyber threats. The prevalence of networked systems and internet-connected devices heightens the risk of infiltration into military digital infrastructure (Salam, 2018). These threats can compromise data, disrupt operations, and endanger personnel. Therefore, it is crucial for the armed forces to continuously enhance cyber security measures and collaborate with intelligence agencies to stay ahead of evolving threats.

Vulnerability of the Present System

BDAF's current cyber defence mechanisms exhibit weaknesses, including insufficient infrastructure, training, resources, and cyber awareness. Dependency on foreign vendors for critical equipment with potential backdoor vulnerabilities and inadequate cyber warfare capabilities are significant concerns. Additionally, reliance on external transmission networks poses a security risk. BDAF should prioritize investing in infrastructure, training, and awareness programs, fostering domestic capabilities, and ensuring a well-structured approach to cyber defence to bolster its cyber security posture.

Global and Regional Threats

Bangladesh's strategic location places it in a region with heightened cyber activity from neighbouring powers like India and China, both of which possess advanced

cyber warfare capabilities. Technologies such as artificial intelligence (AI) and quantum computing are reshaping the cyber threat landscape, posing new challenges for defence systems.

Historical Incidents

In 2021, reports indicated increasing cyber attacks in South Asia, including phishing attempts targeting government institutions in Bangladesh. Potential vulnerabilities in outdated IT infrastructure or insufficient cyber security awareness programs among personnel. Frequent border skirmishes with neighbouring Myanmar and India have highlighted gaps in border surveillance and rapid response mechanisms. In the past, Bangladesh faced challenges from extremist groups (e.g., the Holey Artisan Bakery attack in 2016). While primarily a civilian security concern, these incidents may expose vulnerabilities in intelligence sharing and counterterrorism coordination between military and civilian forces.

Table-2: Cyber Warfare Capability of BDAF

Cybersecurity Gaps	1. Limited domestic capacity for developing and maintaining robust cyber defenses
	2. Increasing digital warfare capabilities of regional actors like India and China highlight a need for resilient cybersecurity frameworks
Modernization Challenges	1. Dependence on imported military hardware (e.g., from China, Russia) can create logistical and operational dependencies, particularly for critical equipment
	2. Vulnerability to supply chain disruptions or foreign-manufactured equipment embedded with potential spyware
Strategic Depth	Geographic constraints (flat terrain, dense population centers) can expose the military to challenges in securing airspace and strategic sites
Training and Preparedness	1. Limited exposure to advanced military technologies like UAVs, cyber-defense systems, and AI-assisted decision-making tools compared to peers in the region
	2. Insufficient joint exercises with technologically advanced allies

Source: Author’s Self Construct

Key Vulnerabilities

A study by Armed Forces War Course participants highlighted significant challenges for BDAF in conducting joint cyber-warfare (Salehin, 2015). The research found progress in combating cyber threats by individual forces but no significant joint initiatives. It concluded that individual efforts would likely be unsuccessful, revealing a lack of joint cyber warfare capability and insufficient cyber warfare knowledge among BDAF personnel.

In 2023, these findings remain relevant. Despite some individual progress, BDAF still faces challenges in joint cyber warfare capability. Addressing these issues is crucial. The following sections will discuss BDAF's cyber security posture, incident response, and cyber workforce to identify areas for improvement.

Defensive Cyber Warfare Capability

Defensive cyber warfare is a crucial element of modern military strategy. However, predicting the effects of cyber-attacks can be challenging due to the complexity of cyber operations. Early warning, a critical factor in thwarting cyber attacks, is a responsibility that each one of us in the cyber security field must take seriously. Technology plays a significant role in identifying and tracking such threats. Defensive cyber warfare necessitates robust protection of both the periphery (user equipment) and the core (Table-1). As long as IT systems and networks remain vulnerable, military forces relying on them are at risk of cyber attacks and exploitations (Tyagi, 2013). Therefore, the development of solid defensive cyber capabilities is essential to safeguard the security of military forces in the modern digital era.

Cyber Security Posture

Cyber security posture includes factors such as the implementation of cyber security frameworks, the use of encryption and multi-factor authentication, and regular patching of software vulnerabilities. In this regard, BDAF still seems trailing. Cyber security frameworks are almost absent from all three services. Though the requirement of multi-factor authentication has been understood and is slowly coming up as the best practice among the services, regular patching of software vulnerability, especially in personal usage, lags significantly.

Incident Response

A country's ability to detect and respond to cyber-attacks is a critical defensive capability. Indicators include the presence of a National Computer Emergency Response Team (CERT), the speed and efficiency of incident response, and the sharing of information about attacks with other countries (Intellipaat, 2024). Interviews with the key stakeholders of BD Army, Navy, and Air Force have revealed that the approach to cyber incident response is still in silo. While three services are developing their capability, a centralized approach has not been developed yet.

Table-3: Army Data Centre Attack List

Ser	Month	Number of Attack	Denied Automatically by IPS
1	January 2023	11286	11286
2	February- 2023	9819	9819
3	March- 2023	10294	10294
4	April - 2023	4273	4273
5	May - 2023	3210	3210
6	June- 2023	3563	3563
7	July - 2023	3479	3479
Total	07 Months	45924	45924

Source: Author’s Self Construct

The attack responses of the Army Data Centre in Table 2 show that as an individual service, BD Army has grown significant defensive cyber capability. However, the possibility of fighting a single-service war in the future is remote. Therefore, warfare in cyberspace has to be conducted jointly. In that sense, it is crucial to formulate joint cyber warfare capability for BDAF. However, BDAF currently does not have such ability.

Cyber Workforce

The number and expertise of cyber security professionals within BDAF are crucial indicators of its defensive capabilities. By and large, only the Bangladesh (BD) Army has formed an Army Cyber Group (Adhoc), which is a significant step towards capability building in cyber warfare. However, BD Navy and Air Force still have not come up with such an initiative. Though, at the national and armed forces level, there are quite a good number of skilled manpower, their proper utilisation and employment are still far from reality.

Offensive Cyber Warfare Capability

Offensive cyber capability is a term that refers to a nation's ability to conduct cyber operations that are intended to disrupt, damage, or destroy the computer systems or networks of other countries or organizations. The process involves several stages: reconnaissance, intrusion, privilege escalation, and payload dropping. Offensive cyber

operations can be classified into counterforce and counter-value targeting. Counterforce targets involve striking an adversary's military forces or infrastructure, while counter-value strikes target the sources of the adversary's national strength (Smeets, 2018).

Challenges Faced by BDAF

Cyber capabilities have become crucial for modern armed forces, allowing for the disruption of adversaries' critical infrastructure such as communications, power grids, and financial systems. Offensive cyber operations can target command centres, air defence systems, and radar installations, while defensive operations focus on mitigating vulnerabilities and responding to threats (Lewis, 2022). To achieve comprehensive cyber capability, BDAF faces challenges at both the individual and organizational levels.

Individual Level Challenges

Cyber security is linked with an organization's overall cyber warfare capability. Moreover, effective cyber defence is directly related to the overall cyber security awareness, cyber security practices, and cyber hygiene of the members of that organization. From an individual perspective in the military, cyber warfare presents various threats that can have significant consequences. These threats can affect the overall cyber capability of BDAF as military personnel directly or indirectly affect the security and functioning of various systems and mechanisms related to cyber warfare and security.

Lack of Cyber Hygiene

Cyber hygiene involves practices that individuals use to secure their devices and networks. BDAF personnel often create vulnerabilities by neglecting proper cyber hygiene, leaving their devices open to attacks. Over 90% of respondents believe BDAF members lack cyber hygiene, a view supported by focus group discussions by Armed Forces War College-2023 participants (Faheem, 2023) highlighting a prevalent lack of awareness and reluctance to maintain cyber hygiene.

Insider Threats

Some individuals within the Armed Forces are compromising organizational security, either deliberately or inadvertently. A survey found that 62% of respondents view insider threats as a significant challenge for BDAF (Faheem, 2023).

Social Engineering Attacks

Members of BDAF are often targeted by social engineering attacks due to a lack of awareness, inadequate training, and casual mindsets. These attacks manipulate individuals into divulging sensitive information or performing compromising actions. A survey revealed that 79% of respondents believe BDAF members are vulnerable to

honey trapping, and 92% think they could be radicalized through social media (Faheem, 2023). Additionally, all respondents considered conversation tapping and email hacking likely cyber attack methods, while 98% cited careless use of online applications as a significant threat (Faheem, 2023).

Using Personal Devices for Office-Related Work

Using personal devices such as smartphones or laptops for work-related tasks creates vulnerabilities in the cyber security of the Bangladesh Armed Forces. Using personal devices for official work ultimately poses a serious cyber security challenge to the organisation.

Organisational Challenges

Apart from individual challenges, BDAF will face numerous organisational challenges. The organisational challenges are discussed in the subsequent paragraphs.

Structural and Institutional Challenges

The absence of a unified cyber security command within the military limits the ability to coordinate responses to cyber incidents effectively. Decentralized efforts lead to inconsistent standards and fragmented defences. Current policies governing cyber security are either outdated or insufficiently enforced. There is a lack of specific guidelines for cyber security risk management within the armed forces.

Technological and Infrastructure Challenges

Reliance on legacy IT systems makes military networks vulnerable to cyber attacks. Limited integration of advanced technologies such as AI and machine learning for proactive threat detection. Heavy reliance on foreign suppliers for hardware and software introduces risks of hidden vulnerabilities, spyware, or malware. Similarly lack of indigenous production capabilities increases operational dependence on external sources. Many existing tools are incapable of detecting or mitigating sophisticated cyber threats such as advanced persistent threats (APTs). Also, there is Limited use of encryption and intrusion detection systems across military networks.

Limited Information Sharing

The cyber operation is a comprehensive effort which cannot be conducted in isolation. At present, there is a lack of information sharing among the services of Bangladesh Armed Forces regarding the cyber threats they have encountered, as there is no common platform or joint organisation where all the services may work closely to solve issues related to the cyber domain. As a result, it is difficult to identify common patterns and develop effective countermeasures.

Mindset of Leadership

At present, a lack of jointness prevails within the services. The senior leadership of all three services mainly focuses on developing the cyber capabilities of individual services in isolation rather than taking a holistic joint approach. As a result, a lack of cooperation and coordination prevails among services. Moreover, cyber gets comparatively less priority during budget allocation. The conventional weapon system, infrastructure development or even development of the IT sector gets more priority than cyber warfare.

Lack of a Unified Strategy

It will be challenging for the Bangladesh Armed Forces to ensure that all branches work towards a common goal of addressing cyber threats without a unified strategy. A lack of coherence in approach and objectives can undermine efforts to respond to cyber threats. According to the survey, 87% of respondents think that BDAF should have a unified strategy to combat cyber warfare effectively (Faheem, 2023).

Dependence on External Technology Vendors

Dependence on external technology vendors for their hardware, software, and other cyber security tools is a tremendous cyber threat to the armed forces. This dependence creates vulnerabilities if these vendors do not have robust cyber security measures. Moreover, the vendors may have access to confidential military information and data through their software and programmes.

Lack of Understanding of Cyber Warfare

Most BDAF members do not distinguish between cyber security and cyber warfare, often using the terms interchangeably. As a result, the focus tends to be on cyber security, particularly social media and online platform security. However, cyber security is just one aspect of cyber defence, and effective cyber warfare requires both defensive and offensive capabilities (Röhrig, 2014). Understanding cyber warfare is crucial for developing comprehensive cyber warfare capabilities for BDAF.

Possible Ways Forward: Development of Joint Cyber Warfare Capability

Key Components of Joint Cyber Warfare Capability

It has been substantiated that BDAF needs to develop cyber warfare capability to mitigate the present and future challenges. BDAF's ability to conduct cyber warfare is at a nascent stage. Therefore, a roadmap to create the required capability is essential. The suggested roadmap should encompass a few components, such as a joint Cyber Warfare Doctrine, Infrastructure, Awareness building, and Training and Integration with the National Cyber Strategy. These requirements have been discussed in subsequent paragraphs.

Joint Cyber Warfare Doctrine and Structure

A joint cyber warfare doctrine is crucial for developing comprehensive cyber warfare capabilities for BDAF. It should outline common objectives, principles, and tactics, providing a unified vision for all services to align their efforts in the cyber domain. A central coordinating body is also essential for implementing this doctrine. The absence of such a doctrine and structure significantly hinders the development of joint cyber warfare capabilities.

Required Infrastructure

To defend against cyber attacks, the BDAF must develop the necessary infrastructure and have access to the required technology, including the establishment of a Security Operation Centre (SOC), Centralised Data Centre, Cyber Incident Response System (CIRT), Firewall System, Data Analysis system, Digital Forensic System, etc. Alongside, to conduct offensive cyber warfare, expertise needs to be developed.

Cyber Security Awareness and Training

Brigadier General (retired) Antonio Trogu, a former member of the Italian Armed Forces, emphasized during the 'HFM-288 Research Workshop that human factors are the biggest challenge in building an effective cyber threat prevention strategy (Sabev, 2019). An integrated approach is needed for efficient human resource management. Developing a joint cyber warfare capability requires increased cyber security awareness and training among Armed Forces members, ensuring they have the necessary knowledge and skills to defend against cyber attacks and operate effectively in cyber warfare.

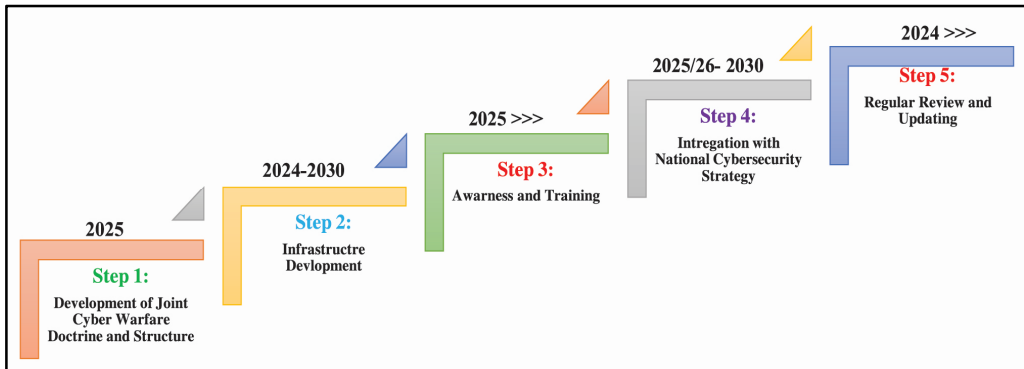
Integration with the National Cyber Security Strategy

BDAF's joint cyber warfare capability should integrate with the national cyber security strategy and policy. This alignment ensures the Armed Forces support national cyber security objectives and enhance the country's preparedness to respond to cyber attacks and operate effectively in cyber warfare.

The Proposed Roadmap for Joint Cyber Warfare Capability Development for BDAF

BDAF acknowledges the need for cyber warfare capabilities in the modern operational environment. However, developing these capabilities requires meeting several requirements. Currently, AFD's cyber warfare policy for BDAF has not been fully implemented due to the absence of a joint structure. Assessing the overall operational environment, the experts suggested that five essential steps must be followed to have a roadmap, as shown in Figure-5.

Figure-5: Roadmap for Cyber Warfare Capability

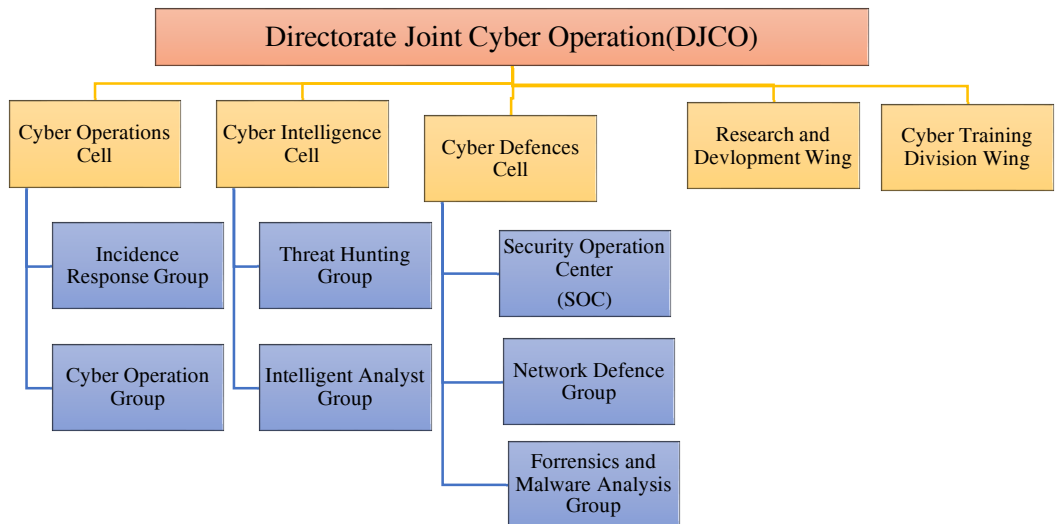


Source: Author’s Self Construct

Step 1: Development of Joint Cyber Warfare Doctrine and Structure

The first step in establishing a joint cyber warfare capability for BDAF is developing a joint cyber warfare doctrine and structure, starting in 2025. The doctrine should outline common objectives, principles, tactics, and roles for all services in handling cyber threats. A joint structure will operationalize this doctrine, ensuring the implementation of defensive and offensive cyber policies. This structure could be a separate entity or fall under AFD. A suggested organogram for the joint organization is shown below.

Figure-6: Suggested Organogram for Joint Cyber Warfare Organisation for BDAF



Source: Author’s Self Construct

Step 2: Infrastructure Development

The second step is the development of cyber warfare infrastructure to materialise the joint cyber warfare capability. The development process may start from 2025. However, it may be conducted in phases, and it should include establishing a SOC, Centralised Data Centre, CIRT, Firewall System, Data Analysis System, Digital Forensic System, etc.

Step 3: Cyber Warfare Awareness and Training

Awareness and training in cyber warfare are crucial for the proposed roadmap. Starting in 2025, an extensive awareness programme must be conducted at both organizational and individual levels to ensure necessary cyber security awareness. This study highlights that awareness gaps can be detrimental to BDAF. Therefore, awareness building is a critical component of the roadmap. Simultaneously, cyber warfare training will enhance cognitive capabilities and help BDAF develop a quality workforce for defensive and offensive operations. This is an ongoing process, essential for the successful implementation of the roadmap.

Step 4: Integration with the National Cyber Security Strategy

The fourth step is to integrate the Armed Forces' joint cyber warfare capabilities with the national strategy and policy for cyber security. This will ensure that the activities of the Armed Forces align with the national cyber security strategy and that their goals are the same as the national cyber security goals. This step will commence soon after step 1 and continue with step 2. The process may start as early as the year 2025 or 2026.

Step 5: Regular Review and Updating

The final step is to conduct regular reviews and updates of the joint cyber warfare capability to keep it effective against evolving cyber threats. This involves continuous evaluation of the Armed Forces' capabilities and training programs, ensuring BDAF is always prepared and adaptable.

This roadmap offers an integrated approach to establishing a joint cyber warfare capability for BDAF, reflecting its current state and emphasizing the need for unified efforts across all services to conduct effective cyber warfare.

Conclusions

Bangladesh's rapid modernization and digitalization have connected the nation to the cyber domain, opening it to cyber warfare due to heightened technological dependence. The BDAF, seeking modern network-based technology for future warfare, has become exposed to cyber threats. The Russia-Ukraine conflict exemplifies extensive cyber attacks, underscoring the role of cyber engagement in

current and future wars and making BDAF a potential target for adversaries. BDAF's cyber capacity is limited, with isolated service efforts highlighting the need for a joint approach. The absence of a consolidated organization leaves tri-service units like the Air Defence Operations Centre susceptible to cyber threats, posing challenges during the conflict. Cyber warfare will be an integral part of future warfare. Therefore, it is essential to understand the necessity of developing joint cyber warfare capability for BDAF and the importance of a unified approach in this endeavour. This research's significance lies in investigating the capability gap to propose suitable modalities for developing joint cyber warfare capability for BDAF.

The paper indicates that BDAF currently needs joint cyber warfare capability. However, given the evolving cyber threat scenario, BDAF must enhance its ability to develop a comprehensive cyber warfare capability to effectively respond to potential threats from adversaries.

The analysis of global cyber threat trends reveals diverse actors driven by distinct motivations, encompassing state and non-state entities like cybercriminals, terrorist factions, and even individuals seeking excitement. The recent warfare underscores the increasing significance of technology in contemporary war and the necessity for robust cyber security measures to thwart such attacks in the future. Moreover, cyberspace has become a pivotal facet of the broader battlespace, where actions originating from or transpiring within cyberspace can reverberate beyond its confines. Nations across the globe are investing significantly to develop their cyber warfare capability, considering the threat landscape. Our neighbouring countries are also enhancing their cyber capabilities. To remain at par with the current cyber domain development, BDAF also needs to strengthen its capabilities to combat future cyber warfare. Alongside cyber defensive capability, effective offensive cyber warfare capability will ensure the preparedness of BDAF to cope with future cyber-related challenges. However, BDAF, with the right measures, can overcome its vulnerabilities and emerge as a strong force in the cyber domain.

Currently, BDAF faces several challenges in cultivating cyber warfare capabilities. These challenges include limited cyber security awareness, the utilization of personal devices for official tasks, insider threats, susceptibility to social engineering attacks, deficient cyber hygiene practices, and limited comprehension of cyber warfare by the members of BDAF. Furthermore, several organizational hurdles include the absence of a central coordinating and implementing organization, fragmented approaches by the services of BDAF, duplicated efforts, lack of a coherent strategy, reliance on external technology providers, and so on.

The paper has proposed a comprehensive roadmap for developing BDAF's joint cyber warfare capability, taking into account its future requirements and current challenges. The roadmap includes the crucial step of establishing a unified doctrine and structure, which will provide a clear direction for BDAF's cyber warfare capability development. Other key components of the roadmap are infrastructure enhancement, cyber security training, alignment with the national cyber security strategy, and periodic capability evaluations.

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Brief Biography



Commander Al Imran Tanvir, (ND), PBGMS, afwc, psc, BN was commissioned in Bangladesh Navy on 01 December 2004. The officer is a Navigation and Direction (ND) specialized officer. He is a graduate of Defense Services Command and Staff College, Mirpur, Dhaka. He is also an alumnus of Armed Forces War College wing of National Defence College, Mirpur, Dhaka. The officer has earned two masters degree in his credits. He attended many professional courses both at home and abroad. Commander Tanvir has a good mix of command, instructional and staff appointments. He served on board various ships of BN and held appointments like Commanding Officer, Executive Officer and Navigating Officer. He also served in Directorate General of Forces Intelligence (DGFI) and Bangladesh Border Guard (BGB) in deputation. He served in UN Peace Keeping Mission in Western Sahara as UNMO. He commanded three Patrol Crafts and served as Staff Officer (Operations) to Commander Flotilla West of Bangladesh Navy. He has received peace-time medal “President Border Guard Medal Seba” from BGB in 2017. Presently, he is serving as Commanding Officer of BNS SAGAR, the only Mine Sweeper of Bangladesh Navy.

Of Hills: The Promises and the Perils

Major General Mohammad Asadullah Minhazul Alam, ndu, psc, PhD

Abstract

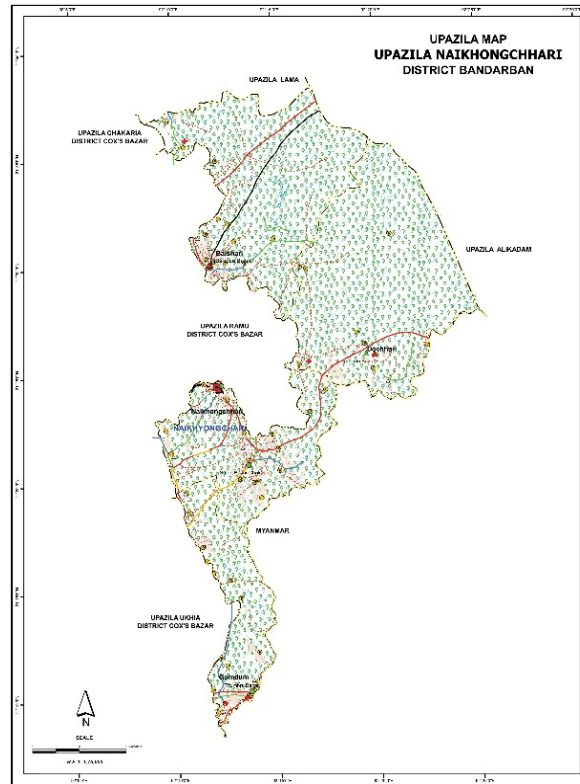
This article attempts to throw light on challenges empirically experienced while doing field training exercises in a hilly and mixed-topography environment in relation to tactics, C2 and logistics on the ground. When faced, these are regularly pondered about and negotiated by Commanders at different levels through creative approaches. However, the efforts are hardly substantiated. Lacking an arrangement for effective conservation of institutional memory, and a consistent scheme of ‘approval’ endorsements, these efforts are often started over with the change of leadership set-ups. This study is an outcome of the identified needs based on empirical findings that could be useful to work on further thoughts and ideas. The motivation comes from the conviction of a more focused look into the matter, and therefore, the paper explores ideas on how forces (at battalion and below) are to be grouped, equipped and trained for a terrain configuration of moderate hills, jungles and plains combine.

In the process it deals with relevant questions. Does the environment call for a certain specialization of forces (dedicatedly grouped and trained) for the particular type of terrain? Or should it be a transformation of the usual units? What are the lessons from the historical endorsements?

Introduction

The Upazila of *Naikhongchhari* (NKC) presents an interesting seahorse-like shape along its administrative boundary line, bearing many more fascinating facts and features. With only 62000 people living in the 169 square kilometre area, it has one of the lowest population densities in the country. But whatever the number of people is, the inhabitants come from all different demographic varieties, representing almost ten ethnic and four religious factions.¹ Like the people, the land configuration is also very diverse there. 80% of the total land constitutes hills and forest. There are hills that keep rising towards the east and connecting to the north-south extended Mayu Ranges. There are interspersed forests and deep jungles that still provide some sanctuary to diminishing wild animals. There are farmlands mostly around the banks of the winding *Baghkhali* River (as spoken by locals; usually spelled as *Bakhkhali*). With its name, the beautiful river bears the legends of the tigers’ frequenting in its vicinity sometimes in the past, although no existing traces persist today.

Figure-1: Naikhongchhari Map from LGED Site



Source: Singer, 2003

But in December 2020, the most fascinating of all was a discovery of the fact that the area was inhabited by many centenarians or near-centenarians. Some seventy-plus farmers were working in the field without support and assistance. Ninety-eight year old Mr. Abdul Kader (pseudo name) of *Napiterchar* village proved to be a living history. Standing upright with two of his near-seventy sons beside him, Mr. Kader clearly recalled the eye-witness experience of the British forces crossing *Bagkhali* river during the Second World War. He also reminisced the legends of Mughal Prince Shah Suja's fateful escape towards the Kingdom of Arakan. Mr Kader's account allowed an exposure to the facts that the very area had been a formidable battleground over the ages. May it be the flight of Mughal prince Shah Shuja in 1660, may it be the fight of King Berring hiding and trying to stage guerrilla wars, may it be the Anglo-Burmese wars - behind the serenity of the landscape hides a rich legacy of many military actions.

Those are precious records of 'collective memories' indeed.

But given the fact of their interesting part, there could be questions of relevance and pertinence. How far are these accounts really useful to benefit our time and future?

Relevance Test: Backtracking the History Pages

We find fast technological advancement becoming a day-to-day marvel, capabilities getting redefined, and the nature of warfare is shifting from one generation to the next. Yet, the combat in hilly terrain continued to have certain things not getting changed at all. One is, certainly, the planning priority. Whether it was a resistance in the 16th century by Rajasthan's Rana Pratap against Emperor Akbar, or Mustafa Kemal at the Gallipoli (1915), or the epic battle of Imphal-Kohima in the WW II Burma Campaign, the essence of success and the planning emphasis for hilly (or mixed hilly) topography remained depended on one crucial factor: control of the heights. It has always been the key to success. That reality, again, is often associated with the idea of the inaccessibility of the terrain. With so many modern scientific blessings, it continues to persist today.

To some extent, NKC has occasionally been tagged with the label of 'inaccessibility' too. While that sounds promising and heartening from the defenders' viewpoint, the peril of overestimating the geo-climatic conditions may not be ignored.

The hills are not so high, and there are scattered valleys, plains and vegetation. The rivers and nullahs offer mobility corridors during dry seasons but turn dangerous with the swelling flow of flood water in the monsoon. Despite all these, perhaps the myth of difficulty got prominent here, over the genuine realities. The application of usual tactics and capabilities, as taught in institutions, do not exactly fit in the terrain realities. Junior leaders work hard to deploy their platoons and sections here, soldiers find it difficult to site weapons with all the basics like 'mutual support' and 'fields of fire'. And so, the myth was established over a period, because of perceptive 'familiarization' that suffers from both *anchoring* and *confirmation* biases.²

But then people fought here in the past. Columns of military forces marched through even denser forests and jungles as late as in the sixteenth century. They all operated without modern technological blessings and gadgets. The intelligence was reliable and timely, the mobility was not so bad with primitive engineering tools and apparatus and the logistics never fell short to feed the requirement. It is therefore wondered if the terrain significantly precludes military capabilities as thought about. Or perhaps a point of 'right technique and apt equipment' could be missing here.

Perceived myths could be weighed against historical instances. If not like Hannibal's and Napoleon's crossing of the Alps, some of the myths of inaccessibility can better be 'double-checked' from the local history pages.

- a. **A Prince's Escape:** Many would not be able to spot the road Dulahazara-Idgar-Baishari-Garjania- Ashartoli in typical maps. Originating at the

Chattogram-Cox's Bazar highway³ and taking an east-bound bifurcation towards the hilly area, the road bears strong local tradition. It is named after the Mughal prince Shuja (Shah Shuja Road) as he was forced to flee to Arakan (Kingdom of Mrauk U) in 1660 after getting defeated in several battles against the army of his brother Aurangzeb. He preferred an exile in an unknown land to surrendering to his brother (and perhaps evading the chances of getting killed like other two brothers: Dara and Murad).

Figure-2: Road Dochari-Garzania-Ashartali ('Shuja Road')



Shuja's tragic flight to Arakan and ultimate demise with the entire family is still a popular part of the local hearsay, folklore and *pala-puthi*. The ill-fated Mughal prince led a sizeable force across what is today's southeastern border of Bangladesh. According to eminent historian and professor Abdul Karim, Shuja went with a force that had a total of five hundred people with a reasonable number of elephants and horses.⁴ He had to cross several nearly impassable rivers and hill ranges (that includes Mayu range too). En route he deliberately bypassed the administrative township of Ramu, for fear of hostility. Needless to mention that the crossing of mighty rivers (like Sangu, Matamuhuri, Baghkhali, Naaf), overcoming hundreds of streams, negotiating jungles and hilly ranges, dealing with torrential rains (Shuja marched between June-August) demanded huge efforts and ingenuity. The forces had to sustain in the condition for months and they did it with considerable success. The difficulties of the route are clearly narrated in another earlier account. Thirty years before his march, in 1630, a traveller named Fray Sebastian Manrique followed almost the same route, as mentioned in his famous *The Itinerario*.⁵ Father Antonio Farinha took the identical route in 1639 with another group of Christian missionaries.⁶ However, more than the historical records, what is important here is to recognize the existence of routes and mobility corridors that let forces pass through, get deployed and sustain

as early as four centuries ago. There are pre-existing ancient tracks and passages that founded an inter-community linking mechanism between the erstwhile Mrauk U Kingdom and the Bengal Sultanate (later the Subah of Bengal). The locals had been trading across for centuries; the tracks and traces persist till today through the maze of forests and hills. Shuja beat the weather and sustained a long march in a far more dangerous situation than today. He could do it with the assistance of prevailing local knowledge and support.

The myth of impassability therefore does not seem relevant enough. The terrain is a difficult ground (as Sun Zi said), but it surely offers routes and approaches where today's modern military gadgets are likely to better assist the traversing of forces than it was done four hundred years before.

b. **King Berring's Fight:** Located not far from Garjania Bazar, an ancient tunnel at the *Ukhiar Ghona* bears strong myths and tales. Its entry is now closed for safety reasons, but people who entered there before provided an eye-witness description. The account holds that the tunnel leads to a sizeable underground hall-type cave. The cave had another exit which no longer exists today with identifiable features. But the cave itself can accommodate a substantial body of people. Artificial air passages leading to the exteriors were also noticed. With its formidable dimension, the cave is associated with some *Kana Raja or blind king*.⁷ Historians assume it to be one of the caves of Arakan leader Sin Piang (to the Europeans, he was known as King Berring) who had to put up a strong fight for liberating his occupied kingdom. In his four years' constant struggle (1811 to 1815) he mastered a large army, sustained in tremendous hostile situations and gained major successes while facing two-sided pressure from the East India Company forces and also from the Bamar King Bodawpaya. Sinpiang's saga tells us how, even with scanty resources, a force can adapt and innovate to raise a protracted war, how adoption of guerrilla tactics pays dividend - especially when becoming hugely outnumbered, and how the terrain is to be used in favour of one's best advantages. Some of the important lessons are indicative of the facts that a light infantry-centric force and flexible organization (allowing quick formation and re-formation), ability to change locations and posture, living off the land and using well-constructed hide outs etc were keys to the success. Both the British and Bodawpaya forces failed to locate him and learn about his build-up. King Berring's technique of using various hideouts, utilising the local's support and sympathy for sustainment and intelligence is described in different contemporary documents.⁸ His success proves that the stockpiling of logistics, and creation of fortress-like Strong Points will be important to retain key areas for a long period. However, there will still be a need to deal with infiltrating forces.

Strong Points, regardless of their large numbers, are barely enough to detect a sizeable force sneaking past and occupying a position in the rear. That will call for a different remedy.

Figure-3: King Berring's Cave (commonly known as *Andhar Manik* tunnel or *Kana Razar Surongo*. Picture from writer's self-collection)



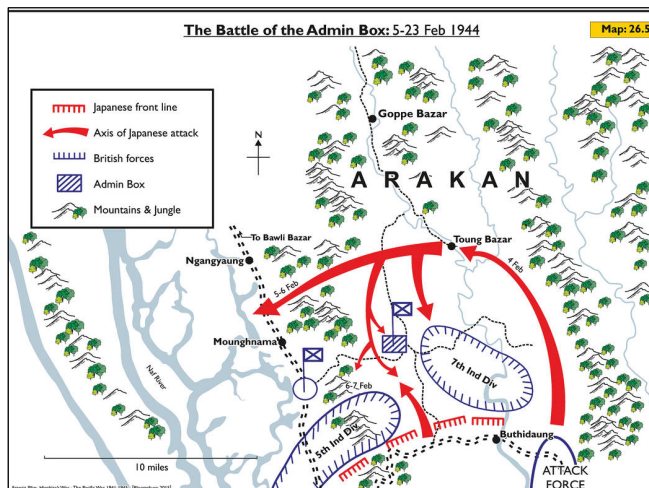
c. **The Battle of Admin Box:** While the battles of Imphal and Kohima are significantly acclaimed and known by the pupils and practitioners of military history,⁹ a much-underrated saga of bravery leaves important lessons at the southern front of the Burma Campaign. The area offered a mixed and complex terrain; intermittent plains like Imphal and Ngakyedauk lay across a few viable routes passing through the jungle-covered hills. The fifteen days' battle, fought in an area named as Ngakyedauk pass between 5-23 February 1944, turned the course of Burma campaign, producing the first decisive victory for British troops against the Japanese. It became commonly known as admin box, because the defended locality was an administrative area for the British 7 Indian Division. Majority of the force was from the *odds and sods*, ...clerks, signallers, postmen, muleteers, canteen staff, etc... 'they were untried in battle and untrained in anything but simply firing out of a trench'.¹⁰ The Defence blazed the trail for subsequent victories by the allied in Burma Campaign. It taught how to prepare and defend against, and finally defeat ruthless offensive in such terrain. It imparted how to fortify the areas for turning into effectively defended localities, maintain the position, ensure the supply chain and finally, generate an offensive through the transformation of an active defence.

Figure-4: The Forested Hills of Manipur today and in 1944



Source: National Geographic¹¹

Figure-5: Battle of Admin Box Schematic



Source: Collected from open internet source

It also teaches how to ‘hang around’ and to make the opposing forces starve to give up in the end. Field Marshall Slim’s forethought to prepare forces with the appropriate ‘specialization’ and change of tactics worked well. Typical ‘enveloping tactics’(schematic)¹¹ adopted by the Japanese aimed at cutting the opponents line of communication was so long paying a dividend, against which the British forces always conducted ‘successful retreat’. This time they stayed put. The soldiers were given one simple order, *keep the enemy away from your trench*. The stockpiling of logistics continued with constant air dropping. When the number of attacks could be foiled with heavy casualties inflicted on the Japanese, the allied started attacking their supply lines. The road-centric manoeuvre was forsaken, the British forces by now learned using jungles to own greater advantage.

d. **Are these Useful?:** When Bismarck wanted to ‘profit by other people’s experience’, he certainly did not agree to countryman Hegel’s pessimistic saying, *we learn from the history that we do not learn from the history*. Nevertheless, a goal to avoid mistake can be greatly assisted by looking back. Truly, many of the historical incidents and precedents will not remain relevant. But then, they are to be evaluated in the context of present dynamics and developments. For the case of warfare, the change is yet to be phenomenal to discard the importance of holding ground with ‘physical occupation’. The principle of territorial integrity is still consistent with the task of defending border. Therefore, a mission to defend sovereignty and territorial integrity in a hilly terrain condition may need the excerpt findings from the above instances. Without making a tall order of research, the following problem-solving matrix could be useful:

Table-1: Problem solving ideas from Historical Precedents

Problem	Sub-problem	Historical idea
A terrain that offers complex challenges from the situational perspective of deployment difficulties and functional perspective of effective employment of force needs to be negotiated for military planning concerns.	Traditional learning on deployment is not quite useful as basic principles don’t match, e.g., depth, mutual support, frontage, reserve etc	Strong point formula based on key terrain feature. Every point meant for holding and sustain for long time (King Berring; Admin Box). Specialised training and grouping of force (Admin Box)
	Movements and manoeuvre with heavy and wheeled equipment are difficult (narrow mobility corridor, lack of manoeuvre space). It’s even more difficult in rainy season	Light and fast mobile element. (King Berring; Admin Box) With the development of tracks and roads, subsequent induction of heavy equipment. Tracked vehicle preferred (Admin Box)
	Traditional C2 system may not function well	Decentralization of command (Admin Box)
	Ground Surveillance is limited	Reliance of extensive HUMINT, local knowledge and support (All three)
	Recapturing any lost territory will be costly, again guarding every inch and hills are impracticable due to close terrain and requirement of heavy force concentration	A separate mobile reserve to launch offensive action (Admin Box)
	Infiltration and encirclement need to be deterred	British forces compiled heavy logistics to sustain against encirclement (Admin Box)
	Maintenance of supply chain very difficult. Risk of getting cut-off and other logistic challenges	Air transportation (Admin Box) Stockpiling (King Berring; Admin Box) Local support (Shuja and King Berring)

Source: writer’s self-construct

How to Plan Here

NKC could prove nightmarish from a military planning perspective. It presents a bundle of challenges, which hardly have any textbook answers or solutions. The most familiar of all is the mixture of all different types of land, through which rivers, canals and passes are offering excellent infiltration routes. The satellite map below proves this statement. How should one guard these lanes in the AOR? Is our existing array and grouping good enough?

Figure-6: NKC Area from Google Map



Source: Author's self-construct

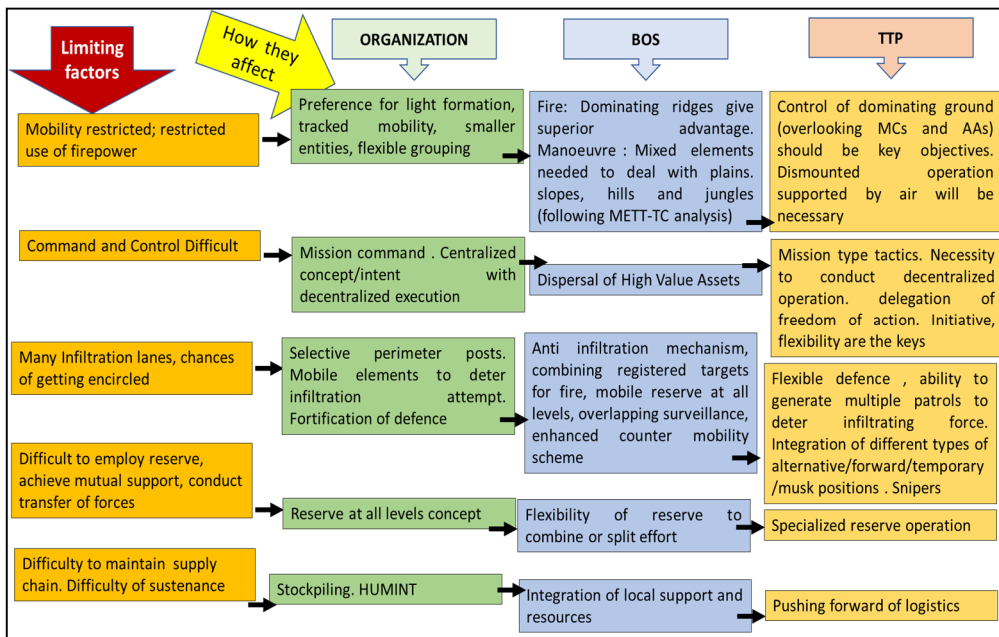
At the battalion and the company level, the ground demands assorted grouping of the weapon capabilities, exceptional deployment design, innovative training and innovative incorporation of fire, manoeuvre, intelligence and sustenance concepts. US Army's Field Manuals elaborates on mountain operation, suggesting to evaluate different types of terrain distinctly into consideration and develop individual skill levels according to the types of terrain. Type of terrain would govern required skill category on assault climbing, trail walking, mountaineering, mounted or dismounted mobility etc.¹² Similarly grouping of forces (light and heavy forces combined), fighting technique (better opportunities to attack from the flank or rear) are also influenced by the terrain and commanders must plan it from beforehand. The manual remarks:

'In mountainous terrain, it is usually difficult to conduct a coordinated battle. Engagements tend to be isolated, march columns of even small elements extremely long, and mutual support difficult to accomplish. ... the mountainous environment decreases the commander's mobility. Therefore, commanders must be able to develop

a clear vision of how the battle will unfold, correctly anticipate the decisive points on the battlefield, and position themselves at these critical points.¹³

At the outset, the planners must recognize the uniqueness (or ‘peculiarities’ more aptly) of the operating environment to determine the imperatives. A cursory look inside a conceivable effect analysis could be useful. The following diagram is a sample assessment. It determines how some of the very common realities on the ground could be regarded against pertinent factors like the Organization of the force, the Effect on the employment of a Battlefield Operating System (BOS) and how the Tactics, Techniques and Procedures (TTP) might need additional attention.

Figure-7: A Sample Environmental Effect Assessment



Source: Author’s self-construct

Although the above assessment is not exhaustive, it helps generating planning ideas at appropriate levels. The higher the Command echelon, the more thorough the assessment should be. For example, for a supplementary evaluation, a higher Headquarter may also engage in a perspective-based problem-solving mechanism as follows:

Figure-8: A sample perspective-based solution schematic

Question How to deal with a terrain that offers complex challenges from the situational perspective of deployment difficulties and functional perspective of effective employment of force?	Challenge Areas	Answer (Through two-fold lenses)	
		Situational (Deployment difficulties due to terrain, weather and unfamiliarity)	Functional (Effective employment of force)
	Organizing and Grouping	?	?
	Training	?	?
	Sustenance	?	?
	Surveillance	?	?

Source: Author’s self-construct

Food for Thought

Specialization of military forces based on purpose, peculiarities of terrain, threat and many other considerations is not a new proposition. It is being practised all over the world and even by our neighbours. A dedicated specialized outfit is better focused for the task, and also for the training. Over and above such specialization saves time and cost when it comes to quick-time effective deployment. For the terrain under discussion, specialization of forces as a whole could be given due thought. It will initiate and oblige inevitable requirement to develop relevant training doctrine, study appropriate grouping and equipping requirement and prepare forces with necessary skills and techniques.

When it comes to instilling adaptive techniques in our doctrinal practice and parlance for an aggressive defence in the hills, below is a list of thoughts from past experience and study, expressed in brief:

- a. **Perimeter Defence:** When it comes to holding critical terrain without any or adequate mutual support, an all-round perimeter defence is very much needed. It is designed to repel attack from any direction and is supported by a number of outer fighting positions. Not being usually practiced in the plains, this is something which has proven very effective all along the historical instances.
- b. **SIOT:** The technique of Small Infantry Operating Team (SIOT) was effectively used by a neighbouring army during their civil wars. It entails the ability of the entire battalion and company to re-group in small operating teams (8 to 10 men) to dominate the area by aggressive patrolling, deter infiltration and retain initiative. This gives the advantage of covering a large area for security and surveillance. It endures the central criticism of piecemeal deployment and demands huge physio-mental skill development. It also claims a supportive sustenance mechanism.

c. **Swarming:** This is related to the earlier paragraph on generating a lot of small fighting teams. Swarming suggests ‘populating’ the vulnerable area and likely AA with a good number of dominating patrols, surveillance drones, observation outposts, firing positions etc. It will surely demand a lot of resources, human or artificial, but can be augmented by suitable integration of other supporting/ auxiliary forces.

d. **Mission Command /Auftragstactic:** In Mission Command, the intent is given by the higher commander, units and sub-units enjoy liberty and flexibility to plan and execute for successful accomplishment. **Planning initiative** and **freedom of execution** are two keys to this notion. In this regard, FM 3-97-6 holds:

Leadership rapidly becomes the primary element of combat power on the mountain battlefield. Commanders must recognize the distinctive effects created by decentralization of command, develop a depth of leadership that forms the vital link to unity of effort, and organize and direct operations that require **minimum intervention**... the nature of mountain warfare generally necessitates that commanders embrace the philosophy of command and control known as **mission command**. This type of command and control requires subordinates to make decisions rapidly within the framework of the commander's concept and intent. Commanders must be able to **accept some measure of uncertainty**, delegate, and trust and encourage subordinate leaders at all levels to use initiative and act alone to achieve the desired results, particularly when the situation changes and they lose contact with higher headquarters¹⁴.

e. **Sustenance (*pushing forward and stockpiling*):** The defended localities must have an additional allotment of essential combat supplies. The troops should be supported to remain focused on their defence, not leave it or fall back for administrative requirement as far as possible. For example, the typical system of food collection demands a body of troops to fall back, collect the food and get back to their sections or platoons. With experience, it has been found that the method may be reversed by utilizing indigenous transportations and deliver the food to forward locations. Such novelty can reduce both risk and fatigue.

f. **Integration:** The mountains ‘eat up’ forces by claiming additional deployments for covering the gaps, forward positions, counter infiltration measures, perimeter posts etc. Even after a substantial deployment, infiltration cannot be detected from a close proximity. It has been experienced that, on a dark night a large body could sneak past within hundred meters of the deployed defence just because the defiles, *nullas* and *charas* gave wonderful cover and concealment. Therefore, a detection and information collection mechanism comprising all available local resources on the ground must be integrated from the

outset of the planning. The locals are quite resourceful, bear the inherited knowledge of centuries and are habitual fighters in that rugged part of the country. (In one instance, one of the locals found coming forward to ‘reassure’ the CO doing exercise,” Sir don’t worry, we are here at the front’. And he meaningfully made a gesture with his hand-held axe.) The locals are genius at innovation too. They can quickly form a boat-bridge to cross rivers and nullah with military transports, their tractors can ply gentle slopes and their wooden logs are wonderful materials for defence fortifications.

g. **Innovation:** Innovation is the key to effective persistence in hilly terrain. Resources will be very meagre compared to evolving difficulties and needs; units and sub units will have to endure all the risks of being cut off or isolated; and the need for regular innovation, adaptation and evolution will be crucial. All aspects of deployment and application of Battlefield Operating Systems need to be aided by inventive ideas at different stages. One good instance, as mentioned earlier, is boat ferry or boat bridge concept (as on the picture)¹⁵ which has been widely used by the mediaeval and the colonial armies before inventing of the modern bridging capability. Likewise, for similar cases related to fortification, communication, heavy equipment transportation (including guns) and all associated challenges, Junior Leaders should be encouraged to come forward with their novel ideas.

Figure-9: Boat bridge over the Ganges at Cawnpore, 1891



Source: Author’s self-construct

Epilogue

Hills offer promises for the defender, only if one is pre-organized to tackle the associated perils. The environment demands an extra bit of preparedness, patience, acclimatisation and innovation. It calls for adaptive delegation, spontaneity and terrain-pertinent skills. However finally, it is the individual's indomitable spirit that would make all the differences. Under comparable conditions, Field Marshal Slim credited the human factors more than the 'lavish equipment', that turned a **Defeat into Victory**.

Slim's importance on the five 'chief characteristics' of his success is worth mentioning:

- i. The acceptance as normal of the regular moment and maintenance of standard formation by air.
- ii. Great tactical freedom for subordinate commanders.
- iii. The operation, over wide distances in the most difficult country, of comparatively small forces in tactical independence but strategic combination.
- iv. Reduced scales of transport and equipment, supplemented by ingenuity and improvisation from local resources.
- v. The high quality of the individual soldier, his morale, toughness, and discipline, his acceptance of hardship, and his ability to move on his own feet and to look after himself.¹⁶

It is no wonder that the experiential findings narrated in this article practically complements the version of Field Marshall Slim. Especially on the last point related to individual quality, Slim frequently reiterates how dispersed fighting condition craves two main requirements; **skilled and determined junior leaders**, and **self-reliant, physically hard, well-disciplined troops**.¹⁷ He acclaims the soldiers of Fourteenth Army, who, despite many racial differences, made it a 'Soldier's War', amid tremendous difficulties, confusions, scarcities and unforeseen.

Likewise, defending and fighting in hills, mountains and rugged terrain will constantly cause many perils. There will be blunders, surprises, and there will be defeats to be turned into victory. In those difficult moments, the calling for the right spirit will have to be promptly responded - without fail, delay or questions - as Tennyson proposed in *The Charge of the Light Brigade*:

"Forward, the Light Brigade!"
Was there a man dismayed?

Not though the soldier knew
Someone had blundered.
Theirs not to make reply,
Theirs not to reason why,
Theirs but to do and die.
Into the valley of Death

Rode the six hundred.¹⁸ No calculation or question, just believing in the task and purpose is all that would be needed. Otherwise, the promises of the hills could be doomed in perils, riding into the valley of death will not be possible.

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Brief Biography



Major General Mohammad Asadullah Minhazul Alam, ndu, psc, PhD is the General Officer Commanding and Area Commander, Cox's Bazar Area in office since 24 October 2024. Prior to his current assignment, he worked as the Commandant of Defence Services Command and Staff College. Major General Minhaz was commissioned with the 25th Bangladesh Military Academy Long Course, in the Corps of Infantry. He obtained the Sword of Honour, for the best all-round performance. A commando officer with an ongoing 33 years plus career in Bangladesh Army, Major General Minhaz, worked in the United Nations field missions, in 1999-2000 as UNMO in UNTAET, and in 2020-21 as Sector Commander MINUSCA. He served on several terms in the CHTs for Counter Insurgency and post Counter Insurgency operations. Major General Minhaz served in five infantry regiments and PGR in different tiers of command and staff appointment. He worked

as Staff Officer in Brigade and Division Headquarters, the East Bengal Regimental Centre and Headquarters Army Training and Doctrine Command. He commanded a battalion in the CHTs, a contingent in Kuwait, a brigade in Ramu (with extensive engagement in Rohingya affairs) and a multinational sector-force in Central African Republic under the UN. Major General Minhaz is the founding Director of the Army War Game Centre, a prime project of the Army, materialized after years of research and development. He also worked as Director, Overseas Operations Directorate at Army Headquarters, Managing Director of Bangladesh Machine Tools Factory Limited and as PAPA BIR. In DSCSC he worked as Instructor Class-A and Chief Instructor. Major General Minhaz obtained his Masters in Defence Studies from Defence Services Command and Staff College, Mirpur; besides, he is also a graduate from Singapore Command and Staff College. In 2018, he obtained Master of Science in National Security Strategy from National Defence University, USA. In 2021 Major General Minhaz was conferred upon PhD from Jahangirnagar University in International Relations discipline. More an avid reader, Major General Minhaz regularly writes for newspapers and journals, and authored three books till date.

Military Diplomacy for Bangladesh in the Context of New World Order

Lieutenant Colonel K M Mehedi Hasan, afwc, psc, Engineers

Abstract

In the rapidly evolving landscape of the new world order, military diplomacy has become a pivotal instrument for Bangladesh to secure its national interests and enhance its global standing. The strategic utilisation of military diplomacy enables Bangladesh to foster bilateral and multilateral relationships, ensuring regional stability and security cooperation. Engaging in joint military exercises, intelligence sharing, and defence dialogues with key international partners, Bangladesh can bolster its defence capabilities while demonstrating its commitment to peace and security. This proactive approach not only deters potential threats but also reinforces Bangladesh's role as a responsible member of the international community. Considering the above, this paper aims to analyse the current geopolitical standing of Bangladesh in the context of the new world order. The paper subsequently reviews several significant diplomatic initiatives undertaken by the Bangladesh Armed Forces from both current and retrospective standpoint. Finally, the challenges and opportunities for Bangladesh to pursue military diplomacy is also discussed.

Introduction

Military diplomacy, a sub-set of Track-1 diplomacy, refers to the pursuit of foreign policy objectives through the peaceful employment of defence resources and capabilities. It can be understood as the peaceful application of resources across the spectrum of defence to achieve positive outcomes to develop a country's bilateral and multilateral relationships. The primary aim of military diplomacy is to help shape and execute the state's security policy, fostering stable, long-term international defence relations. The military power of a state is inextricably linked with its diplomacy, begets a diplomatic bonus and provides wider freedom of action for the state if the state plays its cards well. Since there is no universally accepted definition, countries tailor its meaning to fit their security policies. In Bangladesh, while the term appears in journalism, it is not explicitly mentioned in foreign and security policy documents.

Military officers share a unique value system, thought process and ethos, allowing them to connect more effectively with fellow officers, regardless of nationality, viewing them as comrades. Many governments in the Asia-Pacific region are significantly influenced by their military. Countries such as Pakistan, Myanmar,

Cambodia, Vietnam, the Philippines, and Indonesia experience strong military impact on policy making. Consequently, Bangladesh should prioritise military diplomacy to influence countries where the military plays a substantial role in policymaking. As a sovereign nation with a strong and credible military, Bangladesh should leverage this potential to advance its national interests. However, limited understanding and recognition of military diplomacy and its strategic importance within the country often result in fragmented and inept efforts in this field.

Apart from the internal issues, additionally, Bangladesh contends with significant external challenges in pursuing military diplomacy such as geopolitical tensions in South Asia, contradictory strategic interests of neighboring countries, and complex regional security dynamics. Keeping all these in view, this paper addresses the issue in two aspects. At first, the definition, scope and elements of military diplomacy is discussed followed by defining the world order. Here, an endeavour is also made to examine the current global and regional geo-strategic environment affecting Bangladesh and Bangladesh Armed Forces in pursuing military diplomacy. Secondly, the paper highlighted the legacy and present context of military diplomacy of Bangladesh including challenges and opportunities in this field.

Definition and Elements of Military Diplomacy

Definition and Scope

Diplomacy is typically defined as the art and practice of managing a nation's foreign relations, while military diplomacy involves uniformed personnel or civilians in defence ministries conducting these foreign relations. It has been a vital aspect of international diplomacy, serving as an effective method to promote bilateral and regional relationships and address shared security concerns. One simple definition of military diplomacy as brought out by C Raja Mohan, an Indian scholar, is ‘the use of armed forces in operations other than war, building on their trained expertise to achieve national and foreign objectives abroad’.

Defence Diplomacy viz a viz Military Diplomacy

The terms ‘Defence Diplomacy’ and ‘Military Diplomacy’ are often interchangeably used by many scholars and in different official documents. However, there is a difference between these two terms. Military diplomacy is an impressive range of modalities ranging from strategic to tactical level. It begins with meetings at a strategic level in a ministerial forum, operational-level interactions by senior officials of defence force, services chiefs’ meetings, and tactical-level interactions by military exchanges, exercises, visits, etc. (Tan, S., & Singh, B., 2012). On the contrary, defence diplomacy is the military-to-military cooperation which is not bounded by traditional military roles

of defence or deterrence, but rather inclusive of all security-related issues and humanitarian assistance. It necessarily does not involve the allies only but also partners and potential allies (Drab, L. 2018). In short, the term ‘military diplomacy’ refers to interactions and exchanges between uniformed services, whereas ‘defence diplomacy’ encompasses activities carried out by the entire defence establishment, including civilian bureaucrats even research and development organisations.

Common Methods of Military Diplomacy

According to Pajtinka, E. (2016), the common methods of peacetime military diplomacy in varied degrees include:

- Defence consultations and strategic dialogues.
- State to state military protocols.
- Participation in bilateral and multilateral exercises.
- Cooperation in common security areas like counterterrorism.
- UN peacekeeping operations.
- Exchange of military attaches, visits by military delegations and military study abroad.
- Sending of training teams abroad.

New World Order and the Balance of Power

The BRIC nations Brazil, Russia, India, and China are reshaping the global power structure, signalling a decline in the United States’ dominance in economic development and globalisation. Following the collapse of the Soviet Union, the U.S. held unparalleled economic and military power, effectively governing a unipolar world where no nation or organisation could challenge its decisions.

However, the rise of regional powers like Türkiye, China, Russia and India, along with influential alliances among them, is shifting the world order toward a multipolar system. Changes in global interests driven by globalisation and evolving international relations, coupled with Russia’s resurgence and China’s economic growth, have laid the groundwork for a multipolar future.

Due to this transformation from unipolar to multipolar world order, the world is currently experiencing profound and complex changes. The traditional world order is gradually disintegrating, and a new one has yet to form fully. This shift in power dynamics is part of a new wave of globalisation, with reports indicating that developing countries like Bangladesh, once considered peripheral in the global economy, are poised to become the main drivers. As global power becomes more

distributed and emerging economies gain prominence, Bangladesh must adapt its both Track-1 and military diplomatic strategies to safeguard its national interests and leverage its growing economic potential.

Current Global Context and Bangladesh

The 21st Century has seen a paradigm shift in the geo-strategic equations of the world with the focus shifting to what is known as 'soft power'. The new geopolitics is premised on the primacy of this soft power criterion of influence and is more universalistic in the composition of actors providing global leadership and influencing policy. In the present context, the economy triumphs over military might. From that perspective, from a global point of view, Bangladesh is maintaining an impressive track record for growth and development, aspiring to be a developing country by 2026. The economy of Bangladesh is the 33rd largest in the world in nominal terms and the 25th largest by Purchasing Power Parity (The Daily Star, February 15, 2024). This is a solid standing for Bangladesh in the world forum.

Although the threat of total war may be decreasing, the world remains perilous, particularly in regions where traditional conflict is considered a legitimate way to pursue national interests, such as the Middle East and South-Central Asia. In these 'transitional zones,' regional instability could escalate into unconventional warfare. This situation introduces a new future danger: conflicts with nations or groups possessing highly sophisticated and asymmetric capabilities. Bangladesh has all the reasons to be concerned about several armed groups or even countries in the Southeast Asian region.

Therefore, apart from the so-called soft power that focuses more on the economic aspects, having a secure and conducive environment to do business is of utmost importance. Therefore, irrespective of the fact that conventional threats have greatly diminished even in the Bangladesh context, the more dangerous asymmetric threat which can directly target civilians has grown exponentially. Therefore, keeping an eye on the geographical, strategic and political environment of the world, military diplomacy has assumed a new significance for Bangladesh as a tool for furthering national interests.

Current Regional and Geo-Strategic Environment and Bangladesh

A comprehensive understanding of the geostrategic significance including the geo-economic importance of Bangladesh in the South-East Asian region shall provide a clear idea about the geopolitical environment of this region. The countries of this region seats on a buffer zone of two great oceans- the Atlantic and the Pacific connected by the Indian Ocean. One of the two strategic chokepoints Malacca Strait is also located in the South-East Asian region. Many geo-strategic analysts opine that a power game has started between the USA and China to have authority over this

region. Bangladesh's geographic location has involved her automatically in this power race. Various global and regional organisations like the United Nations (UN) or the Association of Southeast Asian Nations (ASEAN) have also been involved in this geopolitical environment either to maintain peace in this region or to protect the interest of member states.

Bangladesh pursues a moderate foreign policy; one of the basic principles of which is 'Friendship towards all, malice towards none'. The country is always willing to maintain a good relationship with her neighbours India and Myanmar and a regional superpower China. While the relationship with India and China is relatively consistent and warm, Bangladesh finds it quite difficult to define the relationship with Myanmar in the same way. Bangladesh, since birth, has never done anything illegally which might deprive Myanmar of her rightful interests. On the contrary, historical evidence proves that Myanmar's several actions went directly against Bangladesh. However, both through conventional and military diplomacy Bangladesh always persuaded for a better diplomatic relationship with Myanmar even after the Rohingya crisis.

Bangladesh in Military Diplomacy: A Retrospect

Bangladesh achieved independence after nine months of bloody liberation war in 1971. After independence, Bangladesh did not hesitate to request the Indian Government to withdraw Indian troops. Bangladesh Government understood that the country could not uphold its sovereignty by keeping the foreign troops. Thereby, it was ensured that the Indian troops would withdraw within 87 days of liberation. This was a great success in the domain of defence diplomacy. Bangladesh also signed the India-Bangladesh Friendship Treaty on 19 March 1972 with India. It was mostly considered a security and military pact where both the countries agreed upon a non-aggression pact against each other. The treaty also included not forming a military alliance and would restrict the use of territories against each other. Historically, it was the birth of military diplomacy for Bangladesh.

The second military diplomacy of Bangladesh commenced during the Arab-Israel war of 1973. Bangladesh sent a specialised artillery unit, medical unit, and several tons of tea from the Bangladesh Army to the battlefields of Egypt and Syria as a sign of Bengali brotherhood and sympathy towards the Arabs. In response, Egyptian President Anwar Sadat sent 30 Russian-made T-54 tanks to Bangladesh in 1974, consolidating the first tank regiment of Bangladesh. This small step of military diplomatic effort proved as a giant leap on the way of the foreign policy of Bangladesh towards the Middle East which is still unwavering.

Bangladesh's military diplomacy with the United States began in the early 1990s. At That time, due to the Iraqi invasion of Kuwait and the consequent US-led Operation

Desert Storm, the Bangladesh Army was one of the participants. After the catastrophic cyclone in 1991, US Pacific Command began conducting rescue operations along the coast of Bangladesh in the name of Operation SEA ANGEL. Since that event, the military relations between Bangladesh and the United States have been in a very static and balanced position. Bangladesh is also receiving some military assistance from US on easy terms, including four C-130 transport aircraft for the Air Force, some small and medium-sized warships for the Navy. Moreover, there are numbers of combined exercises, and training courses are carried out by both countries.

The effect of Bangladesh's military diplomacy through strong presence in the UN peacekeeping mission in different parts of the world is the largest. This diplomacy also began in the last decade of the last century. Over the past three decades, active participation in various UN peacekeeping operations in Europe, South-East Asia and Africa has been able to take Bangladesh to a new height in the world arena. Bangladesh is currently the largest troop contributor to UN peacekeeping missions. From US President Barack Obama to UN Secretary General Ban Ki-moon, many have praised the Bangladeshi government and military for maintaining world peace. At present, as the only Asian navy, the United Nations has assigned the Bangladesh Navy to patrol and conduct complex military operations in the Mediterranean region adjacent to Lebanon, which is helping to showcase Bangladesh's growing capabilities to the world. The name of Bangladesh will be written down in the history of the West African countries not only for their traditional peacekeeping work but also for their contribution to the socio-economic and infrastructural development.

Recent Military Diplomatic Efforts of Bangladesh Armed Forces

Historically Bangladesh has used various means of military diplomacy including traditional methods of exchange of defence attaches, training exchanges, UN missions and overseas calls by Naval Ships. The scope of military diplomacy has however increased of late. Some of the major contributions by the Bangladesh Armed forces towards military diplomacy in the recent past are as follows:

Participation in Bilateral and Multilateral Military Exercises

Participation in bi-lateral exercises such as SAMPREETI with India, KIS with Türkiye, EFES with Kuwait, TIGER SHARK with the US and multi-lateral exercise named SHANTIR OGROSENA with India, Sri Lanka and Bhutan reflect a new resolve of the Bangladesh Armed Forces to step up military diplomacy up one notch.

Professional Military Exchanges

Military exchanges on training and courses with developing countries, neighbours and developed countries such as the USA, UK, India, Pakistan and China to prestigious

courses such as Staff College, National Defence College, etc. have been prevalent for many years. Such exchanges not only give a global outlook to own officers and men but also create goodwill ambassadors out of all foreign students hosted by the training institutions of the Armed Forces of Bangladesh.

Cooperation in Common Security Areas like Counterterrorism

Bangladesh has become part of a 34-state Islamic military coalition based in Saudi Arabia, with a joint operations centre located in Riyadh to coordinate and support military efforts. The coalition seeks to help member countries strengthen their military capabilities to combat terrorism. This represents another significant achievement in military diplomacy for Bangladesh on the global stage.

UN Peacekeeping Operations

As a responsible and peace-loving nation, Bangladesh has become the largest troop contributor to UN missions for several times. So far Bangladesh has taken part in 63 peacekeeping missions with a total contribution exceeding 200,000 troops in 43 different countries around the globe. Bangladesh have made reckonable sacrifices to make the world a better living place, and thereby branding Bangladesh in the global forum. The name of Bangladesh will be written down in the history of the West African countries not only for the traditional peacekeeping operation but also for the contribution to the socio-economic and infrastructural development in those countries.

Visits by Military Delegations

A good number of high-level military delegations are participating in various world forums and projecting the country in a very positive light. Visits of senior leadership to China, KSA, Kuwait, Myanmar, Türkiye, and the USA are glowing examples of this kind.

Defence Procurement

According to the latest data from the Stockholm International Peace Research Institute (SIPRI), Bangladesh has spent \$2.59 billion in arms import from China and \$110 million from the USA in the last ten years. This provides Bangladesh with significant influence in the international arena, as many countries now see Bangladesh as an attractive customer for their manufactured hardware.

Training Teams Abroad

The Bangladesh Army has a sizeable training team at Ali AL Sabah Military College, Kuwait. More than 105 instructors, both officers and men, are imparting training to young cadets from different Gulf Countries. Besides, our staff college runs a package in DSCSC, Sri Lanka. These training teams are providing a historical service in

furthering the cause of Bangladesh in the host countries and beyond. The amount of goodwill earned by these teams is much more than can ever be generated by any diplomatic mission.

Supporting Friendly Countries during COVID Situation

From April 2020 to February 2021, a Bangladesh Army Medical team consisting of 30 doctors and 70 ICU assistants aided Kuwait in combating COVID-19. Despite facing domestic shortages, Bangladesh was among the first countries to provide medical support within two weeks of Kuwait's request at the onset of the global pandemic. This Emergency Medical Team worked tirelessly alongside the Kuwaiti Ministry of Health as frontline responders in various COVID hospitals, field facilities, and quarantine centres across the country. Similar support was also extended to the Government of Maldives.

Participating in Special Parades

Off late, a contingent from Bangladesh Armed Forces proudly marched down at New Delhi on India's Republic Day Parade. The 122-person contingent included soldiers from units that had fought alongside the Indian Army during the Bangladesh Liberation War. This serves as an apt recognition of the contributions made by soldiers from both nations in 1971, and a unique effort to honour the sacrifices of people on both sides, as well as the astute leadership of Bangabandhu Sheikh Mujibur Rahman and Indira Gandhi through military diplomacy. In the same note, on 16 September 2021, a 39-member Bangladesh Armed Forces contingent took part in the special parade in Mexico marking their 200th anniversary of independence.

Challenges and Opportunities of Military Diplomacy for Bangladesh

Challenges

Besides the major external challenges, the potential of military diplomacy has probably not been understood fully in Bangladesh as a concept and continues to be a disjointed effort. Military diplomacy mostly aims at leveraging defence deals rather than a holistic approach based on personal interactions and joint doctrines. Some of the pitfalls in the progression of military diplomacy as a more potent resource are:

Complex Geo-Strategic Location: One of the major challenges of Bangladesh in developing military cooperation is its geographical location. Bangladesh is a South Asian country and a member state of SAARC. It is bounded by India in all three sides, ASEAN country Myanmar and opening towards Bay of Bengal in the South. China is also close neighbour and influences the region directly. Moreover, a politico-military rivalry exists between two major global and regional powers, India and China. On the other hand, both

the countries are Bangladesh's development partners. Bilateral or multi-lateral military alliances against any of them will affect its sustainable development.

Lack of Conducive Environment in the Neighbourhood: A major challenge of forming a security forum in South Asia is lack of mutual trust among the member states. Decades of mistrust, confrontations and conflict made this one of the most volatile regions of the world. SAARC could not be utilised for security and defence like ASEAN or ASEAN Regional Forum (ARF) though counter terrorism got priority in the last few summits. However, prospect on such dialogue at SAARC will remain questionable due to India-Pakistan-China relation equation.

Non-Integration with Overall Foreign Policy: Military diplomacy has never been fully integrated with the nation's overall foreign policy as is being done by the United States, France or China. The role of Defence Attache is not integrated with the overall foreign or security policy of Bangladesh. Bangladesh is yet to get the best of this appointment and infrastructure that has already established a great reach.

Backward Defence Industry: The Bangladeshi defence industry is largely underdeveloped with only limited domestic suppliers. As a result, most of Bangladesh's defence and security equipment and service needs are met through foreign suppliers leaving enormous opportunities for domestic production of a few items like Personal Protective Equipment, surveillance equipment, communication equipment, naval vessels, and security consulting services. Transforming herself from an 'Arms Importer' to an 'Arms Selling' country, Bangladesh can largely bolster her military diplomacy.

Competitive Environment: The 'Great Game' of the 21st Century is very competitive with countries vying for a piece of the diplomatic cake to increase their presence and influence in the developing world. For Bangladesh, to thrive in this highly competitive environment, a serious rethink of our foreign policies duly incorporating economic and military diplomacy is essential.

Opportunities

Some recommendations for optimising the potential of military diplomacy and taking it to a new plane are:

Exploring Blue Economy through Military Diplomacy: The Blue Economy concept is rapidly gaining currency in Bangladesh as an essential element of national security and prosperity. The rising popularity of this concept especially after commendable achievements in the maritime boundary issue with Myanmar and India has led to a deep obligation to the role of navy and military diplomacy as key enablers of the blue economy. For maintaining justified maritime interests, military diplomacy

in the form of port calls, flag showing, goodwill visits, senior leaders' engagements, and joint exercises with foreign navies will surely revamp and support the concept of blue economy for Bangladesh. Bangladesh must utilise the political or diplomatic role of sea power far more than its wartime uses.

Leveraging on Regional Platforms like BIMSTEC: A regional platform that Bangladesh can utilise for military cooperation through defence diplomacy is the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC). The advantages of utilising BIMSTEC are: some of the member states of BIMSTEC are also members of ASEAN giving an opportunity for greater security, and both India and Myanmar two neighbouring states of Bangladesh are members of a single regional forum.

Military Diplomacy with Neighbours: Military diplomacy of Bangladesh with the neighbours is probably the greatest want of the hour. However, each neighbour of Bangladesh has had its peculiar issues due to which military diplomacy with any of the countries, especially with Myanmar has never really flourished. A brief on the issues plaguing each of Bangladesh's neighbours is as follows:

India: Military-to-military engagement with the Armed Forces of India had been virtually non-existent until the late 2000s. That has changed in the last few years. Bangladesh has recognised the importance of engaging the army as an institution and has actively sought to intensify its ties since 2008. The broad framework agreement for cooperation signed by Manmohan Singh and Sheikh Hasina in 2009 has provisions for substantive military and security cooperation. Bangladesh just needs to push it forward to reap the best out of it.

Myanmar: Myanmar was always desperate to earn global support for her existence. As such, Myanmar used every possible means to establish or re-establish a relationship with powerful countries. Myanmar military has shaped up her domestic culture for about sixty years and her external relationships are also predominantly based on military interests. Inside the hybrid regime of Myanmar, military issues get precedence over political requirements. Bangladesh is trying to keep the military relationship alive between the Armed Forces despite various odds. This thin but potentially important relationship can be a springboard for conflict resolution between the countries. After the Rohingya crisis in 2017, Myanmar's allies are not in a position to provide bold military assistance to Tatmadaw. Here, Bangladesh may exploit the opportunity by filling up the void.

Conclusion

In the context of the new world order, where geopolitical dynamics are increasingly complex and interdependent, Bangladesh's strategic embrace of military diplomacy is

crucial for safeguarding its sovereignty, advancing its development goals, and contributing to regional and global security architectures. Bangladesh's military diplomacy is instrumental in addressing non-traditional security challenges, such as humanitarian assistance, disaster relief, and peacekeeping operations. Given its geographical vulnerability to natural disasters, Bangladesh Armed Forces are adept at providing critical aid and relief, showcasing their operational efficiency and humanitarian commitment on the global stage. Furthermore, as one of the largest contributors to United Nations peacekeeping missions, Bangladesh's military diplomacy underscores its dedication to global peace and stability. These efforts enhance its diplomatic leverage and project a positive image, facilitating greater international cooperation and support.

Military diplomacy is an inseparable and important part of Bangladesh's overall diplomacy. If applied holistically and with an overall strategy, it is likely to produce disproportionately high spin offs in strengthening ties and building relationships with many countries. However, Bangladesh needs to work out a long-term plan to pursue military diplomacy much more aggressively to create a strategic space for itself in its immediate neighbourhood and beyond. It is however imperative that all stakeholders in the government first understand the nuances of this great force multiplier, which is likely to produce numerous tangibles as well as intangible gains in the years to come.

It is to be remembered that military diplomacy is all about the exercise of Soft Power. While it is a necessity for 'Big Powers', it is an opportunity for small states like Bangladesh. It is also important to note that the extent, reach and authority of military diplomacy is highly contextual. More so, to ensure transparency, democratic oversight is a must. Otherwise, instead of strategic success, it might lead to a strategic catastrophe.

Recommendations

Based on the discussions on the military diplomacy of Bangladesh, here are three concise recommendations for policymakers:

Empowering Defence Attachés: Bangladesh should focus on fostering strategic partnerships with neighboring and global powers through empowering defence attachés. This will further assist in integrating military diplomacy with Bangladesh's overall foreign and security policies.

Leveraging Geo-Strategic Importance: Military cooperation initiatives, particularly through BIMSTEC and ASEAN platforms, such as hosting international seminars, intelligence sharing with regional and global partners, and participating in regional defence exercises can underscore Bangladesh's

strategic importance in the Indian Ocean Region, attracting international investment and partnerships.

Promoting Blue Economy Security: Expanding naval and maritime diplomatic efforts to support the Blue Economy, including joint naval exercises, conducting maritime patrols, and port visits will secure maritime interests and assert Bangladesh's presence in the Indian Ocean region.

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Brief Biography



Lieutenant Colonel K M Mehedi Hasan, afwc, psc, Engineers was commissioned on 07 June 2000 with 42nd Bangladesh Military Academy Long Course in the Corps of Engineers. He served in different Engineer Battalions at various regimental appointments. He commanded an Engineer Construction Battalion and a Division Engineer Battalion. In staff appointment, he served as a Brigade Major of a Composite Brigade. He served as an Instructor Class ‘C’ at the Engineers Centre and School of Military Engineering (ECSME). He was Platoon Commander and Term Commander at Bangladesh Military Academy. Presently, he is serving as Directing Staff in Defence Services Command and Staff College, Mirpur. Lieutenant Colonel Mehedi is a graduate Civil Engineer from the Military Institute of Science and Technology (MIST). He is a graduate of Defence Services Command and Staff College, Mirpur. He is also an alumnus of Defence Services Command and Staff College, Sri Lanka. He has three master degrees in his credentials. Lieutenant Colonel Mehedi had his tour of duty in the United Nations Mission in Liberia. He commanded a Demining Contingent in Kuwait under Operation Kuwait Punargatan (OKP). Lieutenant Colonel Mehedi has a publication in Bangladesh Army journal titled ‘Cascading the Philosophy of Mission Command (*Auftragstaktik*) from the Prussian Army Down to the Bangladesh Army: Exploring the Feasibility’. He is happily married to Kamrun Nahar Mithun and blessed with one son and a daughter.

Application of the Theories of Center of Gravity: Perspective on the Global War on Terror

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Abstract

Center of Gravity (COG) is one of the key concepts of operational art and design. It is determined to identify the most vulnerable point of the enemy to attack and the most valuable point for friendly forces to protect. Conventional military threats' strengths and weaknesses are compared with their strategic and operational objectives to identify the center of gravity. In a doctrinal method, COG is deconstructed to identify the critical capabilities, requirements, and vulnerabilities. To neutralise an enemy, one should directly attack the COG or the critical vulnerability indirectly. For non-conventional threats like terrorism, the determination of the COG is very critical. Some hold opinions that it is not possible to identify the COG in the war against terrorism and even that one may not exist at all. However, if we follow the systematic approach of COG deconstruction, it is possible to break down all the critical strengths in the process. Therefore, COG determination and deconstruction methods are equally applicable in fighting non-conventional terrorist threats.

Introduction

The concept of Center of Gravity (COG) is the centerpiece of operational art. From Clausewitz to modern military thinkers, all concentrated heavily on COG to plan war. Joint Publications give a systematic approach to analysing and determining COG. The success of operations in modern warfare depends mostly on neutralising an enemy's COG and protecting one's own. But, there are varied understandings of COG itself. Defining, analysing, and deconstructing COG is one of the foggiest areas in operational art theories. Methods to determine the correct COG vary from service to service, the nature of war, the nature of the enemy, and many more tangible and intangible factors.

Military doctrines typically consider an enemy's critical strengths and weaknesses to determine the COG. Often, these critical factors are quantifiable and tangible. However, in conventional warfighting against non-convention enemies in the Global War on Terror (GWOT), determining the critical factors is not straightforward. In such cases, enemies' critical factors are intangible or abstract. There is a possibility of having more than one critical strength, which has the potential to be a COG.

Clausewitz's concept of COG suggests the likelihood of intangible critical factors that could become the hub of all power. The whole effort is often concentrated against a single COG at the military operational level. It is questionable whether such enemies can be defeated by attacking any COG. The thesis of this paper argues that the theories of COG are still applicable in such cases if the critical strengths of such threats are correctly identified.

Theoretical Approaches to COG

In Physics, a center of gravity is the point of a body where the total weight is concentrated. It may also be termed as the balancing point of a body.¹ But in military use, it has varied explanations. From the idea of “*Schwerpunkt*” by Carl von Clausewitz to the current versions of Joint Military Publications, there have been several concepts and explanations of COG. Clausewitz stated, “COG is the hub of all power and movement, on which everything depends. It is the point towards which all energy should be directed.”² He argued that an enemy's army, their capital or their principal allies can be the COG for them if the enemy is a single power. Even if multiple allies are operating together with a single political objective, they may be considered a single power. However, there can be multiple COGs if realistically it is not possible to reduce multiple center of gravities to one.

Joint Publication (JP) 5-0 explains COG at different levels. At any of the levels, COG is linked with the objectives. At the strategic level, COG can be a military force, an alliance, leadership, a set of critical capabilities or functions, or a national will. At the operational level, an enemy's military capabilities or a powerful component of their military capability can be their COG. However, COG should be analyzed in an adversarial context. COGs are determined concerning both friendly and enemy objectives.³ There is a distinction between Clausewitz's definition and the Joint Publications. In JP 5-0, the definition is limited to sources of powers in the military system. The JP also suggests that military forces are not the COG themselves, but they possess the COG.⁴ Clausewitz probably did not make the distinction of operational COG however, Joint Doctrine focuses more on operational COG.

Milan Vego defined COG in one of the most complete and comprehensive way as,

*a source of massed strength - physical/moral – or a source of leverage whose serious degradation, dislocation, neutralization, or destruction would have most decisive impact on the enemy's or one's own ability to accomplish a given political/military objective.*⁵

He also advocated the constructs of critical factors, which can be both tangible and intangible strengths or weaknesses from where the COG can be determined.

There are different methods of identifying the COG. Eikmeir proposed a four-step method to determine an enemy's COG. These steps involve the identification of the enemy's critical capabilities (CC), determining COG from the CC, identifying critical requirements (CR) to achieve objectives, and identifying the vulnerable components of CR, i.e., critical vulnerability (CV) to attack or disrupt.⁶ JP 5-0 determines COG from an objective analysis approach. First, the critical factors, i.e., critical strengths and critical weaknesses, are identified. Then the critical factors are validated to identify the COG. Once the COG is determined, then CC, CR and CV are identified.⁷ Joe Strange of the USMC has proposed a CG-CC-CR-CV method for analysing the COG.⁸ His methods are almost identical to the JP suggested method. However, before applying any of the methods, it is important to understand the enemy and the nature of the threats. This is particularly important when dealing with an abstract and conventional enemy. This paper focuses on understanding the nature of unconventional enemies like AQAM, ISIL and similar organisations to examine the feasibility of applying COG theories in fighting them.

Understanding Terrorism as the Enemy and Its Complex Nature

Ideology & Strategy

The main driving force of radical terrorist organisations such as Al-Qaeda (AQ), Al-Qaeda-associated movements (AQAM), or Islamic State of Iraq and Levant (ISIL) is their religious ideology. They often exploit the distorted and isolated part of the religion for political or strategic gain. Therefore, the most catastrophic threat posed by extremist terrorists is their ideology.⁹ Their goal is not to make money; rather, their goal is to impose radical beliefs on people everywhere.¹⁰ This factor makes AQ popular amongst people with similar beliefs. Moreover, the terrorist's narrative about historical evidence and the current sufferings of the Muslim population around the world helps AQAM propagate their ideologies against the United States and its Western allies. Therefore, the terrorist ideology is one of the biggest threats.

AQ's strategic target was always to attack the United States from the very beginning of their strategy. In a 1998 fatwa, Bin Laden claimed that America had declared war against God.¹¹ Earlier in 1996, he appealed to all Muslims to drive Americans from the holy land of Saudi Arabia. He tried to gain the support of the Muslim world against the United States, capitalising on the common grievances of Muslim sufferings. As the 9/11 Commission reported,¹²

To the first, they say that America had attacked Islam; America is responsible for all conflicts involving Muslims. Thus, Americans are blamed when Israelis fight with Palestinians, when Russians fight with Chechens, when Indians fight with Kashmiri Muslims when the Philippines government fights ethnic Muslims in Southern Island. America is also held responsible for the governments of Muslim countries, derided by al Qaeda as 'your agents'.

The 9/11 attack was a long-planned AQ response to the United States. Bin Laden recollects the events of the demolition of the towers in Lebanon by the aggressor Israel in 1982 with the direct support of America and plans to “punish the oppressor in kind and that we should destroy towers in America so that they taste some of what we tested and so that they be deterred from killing our women and children.”¹³ After the 9/11 attacks, the United States responded immediately by striking their strategy directly by considering terrorism anywhere on the planet as a threat. As narrated in the 9/11 Commission report, “In this sense, 9/11 has taught us that terrorism against American interests ‘over there should be regarded just as we regard terrorism against America ‘over there’. In the same sense, the American homeland is the planet”.¹⁴ The United States recognised that the broad political-military strategy to defeat the danger of Islamist terrorism should include attacking terrorists and their organisations, preventing the continued growth of Islamist terrorism, and protecting against and preparation for terrorist attacks.¹⁵

AQ’s strategy was to continue the economic fight with the United States and its allies. Their strategy was to bleed America to the point of bankruptcy.¹⁶ As Sun Tzu said, “There has never been a protracted war from which a country has benefited.”¹⁷ AQ probably took Sun Tzu by heart, as one of their main efforts was to protract the war through guerilla warfare and force the United States to leave the Middle East. The other effort was to drive the US-led alliance to multiple theatres of operation to exhaust their military and economic resources.¹⁸

With an increasing number of new fronts with AQAM presence, it is even hard for the United States to conduct military operations in all the areas with AQAM presence. The US strategy was focused not only on fighting Al Qaeda but also to neutralise every terrorist group across the globe.¹⁹ The US presence is mainly limited in few fronts, whereas other fronts are mainly unopposed or hardly considered. On the other hand, AQ established a secure financial support network known to be the “Golden Chain.” The main financiers were based in Saudi Arabia and the Persian Gulf States. Donations for this system flowed through charity and non-governmental organisations (NGOs). They used these funds for procuring arms and supplies for their Mujahedeen (Holy Warrior).²⁰ In recent times, ISIL emerged as biggest challenge to the conventional forces with no signs of resource shortage.

Approaches to Determine COG in GWOT

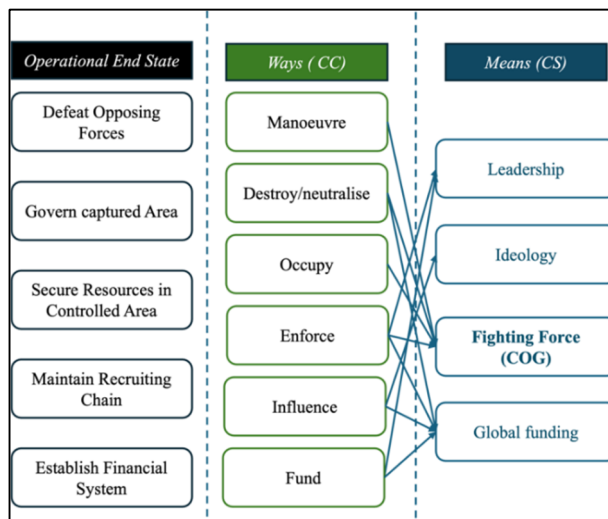
Now that we recognise the growing threat of terrorism, we must identify the COG. Different methods may be adopted to identify the COG of terrorist organisations. Whatever may be the case, the end state and the objectives remain the most important aspect of COG analysis. In any method we apply, the strategic objective and

operational objective remains almost the same. After analysing terrorist strategies progress, it is evident that the establishment of an Islamic State Caliphate is their strategic objective. At the operational level, their objectives may be to defeat opposing forces, establish governance based on Shari'a law in captured territory, secure natural resources in controlled areas, maintain a steady recruiting chain, and establish a financial system.²¹ Now, different COG determination methods may be applied to validate fulfillment of the objectives.

Eikmeir Method

This Eikmeir method starts with an analysis of the end state. The next step is to identify the ways or the required capabilities to achieve the end state. Identification of means or critical requirements will be the third step. Step four will then list the means that have the capabilities to achieve the end state. Finally, the COG may be determined from the list.²¹ Considering the operational objectives, the COG may be determined as shown in figure 1. In this method, the fighting force becomes the COG which possesses most of the capabilities (ways) to achieve the operational end state. But this methodology may fail to achieve the strategic end state, as the other critical strengths like ideology, leadership and funding issues remain unaddressed.

Figure-1: Operational COG Analysis (Ekmeir Method)



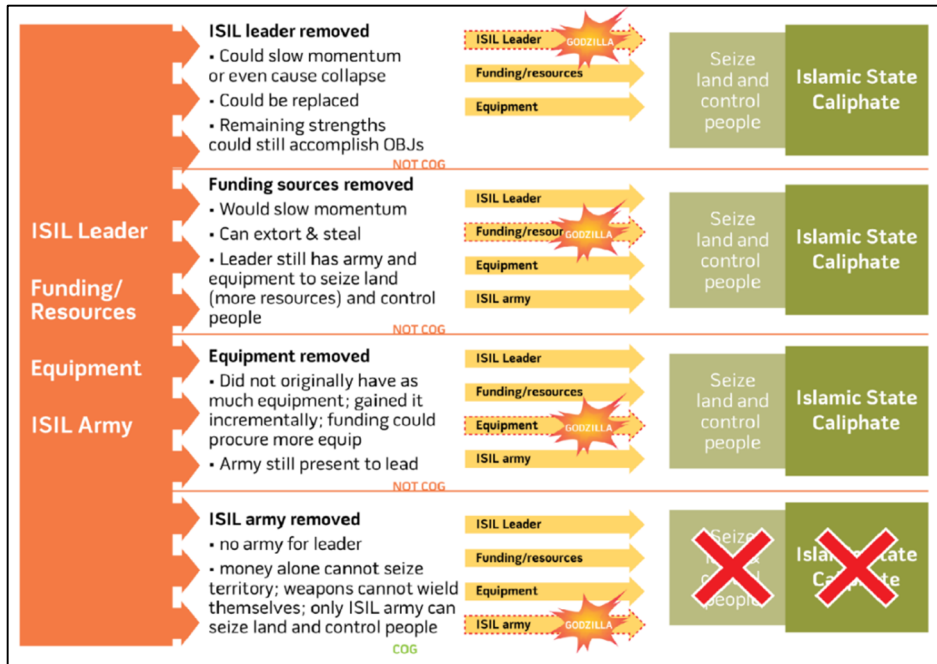
Source: Author's Self-construct

Godzilla Method

Butler's Godzilla COG determination approach is another easy way to determine COG at the operational level.²² In this method, all identified critical strengths are validated with the objectives. Subsequently, each of the strengths is removed to check

whether the fulfilment of the objectives could still be met. From the analysis, if the objective is not attainable without a critical strength, that critical strength is then identified as the COG. Smith, Jetter, and Westgard analyzed the COG of ISIL following the Godzilla methodology as shown in Figure-2.²³

Figure-2: COG analysis in Godzilla methodology



Source: Smith, Jetter and Westgard, Three Approaches, 130-135

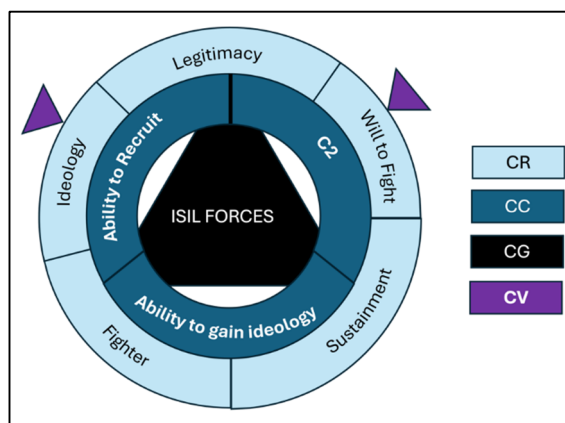
Like the Eikmeir Methodology, this method also determines the ISIL army as the COG. In both methods, ISIL fighting forces were considered like conventional militaries. Theoretically, the removal of the ISIL army means ultimate success. But considering the nature and pattern of this war against ISIL, the army is mostly volunteers. The recruitment is also not structured traditionally. Rather, ideology and charismatic leadership drive the recruitment of the fighting forces. Therefore, only determining a single COG may not effectively counter threats like ISIL.

Critical Factors Analysis Methodology

Joint Publication 5-0 suggests an objective method of determining COG. In this method, the COGs of the enemy and friendly forces are analysed as both the destruction of enemy COG and protection of one’s own COG are important. Thereby, the enemy COG will be the enemy’s critical strength that can achieve their objectives and deny friendly objectives. Smith, Jetter and Westgard analysed the operational COG as the ISIL forces. They determined the operational objectives to be control of

Sunni areas in Iraq and Syria, recruiting more fighters and gaining fund to support efforts.²⁴ However, at the strategic level, the objective was the creation of an Islamic State, uniting all Muslims and defeating U.S. and Western allies. Their strategic COG was determined as ISIL ideology. There was a gap between the strategic and operational COGs. To what extent the achievement of the operational COG will ultimately affect the strategic objective is unclear. At the operational level, one strategic objective may probably be achieved, whereas the other two objectives will remain unaddressed. Their analysis of the operational level COG can be deconstructed, as shown in Figure-3.

Figure-3: COG analysis in Critical Factor Analysis Method (JP 5-0)



Source: Author's self-construct

Alternative Methodology: Critical Strength Analysis Approach

Understanding the critical strengths and weaknesses of terrorism is the key determinant factor in GWOT. Suppose we consider the operational capability and strategy of terrorists in the last decade. In that case, their strength lies in their strategy of protraction, to attrite the enemy with surprise attacks, hurting the enemy's economy, their ability to motivate and mobilise many supporters/fighters under their umbrella, their communications network, and their financial backbone. The different COG analysis methods described above show that each identifies the tangible critical strengths of the COG. However, none succeeded in attacking the core strengths behind the terrorist fighting force. The destruction and elimination of the ISIL fighters on the ground do not guarantee the defeat of ISIL. The leadership and their ideology will still be able to generate a significant number of fighters consistently if their financial sources and physical territorial occupation are not neutralised. Therefore, each of their critical strengths must be attacked to defeat them. Consequently, a different approach may be considered to attack their critical strengths. Another option can be to consider multiple critical strengths as COGs.

An enemy like the terrorists may not have distinctly separate strategic or operational COGs. Ideology and leadership are often considered strategic COGs for the terrorists and their fighting forces as operational COGs. Such threats have a very vague difference in strategic and operational levels. Therefore, we should analyse carefully each of the tangible and intangible critical factors. Paul Wilson identified charismatic leadership, benefits of geographic sanctuary, intricate command and control, global funding base, and radical ideology as the critical factors of ISIL and similar terrorist organisations.²⁵

Table-1: Critical Strength Analysis

Critical Strengths	CC	CR	CV	Feasibility to Attack
Ideology	Popular support	Propaganda	International support	Yes
		Gain ideological support	Contest orthodox ideology	No
		Media		Yes
		Reach vulnerable population	legitimacy	No
Leadership	C2	Organisational structure	Dependence on charismatic leaders	No
		Lone Wolf		No
		Communication network		Yes
			Contested governance	No
Geographical Sanctuary	Ability to operate in complex OE	Local Support		Yes
		Freedom of movement		No
			Difficult terrain	Yes
		Government Support		Yes
Global Funding Base	Financial sources	Secures and State Sponsored funding network		Yes
	Logistics		Unsecured logistic supply chain	Yes
		Resources in occupied area		Yes
Mobility and Reach	Sustainment	Transport network		Yes
		Global reach		Yes
Motivated Fighting Force	Warfighting Capabilities	Organised unconventional fighter		Yes
			Weapons & equipment	Yes
			Training	Yes
		Volunteer fighters		Yes
	Cyber Capability	Suicidal fighters		No
		Cyber access		Yes
		Local Fighters		Yes
		Recruitment process		No

Source: Author's self contact

Considering previously discussed methodologies and identified critical strengths, an approach to determine CC, CR, and CV is proposed in Table-2. The feasibility of attacking the CR or CV is also shown in the table. This analysis shows that most critical strengths can be addressed militarily or at the operational level if considered a COG. In another way, it can be said that neutralising all these critical factors at the operational level can restrict terrorist organisations from achieving their strategic objective. Therefore, instead of targeting a single critical strength as a COG, all potential critical strengths should be targeted to defeat AQ, ISIL or similar organisations.

Counter Arguments

The War against terrorism is by nature different from conventional war. It has turned into a hybrid war where the conflict falls into a grey zone between conventional and unconventional war. Frank Hoffman defined a hybrid threat as “any adversary that simultaneously employs a tailored mix of conventional weapons, irregular tactics, terrorism, and criminal behaviour in the same time and battlespace to obtain their political objectives.”²⁶ The ambiguous, agile, and amorphous nature of non-conventional terrorist threats is their main strength. Any single-massed point or strength may not provide them with their source of power or will to fight. In such cases, even if a single centre of gravity is identified, it may not be the source of their resistance that may be attacking victory or success. COG theories are mainly concentrated on enemy mass at the operational level. However, in an unconventional or irregular environment, it is not applicable. Rather, it can be said that targeting a specific point of an enemy in unconventional warfare can be counterproductive. With the growing trends of *Lone Wolves*, the concept of enemy mass may also become irrelevant in future days. Therefore, the current doctrinal method of identifying the COG and concentrating all efforts toward the COG is not relevant in fighting against terrorists/ violent extremist organisations like ISIL, AQ, or associated organisations.

Some might argue that not all enemies should necessarily have a COG. Not all enemies exhibit a COG. In such cases, the doctrine of using COG as a fundamental tenet is inadequate.²⁷ The concept is based on the unity of efforts to a specific threat strength. Often, terrorists operate in small cells with limited to no connection with their leadership. Even if the connection exists, they are mostly intangible and based on ideological similarity. Therefore, COG cannot exist where unity of effort is missing. Accordingly, COG doctrine may not be applicable in such cases. However, the theories are still relevant, as there are identified strengths of such organisations that can be attacked to degrade, neutralise or contain their operational capabilities.

Conclusion

The Center of Gravity is one of the critical aspects of modern operational art. The optimum use of force by unity of effort is the purpose of determining the COG. There

are many different definitions and explanations of COG theories. However, all the theories and doctrines focus on identifying the objectives and the critical strengths that can achieve those objectives. The COG can be different at the strategic and operational levels. In the case of the GWOT against threats like ISIL and similar terrorist organisations, identification of their critical strengths is very difficult. Even if those are identified, the determination of the COG is quite tricky. Unlike conventional enemies, there are many intangible characteristics and capabilities of those threats. By nature, the capabilities are independent, and each of them can cause significant damage to friendly objectives. Therefore, to focus on a single COG to concentrate all effort may not be the best option against them. Instead, identifying and attacking all critical strengths as multiple COGs can be a suitable and effective option. Though some intangible capabilities might exist, they will still provide some CVs that may be attacked. In the war against terrorism, success at the operational level with emphasis on all critical strengths as COGs may bring the achievement of operational and strategic objectives. The doctrine of COG remains applicable, as the strengths can be deconstructed to critical capabilities, requirements, and vulnerabilities that can be attacked like any conventional threat.

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Brief Biography



Commander M Rafiqul Islam Khokan, (E), NPP, psc, BN was Commander in Bangladesh Navy, having joined in December 2000. He formerly taught at the DSCSC, the preeminent military training institution in Bangladesh as a Directing Staff. The officer is a mechanical engineer by profession. He has an extensive background in holding a variety of staff, instructional, and leadership positions. He pursued academic endeavours and obtained a professional military education both domestically and internationally. He graduated from the U.S. Naval War College in the United States, Military Institute of Science and Technology in Mirpur, the Pakistan Navy Engineering College in Karachi, and Defence Services Command and Staff College in Mirpur. His research on terrorism and counterterrorism, the military planning process, maritime governance and security, and other related topics was exhaustive. At present, the officer holds the position of Deputy General Manager (Mechanical) at Bangladesh Navy Dockyard.

Developing Saidpur Airport as a Regional Air Cargo Hub: An Effective Way to Boost National Economy

Wing Commander Md Nazrul Islam Chowdhury, psc, GD(P)

Abstract

Air cargo transportation has emerged as a vital component of global trade and economic development. The existing international airports of Bangladesh are unable to fulfil the air cargo transportation demand. This incapacity impedes the country's exports and hinders the economic growth. Delving into the government's intent to upgrade Saidpur Airport to an international level, this research unveils the gap in the current development plan of the Civil Aviation Authority of Bangladesh (CAAB). The plan lacks adequate emphasis on cargo operations despite the airport's immense potential to boost trade and commerce. The purpose of this research is to investigate the potential of transforming Saidpur Airport into a dedicated cargo-focused hub and its ramifications on Bangladesh's national economy. The research methodology followed in this study combines quantitative and qualitative approaches. The research culminates in a comprehensive analysis that substantiates the hypothesis: "A regional cargo-focused airport at Saidpur will offer economic dividends to Bangladesh". The findings emphasize the enormous economic potential of Saidpur Airport as a cargo hub with the capacity to stimulate trade, promote economic growth, enhance regional connectivity, and create opportunities for local and international businesses. The study concludes with a series of recommendations to aviation policymakers to expedite investments in infrastructure, modernize cargo facilities, and appreciate the transformation of Saidpur Airport as a cargo-focused airport.

Introduction

Air cargo transportation is an essential mode of transportation for goods and products. It is vital for the economic development of a country.¹ Among the different modes of transportation available, air cargo transportation is preferred for its speed, agility, and care in handling special cargo, e-commerce cargo, and humanitarian cargo. The growing demand for air cargo transportation has led to the development of new airports and expanding or modifying existing airports to meet the needs of businesses and consumers.² There are three international mixed-purpose airports in Bangladesh. Cox's Bazar Airport and Saidpur Airport are the other two domestic airports in the pipeline to have an international gateway. The upcoming Cox's Bazar International Airport is also planned to be passenger-oriented to attract tourists to this beach city.³

Currently, air cargo transportation facilities are available in all three international airports of Bangladesh. These three airports focus more on passenger flights in terms of infrastructure and facilitation. Due to various limitations, these airports could not fulfil the demand for air cargo export from Bangladesh.⁴

The first problem is that the current airports in Bangladesh are unable to meet the increasing demand for air cargo transportation on a national and international level because of limitations in space, design, infrastructure, and other cargo facilitation.⁵ The second issue is that, despite the government's decision to develop Saidpur Airport, it would still have the same problem as the three other international airports that are now in operation. Analysing “Saidpur Airport Layout Plan”, it is found that the airport development plan has no extra emphasis on cargo facilitation. The current development plan of CAAB has very limited scope for cargo operation to meet domestic and regional demands. In light of these problems, the enormous business opportunity offered by the upcoming Saidpur International Airport to stimulate the nation's economy through massive air cargo operations is most likely to be missed. Moreover, the financial implications of cargo-focused Saidpur Airport are not empirically proven. Hence, it is crucial to determine the potential benefits of building a cargo-focused airport at Saidpur with options for passenger travelling.

This paper endeavours to shed light on the possibilities and challenges associated with the development of air cargo operations at Saidpur International Airport. It seeks to validate a compelling hypothesis that “*A regional cargo-focused airport at Saidpur will offer economic dividends to Bangladesh*”. To embark on this causal as well as descriptive study, the research commences by scrutinizing the current state of air cargo operations within Bangladesh, unveiling deficiencies in infrastructure, regulatory frameworks, and operational efficiency that have constrained the sector's growth.

Objective

The paper attempts to evaluate and describe the potential economic impact of developing Saidpur Airport as a cargo-focused airport.

Operationalization of Key Concepts

The key concepts that are critical to this research are defined below:

- a. **Mixed Purpose Airport:** The airport, which has similar passenger and cargo-carrying facilities, is considered a mixed-purpose airport. These airports typically contain a terminal, luggage belts, boarding bridge, cargo storage, despatch centre, customs, immigration, and many other facilities for passengers and cargo.⁶

b. **Cargo-Focused Airport:** Cargo-focused airports are defined for this study as airports that handle a greater number of cargo flights with the option of handling required passenger flights. Cargo-focused airports should have a business and trade-friendly infrastructure like cargo villages, cold warehouses, freight forwarders offices, multiple warehouses, cargo loading bays, etc., and facilities like quick customs clearance, security inspections, etc. Luxembourg Airport, Liege Airport in Belgium, Leipzig Airport in Germany and other similar airports are considered cargo-focused airports for this study.⁷

c. **Passenger-Oriented Airport:** An airport that facilitates mostly passenger travel and can have a minimum emphasis on cargo offloading and clearance has been termed a passenger-oriented airport for this study. In this study, existing three international airports are categorized as passenger-oriented airports.⁸

d. **Economic Dividends to Bangladesh:** Scopes for more export-import opportunities, an increase in local entrepreneurship, and increased regional ties with neighbouring countries by increasing air cargo connectivity at cargo-focused Saidpur Airport are considered economic dividends to Bangladesh in this study.

Current State of Air Cargo Industry in Bangladesh

Bangladesh has a strong presence in the global apparel manufacturing industry, with garments being the primary export commodity.⁹ The demand for air cargo services is driven by the need for efficient and timely transportation of these garments to international markets. However, the minimal air cargo facilitation capacity of the existing three international airports hindered the country's exports severely at different times.¹⁰ The cargo village at HSIA is plagued by space constraints, a lack of professional manpower, ineffective ground handling equipment, and thefts. Bans on direct air cargo flights from these airports to the UK, Australia, and Germany were imposed in 2016.¹¹

Table-1: Air Cargo Export-Import in Bangladesh in 2021-22

Year	Export (M.Ton)	Import (M.Ton)	Total (M.Ton)
2021	175887	116223	292110
2022	214136	124762	338898

In October 2021, an eight-day delay was observed in exporting air cargo because of the unserviceability of the HSIA's Explosive Detective System (EDS) machine.¹² In the last two years, the total import and export of air cargo in Bangladesh are shown in Table 1.¹³ Due to a lack of security facilitation, non-availability of cargo flights and

various other reasons freight forwarders exported air cargo using road feeder service up to Calcutta Airport for transshipment via Delhi Airport (Table 2). Comparing the export data, it is found that 23.7% of air cargo in 2021 and 13.6% of air cargo in 2022 were exported by road feeder service via Indian Airports.¹⁴

Table-2: Bangladeshi Air Cargo Exported through India in 2021-22

Year	Export (M.Ton)	Import (M.Ton)	Total (M.Ton)
2021	54636	-	54636
2022	33825	-	33825

Despite the significant export demand for air cargo from Bangladesh, several limitations hinder its full potential. These limitations include outdated airport facilities, inadequate cargo handling equipment, limited warehousing capacity, complex customs and regulatory procedures, and limited air cargo connectivity.¹⁵ These limitations are affecting the efficiency and capacity of air cargo operations in Bangladesh. A survey on overall air cargo facilitation in Bangladesh shows that 79% of respondents have been rated average, 13% below average, and 4% poor.

The Potential of Saidpur Airport as a Regional Air Cargo Hub

Saidpur Airport has the potential to serve as a regional air cargo hub, catering to both local demand and neighbouring regions. The strategic location of Saidpur, in the northern part of Bangladesh, makes it well-positioned to serve as a gateway for air cargo transportation to neighbouring countries like Nepal, Bhutan, and parts of India. As the north-eastern states of India can send perishable products from this airport to the international sector,¹⁶ the Indian government has already offered lines of credit to acquire the land for the expansion of this airport.¹⁷ Saidpur Airport has the potential to function as a regional distribution centre for Bhutan, facilitating the aggregation and subsequent redistribution of goods to many different countries.¹⁸ According to the trade and transit agreement between Bangladesh and Nepal, Nepal can import raw cotton, tea, fresh fish, textiles, paper boards, pharmaceuticals, chemicals, cosmetics, and various other products. In return, Bangladesh can import rice, wheat, other cereals, pulses, mustard seeds and oil, etc.¹⁹ Bhadrapur Airport and Biratnagar Airport are two airports in Nepal that are within a 20-minute flight distance from Saidpur Airport. Similarly, Paro Airport and Gelephu Airport are two airports in Bhutan that also fall within this 20-minute flight range from Saidpur Airport.²⁰ These airports lack the necessary infrastructure for cargo handling and the safe landing of large aircraft. In 2020, officials from the Nepalese government conducted a visit to Saidpur Airport, where they conveyed their keenness to utilize this airport facility.²¹

Infrastructural and Facilitation Requirements of a Cargo-Focused Airport

The major difference between a cargo-focused airport and a passenger-oriented airport lies in infrastructure.²² To address the current limitations of air cargo operations and tap into the potential of cargo-focused Saidpur Airport, infrastructural development is very crucial.

Infrastructural Requirements: Infrastructure expansion is needed to make Saidpur International Airport a regional air cargo hub. This includes enlarging the cargo terminal to handle increasing air cargo volumes and adding innovative cargo-handling technologies and facilities for perishables.²³ For efficient cargo storage and delivery, contemporary warehouses near the airport must fulfil international requirements for temperature-controlled storage and security. To handle heavier cargo loads and direct international flights, the airport must upgrade runways and taxiways to international standards and improve the apron and aircraft parking facilities.²⁴

Case Study 1: Liege Airport of Belgium: Liege Airport is situated within the geographical region encompassing the prominent cargo airports of Paris, Frankfurt, and Amsterdam in Europe.²⁵ The military airfield underwent a transition in 1990, as the Walloon government strategically decided to establish a hub for cargo flights at Liege airport. A new airport company was formed through a collaborative partnership between the regional airport company of Wallonia and the airport authority of Paris. Challenge Airlines Israel (CAL) commenced operations at Liege Airport as its European base for transporting flowers, fruit, and vegetables five years after its opening.²⁶ The airport experienced a significant enhancement with the establishment of TNT Airways as its regional hub in 1997. Liege Airport ranks as the eighth largest cargo airport in Europe, facilitating the transportation of approximately 500,000 tons of goods annually. The airport is equipped with a runway measuring 8,800 feet in length. The facility encompasses a combined warehousing space measuring 32,000 square meters, incorporating a dedicated terminal that has been purposefully constructed to accommodate perishable commodities.²⁷ Liege Airport features a total of seven B-747 cargo docks. The airport encompasses an 84-hectare cargo village, along with a 4-hectare transshipment yard for road and rail operations. More than 50 companies operate cargo flights to Liege Airport, including Emirates, Kalitta, and Iceland Air. Iceland Air specializes in transporting fresh fish to Liege Airport. TNT Airways is the largest freight operator at the airport and has a code-sharing agreement with China Southern Airlines.²⁸ The emergence of a genuine community has been facilitated by the growth of Liege Airport. By consolidating the many components of the airport network, including airlines, handlers, freight forwarders, and road transporters, this consortium of organizations provides optimal transportation solutions for industry professionals and stakeholders within the region.²⁹

Case Study 2: Remote Airports of Baltic Sea Region (BSR): The Baltic Air Cargo Net project focuses on enhancing air cargo operations at remote airports rather than major hubs. It employs innovative approaches, such as the "flying truck" concept as a road feeder service, to facilitate air cargo operations in regions where traditional methods may not be feasible. This case study examines the project's efforts to promote air cargo operations at remote airports and its emphasis on the "flying truck" concept. Remote airports face challenges in participating in the European air cargo market, making belly cargo and pure freighter concepts less viable. The "flying truck" concept, involving road feeder services to connect remote airports with major hubs, emerges as a realistic solution in the BSR. Their regional airports often serve as interim terminals, collecting goods for further transport to major hubs by trucks. Here three regional airports are selected as pilot sites for testing and demonstrating the "flying truck" concept: Tampere Airport, Finland; Linköping Airport, Sweden and Parchim Airport, Germany. All three airports started to make a profit within one year of establishing road feeder service. This project showcases the potential of the "flying truck" concept in connecting remote airports to the air cargo market. By utilizing road feeder services and promoting efficient logistics chains, this concept empowers regional airports to play a significant role in air cargo operations. The case study emphasizes the importance of understanding regional air cargo dynamics, stakeholder roles, and market suitability for various cargo concepts. Innovative concepts like the "flying truck" can bridge the gap between remote airports and air cargo markets. Regional airports can significantly contribute to air cargo operations and regional economic development through strategic initiatives like road feeder service to and from major markets.³⁰

Analysis of the Case Studies: In the case of Liege Airport, strategic decisions made by regional authorities to transition from a military airfield to a cargo-focused airport played a pivotal role in its success. Both cases stress the importance of investing in cargo-specific infrastructure. Purpose-built facilities, like those for perishable commodities in Liege, and innovative concepts like the "flying truck" in the Baltic Air Cargo Net project demonstrate the need for infrastructure that caters to cargo handling and logistics. Liege Airport's location within a cluster of prominent cargo airports in Europe and Saidpur Airport's strategic position in connecting neighbouring countries underscores the importance of geographical location in the success of cargo-focused airports. It is also evident from the case studies that proximity to key markets and transportation routes significantly enhances an airport's cargo potential.

Benefits of Developing a Cargo-Focused Airport at Saidpur

The development of air cargo operations at Saidpur International Airport holds immense potential for enhancing various facets of Bangladesh's economy. Its strategic location in the northern region offers a gateway for the efficient export of textiles,

agricultural products, and manufactured goods, significantly expediting transportation to global markets. This acceleration benefits businesses by enabling the delivery of time-sensitive goods, increasing competitiveness, and contributing to revenue generation and economic growth.

Moreover, expanding air cargo operations at Saidpur Airport can stimulate entrepreneurship in the northern region. This growth can inspire local entrepreneurs to explore logistics, warehousing, and cargo handling opportunities. As the demand for support services like customs brokerage and cargo security rises, entrepreneurial ventures in these fields can flourish, fostering economic development.

Figure-1: Economic Benefits of Air Cargo



Source: ICAO Information Paper, May 2015

As suggested in the ICAO Information Paper, May 2015 Saidpur airport's role as an air cargo hub can catalyze regional trade and commerce, strengthening economic ties between Bangladesh and its neighbouring countries, including Bhutan, India, and Nepal. Improved connectivity and efficient cargo handling services can facilitate cross-border trade, stimulate economic growth, and diversify regional economies.

Challenges of Developing a Cargo-Focused Airport at Saidpur

Infrastructure Development: A fundamental challenge lies in the substantial infrastructure development required to accommodate efficient air cargo operations at Saidpur Airport. This includes the expansion and modernization of cargo terminals,

construction of warehouses, enhancement of apron and aircraft parking facilities, and upgrades to runways and taxiways. The airport's infrastructure must meet international standards, which necessitates significant investments and careful project management.³¹

Regulatory Framework and Operational Efficiency: Establishing a favourable regulatory framework for cargo operations is crucial but can be complex. Streamlining customs procedures, simplifying documentation processes, and ensuring compliance with international standards demand meticulous attention. Additionally, maintaining operational efficiency, especially during peak cargo traffic, can be challenging.³²

Capacity Building and Skilled Workforce: Developing a cargo-focused airport requires a skilled workforce capable of handling various aspects of cargo operations. Skilled personnel are required for cargo handling, customs procedures, security protocols, and customer service. Developing this skilled workforce to meet international standards can be time-consuming.³³

Effective Marketing and Stakeholder Engagement: Promoting the capabilities of Saidpur Airport as a cargo-focused facility requires effective marketing strategies. Stakeholder engagement with airlines, freight forwarders, logistics companies, and potential customers is crucial to generate interest and attract cargo traffic. Building strong partnerships and collaboration with industry players is essential for the success of the airport's cargo operations.³⁴ Attracting airlines, freight forwarders, and other stakeholders to Saidpur Airport can be challenging in a competitive market. Effective marketing and stakeholder engagement will be crucial to claim the airport as a preferred cargo hub.³⁵

Mitigating Measures: The development of air cargo operations at Saidpur Airport comes with significant challenges, but these can be effectively mitigated through thoughtful strategies. These mitigation measures, combined with careful planning and strategic partnerships, can help overcome the challenges and ensure the successful transformation of Saidpur Airport into a thriving cargo hub.

a. **Infrastructure Development:** Securing funds through public-private partnerships, international grants, and loans can facilitate the required infrastructure development.

b. **Regulatory Framework and Operational Efficiency:** Collaborating closely with government authorities, customs agencies, and industry stakeholders is essential for establishing an efficient regulatory framework.

c. **Capacity Building and Skilled Workforce:** Comprehensive capacity building programs and training initiatives, in collaboration with international training institutes and experienced cargo hubs, can expedite skill development.

d. **Effective Marketing and Stakeholder Engagement:** Implementing a robust marketing and promotional strategy is crucial. Highlighting the airport's strategic location, cost-effectiveness, and efficient operations can attract regional stakeholders.

Key Findings

Saidpur Airport's geo-strategic location near Nepal, Bhutan, and India's north-eastern states positions it as a highly demanded hub for trade and tourism. The prospects of Saidpur Airport as a regional cargo hub garnered significant attention and optimism during the qualitative analysis of the topic.

A dedicated cargo-focused airport at Saidpur was also found as a solution to reduce air cargo transshipment dependency on other countries. It has the potential to save foreign currency and attract local and foreign investments.

Developing Saidpur International Airport as a cargo-focused airport can potentially benefit the national economy of Bangladesh by attracting international cargo operators and serving as a hub for air cargo transportation. Having similar geostrategic locations and demands like the airports in Europe, cargo-focused Saidpur Airport may also influence the economic growth of Bangladesh.

Additionally, the development of air cargo operations at Saidpur Airport can generate significant employment opportunities in the northern region. As the airport expands its cargo capabilities, it will require a diverse workforce, benefiting the local population by providing stable, well-paying jobs and reducing unemployment rates.

Furthermore, the establishment of an efficient air cargo hub can attract Foreign Direct Investment (FDI) to the region. Foreign investors are drawn to locations with well-developed logistics infrastructure, making Saidpur Airport an appealing destination for companies investing in logistics, warehousing, and related industries.

The transformation of Saidpur Airport to a cargo-focused airport can stimulate trade, promote economic growth, enhance regional connectivity, and create opportunities for both local and international businesses.

However, it was also revealed that diversifying cargo types, dedicated aprons, cold chain storage, warehouses, runway expansion, and associated infrastructures are the most essential steps to develop Saidpur Airport as a cargo-focused one.

Conclusion

The transformation of Saidpur Airport into a dedicated cargo-focused hub holds significant potential to unlock economic dividends for Bangladesh. As a strategically located airport in the northern region, Saidpur offers a unique opportunity to enhance regional and international trade, especially with neighboring countries like Bhutan, India, and Nepal. By addressing the limitations of current air cargo infrastructure, Saidpur can facilitate smoother, faster, and more efficient transportation of goods, particularly time-sensitive and high-value exports such as garments and perishable items. The development of Saidpur Airport as a cargo-focused facility will not only strengthen Bangladesh's position in the global trade network but also stimulate regional economic growth, attract foreign investments, and create new employment opportunities. With a well-planned investment in infrastructure, regulatory frameworks, and workforce training, Saidpur has the potential to become a vital economic hub that contributes to the overall growth of the nation.

While challenges such as infrastructure development, regulatory efficiency, and workforce capacity remain, these obstacles are not insurmountable. Through strategic partnerships, thoughtful planning, and targeted investments, Saidpur Airport can become a leading air cargo gateway in the region. Ultimately, the realization of Saidpur as a cargo-focused hub will contribute to the economic prosperity of Bangladesh, strengthen its trade relations, and provide lasting benefits to both local communities and international businesses.

However, this research is not a conclusive one as it did not delve into various other arenas in terms of developing the upcoming Saidpur Airport as a cargo-focused airport. Further research may be carried out to find out the cost-benefit analysis of developing the airport and also to ascertain the economic return of developing this airport.

Recommendations

Based on the findings of this research following recommendations are made for consideration:

- a. CAAB may implement phase-wise expansion of cargo terminals, modernization of warehouse, aircraft parking area, and upgradation of runway to convert Saidpur airport as a regional air cargo hub.

- b. An inter-ministerial committee may be formed by the Ministry of Civil Aviation and Tourism to have a collaborative approach towards achieving economic dividends utilizing the cargo-focused Saidpur Airport.

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Brief Biography



Wing Commander Md Nazrul Islam Chowdhury, psc, GD(P) got commissioned in General Duties (Pilot) branch of Bangladesh Air Force on 29 June 2003. In the same year, he obtained B.Sc. (Aeronautics) degree from Bangladesh National University. He has completed various professional courses at home and abroad, like the Advance Trainer Instructor Pilot Program, Squadron Officer's Course, etc. He has served as a flying instructor, flight commander, and staff instructor in various flying squadrons of BAF. His staff assignments include Deputy Director (Operations) at the Directorate of Air Intelligence, Air Headquarters, and General Staff Officer-1 at the Directorate General of Forces Intelligence Headquarters. Wing Commander Nazrul has also served the UN as a military observer in MONUSCO, DR Congo. He is a graduate of DSCSC, Mirpur, and he has obtained a Master of Social Science degree from Bangladesh University of Professionals. Currently, the officer is pursuing Master of Military Operational Art and Science at Air Command and Staff College, USA.

Reviewing Sailors' Assessment System in BN: A Pragmatic Approach For Better Human Resource Management

Commander S M Arafath Ul Islam Chowdhury, (TAS), psc, BN

Abstract

Bangladesh Navy (BN) is a unique service where the Sailors' Assessment (SA) system significantly impacts sailors' career development and organisational efficiency. BN SA system often does not replicate the sailor's yearly performance. Therefore, an amendment to the SA system is necessary to find ways to overcome the drawbacks of the existing system. The researcher hypothesised that 'Reviewing the existing annual SA system will positively impact better HRM in BN'. However, a few studies were conducted on the SA system, and many documents remained untouched. Too many changes were proposed in those studies, but how to implement them and whether they possess any legal bindings were not discussed adequately. Any comparative analysis with the sister services and other navies has hardly been found covered comprehensively. Initially, the study analysed the current SA system to discover drawbacks often resulting in inaccurate evaluation. Then, several tools were applied, including content analysis, primary and secondary data analysis, surveys, focused group discussions (FGD), and interview findings, to propose feasible ways out of the BN assessment system, including challenges. Finally, it recommends a few possible ways to eradicate the drawbacks that will make the SA system more effective for better HRM in BN.

Introduction

Sailors' Assessment (SA) in the Bangladesh Navy (BN) is the performance appraisal (procedures of various performance evaluations) to evaluate one sailor meticulously. Human resource management (HRM) evaluates or assesses one's performance to raise an organisation's standards. Optimising present and future human resources is vital for any organisation and requires considerable thinking and planning (Asit K Ghosh, 1991). The Drafting Authority (DA) in the Naval Headquarters (NHQ) of the BN acts as the human resource (HR) department for sailors.

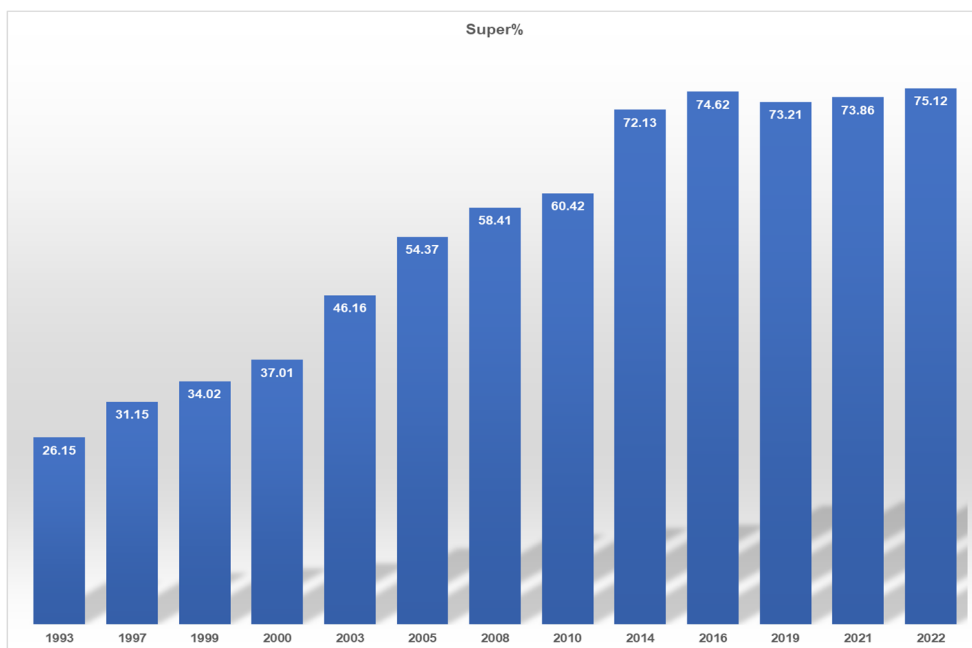
BN has utilised the current SA method since 1982, following Navy Regulation (NR). One sailor's efficiency is assessed by his Divisional Officer (DO) to determine how sound sailors perform (NR, 1982). They are also evaluated unofficially by 360-degree feedback (a procedure of various evaluations from superiors, peers, juniors, and

oneself). The overall character and efficiency evaluation is recorded in the Service Record Book (SRB) upon the Commanding Officer's (CO) approval. In addition, the Bangladesh Navy Sailors' Information System (BNSIS) software maintained by the DA records daily updates (i.e., sea/shore service, achievement, punishment, etc.) of detailed information.

BN officers need to depend on sailors to accomplish the assigned tasks in manifolds (Salahuddin, 2014). Considering BN's unprecedented modernisation, the SA system is also deemed to be updated to meet future challenges and select the finest sailors for improved HRM.

However, the annual assessment sometimes does not precisely represent the sailors' accurate performance. Many sailors appear over-graded and get the highest efficiency assessment, 'Super' (after crossing 7.00 out of 10 in the average numerical assessment). Every year, the number of 'Super' graded sailors increases alarmingly in BN (Figure-1). Placing the right person in the right job for better HRM in BN became challenging for DA because of inaccurate and over-graded assessments. The facts mentioned above necessitate a study to review the current SA in BN to determine whether it needs to be reviewed or not to improve sailors' proficiency for better HRM in BN and how to do it.

Figure-1: Year by Statistics of Super Graded Sailor (AB to MCPO except for OD Rank)



Source: Drafting Authority Office date 01 August 2023

Existing Sailors' Assessment System in BN

Assessment systems can improve job satisfaction, employee retention, loyalty, and overall organisational performance if implemented and administered effectively in modern organisations (GorSum , 2023). SA systems are essential for every navy in the world. To place the right sailor in the right position, the SA system assists in numerous ways to bring out potential sailors.

Existing SA System in BN: The existing SA system in BN follows the annual cycle to evaluate the efficiency of a sailor. When a sailor enrolls in BN, he or she is granted an individual SRB. The SRB is a comprehensive document that contains a wealth of information on a sailor. There are a total of 13 sections in SRB. Generally, Sections 6 and 7 record a sailor's performance.

While evaluating, DOs must consider five performance traits according to the NR (NR, Article 1153, 1982). During the assessment, DO has to write his remarks regarding a particular sailor based on these traits and grade him as Excellent, High, Good, Weak or Poor against each trait. The overall annual efficiency assessment is to be done by CO and assessed as Superior (Super), Satisfactory (Sat), Moderate (Mod) and Inferior (NR, Article 1185, 1982). A specific guideline to award the ‘Super’ assessment has been given in NR (NR, Article 1185, 1982).

Table-1: List of Performance Traits Used for BN Sailors

Ser (a)	Performance Traits in SRB (Presently valid) (b)	Performance Traits in Numerical Assessment Guidelines 2012 (Held up for review since 2012) (c)
1.	Initiative	Professional Knowledge
2.	Power of Command	Effectiveness at his job
3.	Professional ability	Energy and Initiative
4.	Turn-out	Intelligence
5.	Games	Management and Organizing Ability
6.		Leadership
7.		Co-operation
8.		Adaptability
9.		Integrity
10.		Courage and Stamina
11.		Personal Qualities

Source: SRB and DA letter, 2012

DA circulated numerous amendments to the sailors' efficiency assessment system (i.e., 2012 and 2018), including the Numerical Assessment (NA) guidelines. As per 2012 NA guidelines, a sailor has to be assessed in 11 traits (Table-1) alongside the earlier 05 traits in SRB (DA letter, 2012). After the induction of NA guidelines, the annual SA is entered in Chapter 6 of SRB along with numerical points (Table-2). However, after the observation by BN Administrative Authorities, it was held up for review in Senior Officers Conference 03/2012 (Agenda 10) since 2012. The two performance traits list is shown below:

Table-2: Grade for Sailors' Annual Efficiency by CO

SERIAL	GRADE	TO BE WRITTEN IN SRB	NUMERICAL POINT SCALE
1.	SUPER	SUPER	7-10
2.	SATISFACTORY	SAT	4-6.99
3.	MODERATE	MOD	3-3.99
4.	INFERIOR	INFERIOR	1-2.99

Source: BN Sailors SRB (DA letter, 2012)

After that, in January 2018, the criteria for determining the performance standards of sailors by the NA method was introduced (DA letter, 2018). In this case, a minimum of 09 marks is required to get excellent. However, a sailor gets the highest annual efficiency assessment, i.e., Super, by getting only 07 points in the annual SA by CO. As a result, the Super attainment rate in the BN continues to rise.

Table-3: DO Remarks for Each Trait, including Points

SERIAL	REMARKS FOR EACH TRAITS	NUMERICAL POINT SCALE
1.	EXCELLENT	9-10
2.	HIGH	7-8.9
3.	GOOD	5-6.9
4.	WEAK	3-4.9
5.	POOR	1-2.9

Source: BN Sailors SRB (DA letter, 2018)

Existing System for Record Keeping: DOs observe a sailor closely and note his performance in the Divisional Record Book (DRB), and CO countersigns the DRB monthly. The annual SA is evaluated by individual ship/establishment and recorded as per section IV of NR (NR, Article 1171-1186, 1982). The remarks are documented in Section 07 of SRB, and the overall assessment is registered in Section 06. BNSIS

software held at DA contains detailed information on individual sailors' and is updated regularly.

Supplementary Documents Used in Existing System: A few supplementary documents are also used to evaluate a sailor in BN. Those are:

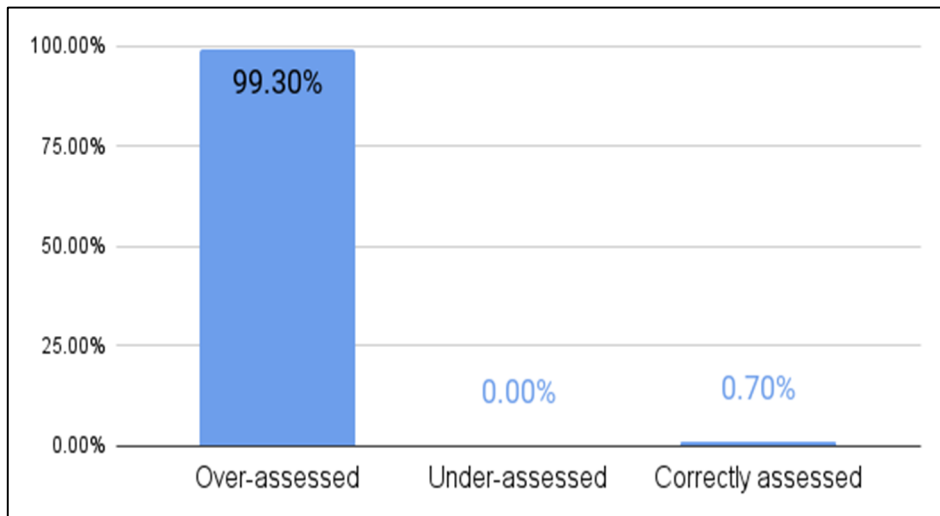
- a. Conduct Sheet, F(SP-4).
- b. Half Yearly Recommendation, F(SP-10).

The Existing Annual Sailors' Assessment System's Drawbacks and Their Impacts on Better HRM

Drawbacks of the Existing SA System: Numerous case studies and data from various ships and establishments were analysed to determine the flaws in the existing SA system. The following are some of the drawbacks as per survey:

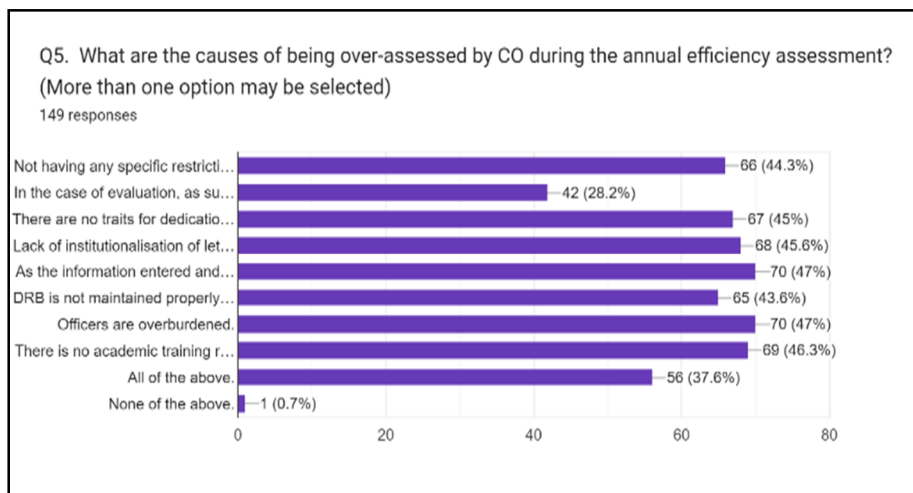
- a. **Over-Assessed:** According to NR, 'Super' should only be granted to the most efficient man (NR, 1982). There has been a significant increase in 'Super' graded sailors over the years, and there is an overwhelming consensus (Figure-2) among BN officers that sailors are over-assessed. The researcher has also found numerous causes (Figure-3) during the survey for over-assessment.

Figure - 2: Drawbacks of The Existing SA System



Source: Survey Findings, 110200 July 2023

Figure-3: Causes of Over-Assessment



Source: Survey Findings, 110200 July 2023

- b. **Same Traits for Sailors and JCOs:** Every rank has a different capacity and requirements for completing their duties. Furthermore, JCOs are now recognised as 1st class officers. Being 1st class officers, JCOs need to be evaluated separately.
- c. **Insufficient Attributes:** Annual SA (efficiency) is carried out on five mandatory traits, which appear insufficient (Hossain, 2018).
- d. **Limited Grade:** Generally, the SA is limited to two grades (Super and Sat). A sailor is rarely assigned the other two grades (FGD 2 , 2023).
- e. **Retention of 'Super':** Once a sailor has gained the 'Super' rating, keeping it does not appear to be as challenging as earning it.
- f. **Overemphasising Previous Assessment:** Under the current assessment method, Section 06 of the SRB records the annual efficiency assessment. This SRB record gives DO favourable feedback regarding sailors. However, sometimes, it biased a few DOs while assessing a sailor in the current year (FGD 1 (with DOs), 2023).

Drawback's Impacts on Better HRM in BN: Placing the right person in the right job for better HRM became challenging for DA because of inaccurate and over-graded assessments. Due to erroneous assessments, DA often could not differentiate between good and average sailors (FGD 2 , 2023).

Assessment System Used in Sister Services and Other Navies

Assessment System Used in Sister Services:

a. **Bangladesh Army (BA):** BA is presently practising the Annual Performance Report (APR) for soldiers to evaluate their performance. In APR, there are ‘Ten’ performance traits and each trait is marked within 1-10 points and added together (BAFI-2081/KA, 2013). The overall grading is divided into 05 categories.

Table - 4: Performance Grade Used in BA

Grade	Point Scale
Outstanding	91-100
Well Above Average	81-90
Above Average	66-80
Average	50-65
Below Average	00-49

Source: Annual Performance Report Analysis, BA

b. **Bangladesh Air Force (BAF):** BAF formulated ‘The Performance Appraisal Form-BAF Airman P-58’ in 2013. There are two separate forms for ‘Sergeant and Above’ and ‘Corporal and Below’. There are ‘Ten’ performance traits for Sergeant and above, whereas Corporal and below are judged on ‘Five’ traits. Each trait is marked within 1-10 points and added together (BAF-P-58, 2020). The overall grading is divided into 06 categories.

Table-5: Performance Grade used in BAF

Grade	Point Scale (up to Cpl)	Point Scale (Sgt and above)
Outstanding	46-50	91-100
Well Above Average	38-45	76-90
Above Average	28-37	56-75
Average	18-27	36-55
Below Average	15-17	30-35
Poor	14 and below	29 and below

Source: Performance Appraisal form P-58, BAF

c. **Comparison with BN:** After studying the abovementioned assessment systems used by sister Services, the following deductions (Table 6) can be drawn:

Table-6: Analysis of Assessment Systems of BD Armed Forces

Ser	Item	Organisation		
		BN	BA	BAF
1.	Assessment From	No (SRB Chapter 7)	Yes	Yes
2.	Performance Traits	5	10	10/05
3.	Separate Traits	-	No	Yes
4.	Grades	04	05	06
5.	Separate remarks for Special Branch, Core or Arms	No	Yes (Medical, EME, ASC)	No
6.	Highest Grade (Starting)	70%	90%	90%
7.	Assessment Cycle	Yearly	Yearly	Yearly
8.	Use of Previous Assessment	Yes	No	No
9.	Feedback Form for Ty	Yes	No	No

Source: Author's Construct, 2023

Assessment System Used in Other Navies:

a. **United States Navy (USN):** USN has promulgated the latest assessment system in 2015. It consists of two forms named 'CHIEFEVAL' for Chief Petty Officers (CPO) and 'EVAL' for other enlisted personnel. Performance traits are graded on a 5-point scale. The performance grade is shown below:

Table-7: Performance Grade used in USN

Grade	Point
Superstar Performance	5.0
Advanced Performance	4.0
Dependable "Fully Qualified"	3.0
Useful, Promising Performance	2.0
Disappointing Performance	1.0

Source: Content Analysis, 2023

b. **Royal Navy (RN):** RN uses Form S3300c as the appraisal report form. It is divided into two sections. Sailors are assessed in 10 performance traits and graded in 07 categories from A to G.

Table-8: Performance Grade used in RN

Term	Grade
Very Strong	A
Strong	B
Developing	C
Not Ready	D
Insufficient Knowledge	E

Source: Content Analysis, 2023

c. **Chinese Navy:** The People's Liberation Army (Navy) uses one assessment form to evaluate a sailor. It has 05 performance traits to judge any individual. It is also divided into 04 categories to differentiate between the sailors.

Table - 9: Performance Grade used in PLA (N)

Grade	Point Scale
Very Good	90-100
Good	75-90
Qualified	60-75
Unqualified	0-60

Source: Cdr Yasir Hasnat, (L), psc, BN - Done Course in China

d. **Malaysian Navy and Indonesian Navy:** The navies also use more than ten traits to assess a sailor by assessment form.

e. **Comparison of Other Navies' Assessment System:** After studying the assessment mentioned above systems used by various navies, the following comparison table can be drawn:

Table-10: Comparison of other Navies Assessment System

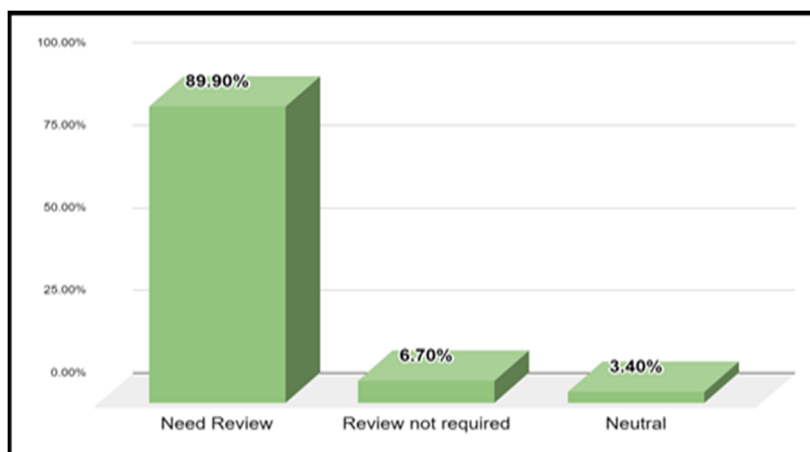
Ser	Item	Organisations				
		USN	RN	PLA (N)	Malysian Navy	Indoneshi an Navy
1.	Assessment Form	Yes	Yes	Yes	Yes	Yes
2.	Performance Traits	07	10	05	>10	>10
3.	Separate Traits	Yes	No	No	Yes	Yes
4.	Grades	05	05	04	05	05
5.	Highest Grade	100%	-	90%	90%	90%
6.	Assessment Cycle	Yearly	Yearly	Yearly	Yearly	Yearly
7.	Use of Previous Assessment	No	No	No	No	No
8.	Feedback Form for Ty	Yes	Yes	No	Yes	Yes

Source: Author's Construct, 2023

Feasible Ways Out

Feasible and Time-Worthy Ways Out for BN: While conducting the research, it felt necessary to amend the assessment process to eradicate the existing system's drawbacks. The study also felt it necessary to amend the SA process to eradicate the existing system's drawbacks.

Figure-4: Necessity of Reviewing the SA System



Source: Survey Findings, 110200 July 2023

Introduction of Assessment Form or Amendment of Section 7 of SRB: An assessment form may be introduced, or only Section 7 of SRB can be amended to evaluate BN sailors. In this regard, a detailed survey was carried out. There is a notable level of support for introducing an assessment form, suggesting a willingness to explore this approach in evaluating sailors. However, some concerns or uncertainties exist within the surveyed group. The DA can shed some light on this issue for further research.

Redesigning of the Grading System, including NA: Most respondents believe redesigning the grading system and changing mandatory traits could be complex, considering the required alterations to NR, highlighting the need for thorough planning and assessment before making such changes. However, BN will be more comfortable redesigning the NA and adding a few essential traits within five mandatory traits because this option does not require changing the NR. Considering other services and Navies, a new grade, 'Higher Satisfactory', may be included (Option 1) with the existing grading system. However, it will be challenging to amend the NR (Article 1185) by BN to introduce this new proposal (JAG, 2023). In Option 2, 'Super' may start from 08 (eight), by which automatically Super will reduce. The following two options may be considered:

Table-11: Proposed Grading System including NA by Changing NR (Option-1)

Ser	Grade	Point Scale in Present Assessment	Point Scale in Proposed Assessment	Remarks
1.	Super	7.00-10.00	9.00-10.00	
2.	Higher Satisfactory	-	7.00-8.99	New Grade
3.	Satisfactory	4.00-6.99	5.00-6.99	
4.	Moderate	3.00-3.99	3.00-4.99	
5.	Inferior	1.00-2.99	1.00-2.99	

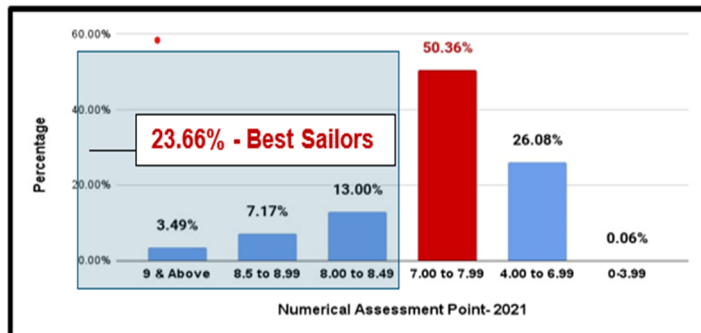
Source: Author's Construct, 2023

Table-12: Proposed NA System Without Changing NR (Option-2)

Ser	Grade	Point Scale in Present Assessment	Point Scale in Proposed Assessment	Remarks
1.	Super	7.00-10.00	8.00-10.00	
2.	Satisfactory	4.00-6.99	5.00-7.99	
3.	Moderate	3.00-3.99	3.00-4.99	
4.	Inferior	1.00-2.99	1.00-2.99	

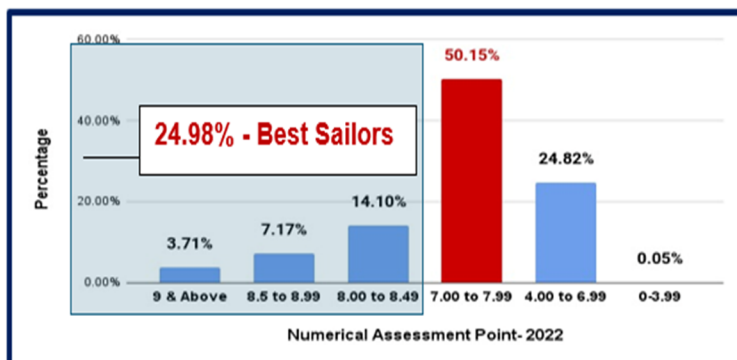
Source: Author's Construct, 2023

Considering Figures 5 and 6, it is evident that almost 50% of sailors got NA from 7 to 7.99 in the last two years; it needs to be considered. BN may follow Option 2 as described in Table 12. After that, in January 2018, the criteria for determining the performance standards of sailors by the NA method was introduced (DA letter, 2018). In this case, a minimum of 09 marks is required to get excellent. However, a sailor gets the highest annual efficiency assessment, i.e. Super, by getting only 07 points in the annual SA by CO. As a result, the Super attainment rate in the BN continues to rise.

Figure-5: Sailors NA Point Percentage in the Year of 2021

Source: DA Office, 2023

Figure-6: Sailors NA Point Percentage in the Year of 2022



Source: DA Office, 2023

Redesigning of Performance Traits: Instead of 05 traits, a sailor can be evaluated on 15 or 20 traits (only for JCO) by changing NR article 1153 b(ii). In contrast, merging traits as sub-traits within five mandatory traits will be easier as BN does not require changing NR. Moreover, each mandatory trait will have 02 or 03 sub-traits for sailors and 03 or 04 for JCOs. The total points of sub-traits will be divided as per trait to get the actual point of each mandatory trait. Option-1 (15 or 20 traits) or Option-2 (10-15 traits) of the proposed assessment are as follows:

Table-13: Proposed Performance Traits Keeping NR Uphold (Option-1)

Ser	Performance Traits	10	9	8	7	6	5	4	3	2	1	Present Performance Traits as per NR	Average Point
1.	Dedication to Perform Task											Initiative	
2.	Adaptability												
3.	Sense of Duty & Responsibility											Power of Command	
4.	Dedication towards Service (only for JCO)												
5.	Leadership Skill & Confidence												
6.	Coordinating Capability											Professional Ability	
7.	Management Capability												
8.	Supervising, Controlling, & Organising Ability (only for JCO)											Professionalism & Efficiency	
9.	Reliability												
10.	Intelligence												
11.	Professionalism & Efficiency											Turn-out	
12.	Ability and Interest to Train Subordinates (only for JCO)												
13.	Discipline & Honesty											Games	
14.	Turnout & Physical outlook												
15.	Cooperation												
16.	Effectiveness at His Job (only for JCO)											Games	
17.	Physical Efficiency												
18.	Firing Skill & Sports												
19.	Health Awareness												
20.	Vision (only for JCO)												
	Total Point												
	Average Point										---		??

Source: Author's Construct, 2023

Table-14: Proposed Performance Traits Keeping NR Uphold (Option-2)

Ser	Performance Traits	10	9	8	7	6	5	4	3	2	1	Present Performance Traits as per NR	Average Point
1.	Adaptability & Dedication towards the task											Initiative	
2.	Sense of Duty & Responsibility												
3.	Dedication towards Service (only for JCO)												
4.	Leadership Skill & Confidence											Power of Command	
5.	Management & Coordinating Capability												
6.	Supervising, Controlling, & Organising Ability (only for JCO)												
7.	Reliability & Intelligence											Professional Ability	
8.	Professionalism & Efficiency												
9.	Ability and Interest to Train Subordinates (only for JCO)												
10.	Discipline & Turnout											Turn-out	
11.	Cooperation & Following Chain of Command												
12.	Effectiveness at His Job (only for JCO)												
13.	Physical Efficiency & Health Awareness											Games	
14.	Firing Skill & Sports												
15.	Vision (only for JCO)												
	Total Point												
	Average Point										---		??

Source: Author's Construct, 2023

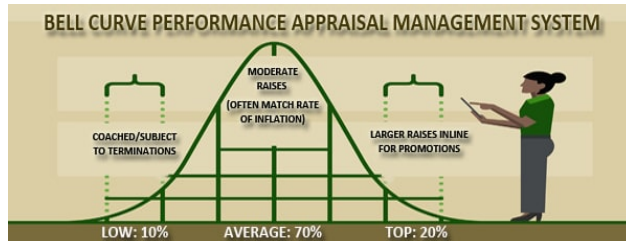
Omission of Section Six from SRB: Section Six gives a general idea regarding individual sailors just after joining the ship or establishment for better HRM within that billet (Nizam, 2023). Therefore, section six can be omitted from SRB, but CO and DO can be informed through digital means from DA (i.e., limited access to BNSIS).

Implementation of Digital DRB: Implementation of Digital DRB (DDRDB) is very much required to assess a sailor properly. Every DO can assess his men daily, monthly or quarterly as needed. It will also establish transparency in the evaluation system. A test trial (regarding DDRB) is underway in all ships under Commander BN Fleet (COMBAN) (Farooque, 2023).

Introduction of Feedback Form: A feedback form has already been introduced for sailors not working directly under DO (i.e., Deputation). However, the study found that many officers need to learn about the newly implemented feedback form.

Restriction on Over Assessment: According to the “Bell Curve Performance Appraisal Management System”, the total human resources of any organisation will be divided into three groups (High-20%, Average-70%, Low-10%) based on performance. Many renowned companies follow this appraisal system (i.e., General Electric, Microsoft, Cisco Systems, etc.) (HR Help Board, 2023).

Figure-7: The Bell Curve Performance Evaluation System



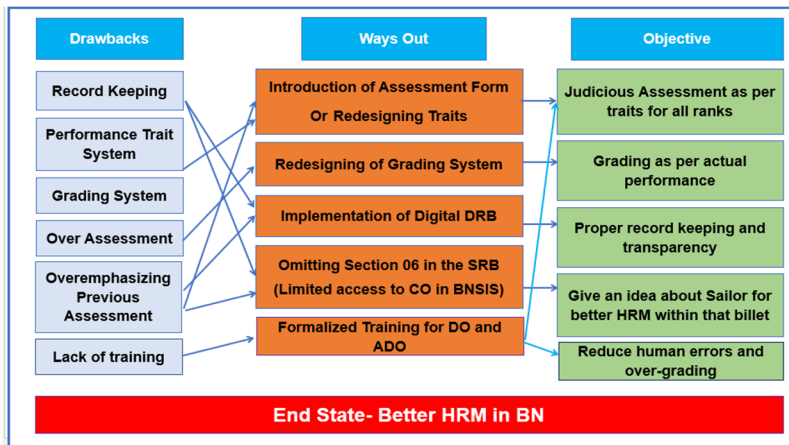
Source: (HR help board, 2023)

Whatever the change in SA of BN (in the Grading system or the NA), it will not be effective until there is a restriction on the total percentage of super-graded sailors (DA, 2023). Based on the survey and interviews, it is suggested that 30% of sailors can be Super, 50-60% can be Satisfactory, and 10% can be 'Moderate grades or Inferior grade' sailors in BN. Moreover, some operational ships or academic bases sometimes have more efficient sailors. That time, the CO will be privileged to give a 35- 40% Super grade among sailors on his ship, obtaining permission from DA through the Admin Authority.

Formalized Training for DO and ADO. To evaluate sailors' performance, analysts need to be prudent. In this regard, at least two weeks of training may be included during XOBC, EOBC, LOBC, and SOBC courses for junior officers. Moreover, due emphasis may be given during the Petty Officers' 'Divisional and Leadership course'.

Interwoven Relationship between Drawbacks and Feasible Ways Out. This research has identified approaches to fix the assessment system's drawbacks. The following diagram (Figure 8) depicts the intertwined relationship between drawbacks and possible solutions:

Figure-8: Relation between Drawbacks, Ways Out, Objectives and End State



Source: Research Findings, 2023

Challenges to Implement

Undoubtedly, it would be challenging to implement a new concept to a decade-old assessment system. It will take considerable time to adapt to the changed one. As a result, a few challenges are likely to be faced while executing the measures as mentioned above:

- a. **Alteration of Navy Regulations:** Introducing the new grading system (Option-1) requires the alteration of NR (JAG, 2023). This will need substantial effort from NHQ to change the existing grading system.
- b. **Difficult to Merge with Existing Assessment System:** Implementing the new SA system will be very complex for the present sailors, who must merge with the existing system (DA, 2023).
- c. **Acceptance of New Formula:** The mentality of BN members in adjusting to a new system instead of the previous system may cause complications (A A Mostofa, 2023).
- d. **Increase the Workload of DOs and COs:** Due to the shortage of officers in BN, if the newly proposed assessment method is adopted, DOs will need more time to handle it (Rashid, 2023). Continuous supervision by COs will be required to ensure effective implementation (DA, 2023).

Conclusion

BN's performance evaluation system and HRM practises are interconnected and contribute to the organisation's better HRM. The sailor's performance is crucial for organisational achievement and better HRM. Annual assessments by DOs identify sailors' quality and contribution to the Service, thereby improving their performance and the organisation's overall smooth running.

Initially, the researcher examined the existing assessment system comprehensively. The current SA system was incorporated with the promulgation of NR in 1982. After that, a few policy letters were circulated from DA occasionally to make additions to evaluate sailors properly.

Subsequently, this paper analysed the current SA in BN, revealing that it is insufficient to reflect sailors' performance accurately. The system has limited record writing options and lacks sincerity from the DO's. The BN assessment system has the same performance traits for all ranks, whereas sister services and foreign navies follow separate traits.

This paper further analysed the existing SA system of other Navies and Sister Services. Generally, many organisations use an assessment form with adequate traits. It has to be highlighted that the highest grade is reserved for the best performers who have to achieve it. This analysis was effective in suggesting the ways out of the drawbacks. Then, an interwoven relationship was made. Finally, some challenges were discussed while implementing feasible ways to maximise employee performance, foster development, and propel organisational success.

Recommendations

Considering the findings of the research, to amend the existing SA system in BN, the following are recommended:

a. The NHQ may form a committee and seek opinions from other administrative authorities to promulgate the amendments (such as redesigning the NA system, redesigning traits, redesigning section 7 of SRB, inclusion of DDRB, restriction on over assessment and omission of section 6 from SRB) within one year.

b. The committee will take opinions from JAG, administrative authorities and other concerned directorates to conduct a feasibility study within 6 months on the following:

- (1) Implement the assessment form instead of writing section 7 in SRB.
- (2) Implementation of DDRB.
- (3) Redesigning the NA system and restricting the total percentage of Super and Satisfactory.
- (4) Section 6 can be omitted from SRB, and there could be limited digital access to CO from DA for better HRM within the ships.
- (5) Clear guidelines for marking the traits while assessing and restriction on over-assessment.
- (6) Implementation of a training system for DO.

c. Subsequently, the DA may ask for a further opinion from administrative authorities and directorates based on the committee report. After that, the DA may put an agenda for approval at the Senior Officers conference. Before that, several DA lectures (including COs meetings) should be held in all the naval areas so that all officers remain aware of the amendments and can give valuable comments (DA, 2023).

d. The DA may issue a policy letter to all units under BN and outside concerned organisations with necessary guidelines after getting approval from the Senior Officers conference regarding the amendments of the SA system.

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Brief Biography



Commander S M Arafath Ul Islam Chowdhury, (TAS), psc, BN, was born on 14 Oct 1986 in Chattogram. He embarked upon his illustrious naval career on the 1st of June 2008 when he was commissioned into the Executive Branch of the Bangladesh Navy. Throughout his dedicated service, he undertook various courses at home and abroad. He did his Executive Officers' Basic Course (XOBC), Missile Command and Tactics Course (MCTC) and Underwater Specialization Course (Long TAS) from BNS ISSA KHAN. He completed his Junior Staff Course (JSC) from the Bangladesh Naval Academy (BNA). The officer underwent a Potential Dignitary Protection Course (DPC) in the Special Security Force (SSF) and a VIP protection course from China. He has completed his B.S.C(Hons) under BUP in 2009. He served on board four Frigates in different capacities. He was appointed as Executive Officer onboard BNS UTTAL and BNS KAPATAKHAYA. He led BNS DURDANTA as Commanding Officer. The officer served in Naval Headquarters as Section Commander under the Drafting Authority, contributing significantly to the Human Resource Management of BN. His service exemplifies his dedication as a proud peacekeeper of the only Maritime Task Force in BANCON-7 under the United Nations Interim Force in Lebanon (UNIFIL). He was appointed Assistant Director and Deputy Director in SSF at the Prime Minister's Office. He is happily married to Salina Rahman and blessed with a daughter and a son.

Naval Gunfire Support in 21st Century: Relevance vs Requirements

Commander A T M Rijwanul Jannat, (G), psc, BN

Abstract

In the past decade, fire support remained an important element for amphibious operations and power projection ashore. Presently, an amphibious operation is expected to counter anti-access and area-denial threats continuously where time, range, volume, accuracy, and cost of guided munition serve as the principal matrix for naval gunfire support. Against this backdrop, the objective of this paper is to find out the relevancy and requirement of naval gunfire support in the 21st century. This is a descriptive study type of research and has followed a qualitative approach. Content analysis was done to validate the thought of this fluid subject. Furthermore, the strategy of a few developed countries has also been analyzed. It is to be mentioned that the requirement and relevancy concept change with the existing situation. There is no such example of an amphibious landing in the recent past with advanced technology and tactics. Writers of various books and journals put their thoughts in their present context. It was challenging to conduct a test for validity or consistency. Finally, a blending concept with modern weapon systems and warfare tactics has been pronounced for naval surface fire support (NSFS).

Introduction

The potential importance of naval gunfire support (NGS) was experienced during the Second World War, the Korean War, the Vietnam War, the Falkland War and the Iraq War. NGS was used decisively during various amphibious landings. This fire support remains an essential element for amphibious operations and power projection ashore. Presently, requirements for rapid and accurate firing solutions make the process particularly difficult. Effective engagement on a fluid battlefield needs a quick reaction. Thus, maneuvering forces ashore need to keep her ready at noticeably short notice for a long distance. Even medium to large-caliber guns face difficulties meeting such criteria.

The present warfare is expected to counter anti-access and area-denial threats continuously¹. Anti-access will restrict a force from entering an area of operation and area-denial will prevent freedom of action of forces. The defender gets the upper hand to resist the attacker. As such, long-range bombardment capabilities will allow forces to remain well outside of the threat. Those modern threats include cruise and ballistic

missiles, crewed aircraft and anti-ship weapons which limit naval maneuverability and ability of ships to use NGS.

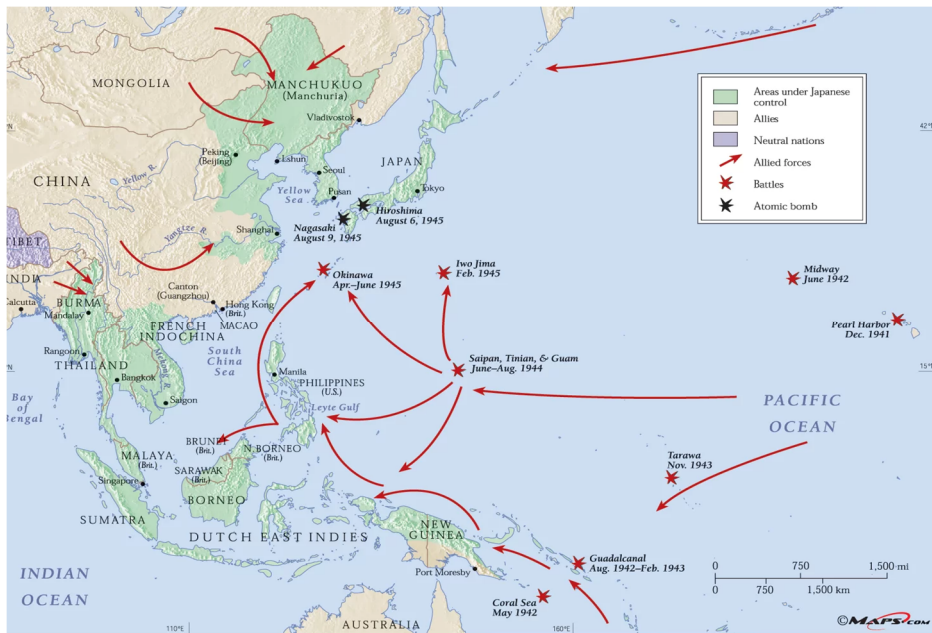
The volume of fire is related to lethality². This may also be defined as the ability to fire the required number of ordnances on a target. Thus, the degree of effectiveness depends on the quantity and destruction capability of ordnances, but suppressing targets demands a smaller number of ordnances. Thus, the volume of fire is often confused with effectiveness. On the other hand, a ballistic path of a gun's ammunition is inherently inaccurate. Additionally, precision guidance is necessary for accuracy at longer ranges, but those are costly items.

Time, range, volume, accuracy and cost of guided munitions serve as the principal matrix for NGS. It is hard to achieve all those characteristics simultaneously in reality. The standoff concept inherently increases the flight time of ammunition and subsequently destabilizes the volume of fires. Volume and precision need to be achieved with range. Furthermore, accuracy and cost benefits put a question mark for NGS in the 21st century. The invention of missiles and 5th/6th generation fighter aircraft armed with modern weapons challenges the existence of NGS.

Importance of NGS in Amphibious Warfare

a. **Historical Importance:** On 19 February 1915, the British French fleet attacked the mouth of the Dardanelles to keep the first footstep on the land. Difficulties in NGS for the troops storming ashore and distances between assault beaches were the main issues for the failure of the Gallipoli landing³. On the other hand, NGS played a crucial role in World War II where US Amphibious Drives were portrayed across the Pacific. To understand the importance of NGS, the commanding general of Okinawa set forth the defence philosophy on 8 March 1945. He said that 'until the enemy can be lured into a position where he cannot receive cover and support from naval gunfire and aerial bombardment, we must patiently and prudently hold our fire. Then, leaping into action, we shall destroy the enemy'⁴. There was a bargaining by the end of 1970 that NGS had become obsolete. Revival of NGS during Operation Corporate of Falkland War diminishes the thought of intellectuals.

Figure-1: US Amphibious Drive Across the Pacific in World War II

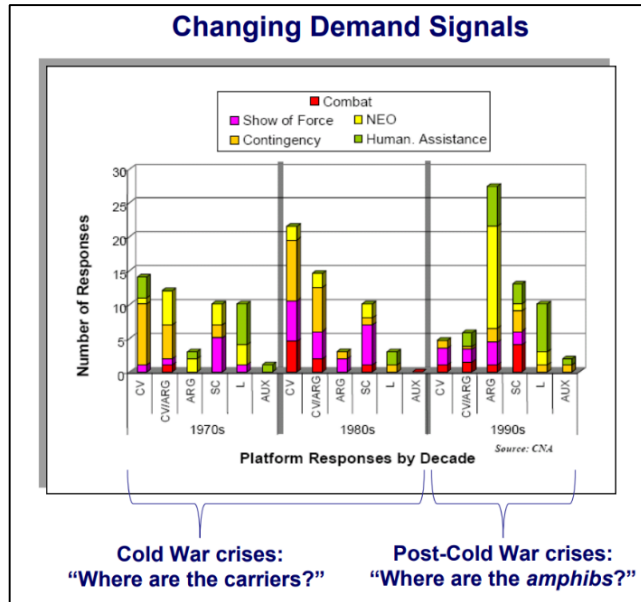


Source: www.amazon.in⁵

Commanding Officer of the GLAMORGAN, Captain Michael Barrow during the Falklands campaign said that ‘I have always placed a high priority on exercising NGS’⁶. In addition to that, Brigadier Thompson of the Royal Force has acknowledged that ‘without artillery, either land-based or sea-based, we certainly wouldn’t have won that war’⁷.

b. **New Age of Positional Warfare:** Nuclear revolution and economic intercession influenced direct inter-state conflict between major powers. The USA, Russia and China retain strong capacity and are very influential over developing countries. Great powers are attempting to demonstrate positional advantages over developing states. Roughly two-thirds of intra-state were involved in some form of intervention by at least one external power between 1979 and 2009. The purpose of this positional warfare is to confiscate geographically limited areas with physical presence where the existence of Amphibious Force with NGS or NSFS is felt in the present-day context. This is either clustered in littoral regions or accessible by critical littoral infrastructure. Thereby, the littorals are counted as the strategic Center of Gravity (CG).

Figure-2: Changing Demand Signal for Positional Warfare



Source: CNA

c. **Indulging with Operational Maneuver from the Sea (OMFTS) and Ship to Shore Movement Concept:** OMFTS is an approach through which the Navy maneuvers to produce a seamless operation between actions at sea and actions on land. OMFTS offers mobility without losing momentum during the transition from sea to shore. Ship to Shore Movement or Ship to Objective Maneuver (STOM) is a tactical concept which is applied to all types of amphibious operations. Amphibious operations with lethal firepower can ensure entry and achieve results on land. This firepower includes fire from ships and fire from aircraft.

d. **Importance of NGS for Smaller Navies:** Coastal states, whether big or small, are often blessed with Islands and long coasts. Controlling choke points for maritime trade becomes one of the vital issues for the smaller coastal nations. Other way, neighboring states also remain involved in the delimitation of maritime boundaries. As such, smaller navies need to adopt a deterrence strategy with credible NGS capability to deter the enemy or to recapture the territory occupied by the adversary when it is needed. The presence of non-state groups along the coast is often denied by naval forces. A credible NGS or NSFS with a modern weapon system is necessary to augment such action. Other than this, NGS or NSFS even utilize to give support to land forces also who are involved in such operations.

Present Status of NGS

a. The USA uses traditional guns like 3-inch to 16-inch. New Arleigh Burke (DDG-51 Class) destroyers have a modern fire control system. This ship can obtain precise fixes by GPS instead of using control system⁸. 5-inch Mark-45 gun was used by the surface combatants whose ballistic ammunition can travel up to a few nautical miles. Indian naval ships are equipped with various

Figure-3: ARLEIGH BURKE Class Destroyer of USA

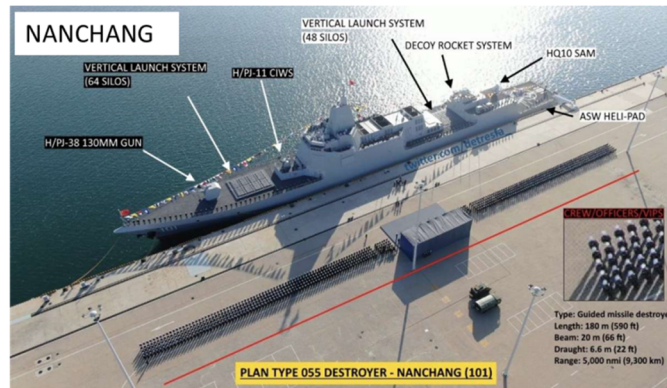


Source: x.com/naval_graphics⁹

caliber guns to support Amphibious assault. A few of those guns are A-190(E) 100mm, 100mm AK-100 naval gun, AK-176-M 76mm gun, AK-76/62 76mm gun, Twin mount gun (76mm), Oto Melara 76mm and Super Rapid Gun Mount (SRGM).

b. Indian Navy is also planning for a main gun of 127mm or higher calibers, which can be produced in India along with its ammunition. China's surface combatant force probably exceeded building of 31 destroyers and 50 frigates¹⁰. Those platforms are equipped with 100 mm gun which can support amphibious forces of China effectively. On the other hand, smaller navies are mainly equipped with traditional guns only. Budgetary constraints, resource management and absence of standard practices are the main hindrance of smaller navies for patronizing the concept of NGS.

Figure-4: Type 055 Destroyer of China

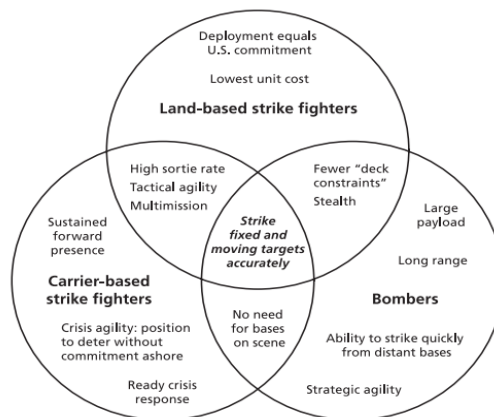


Source: news/world/Chinese navy¹¹

Future Requirement of NGS

a. **Influence of Air Power:** Modern aircraft, either carrier-based or land-based, can carry large payloads and is easy to achieve lethality. Quick response and long-range capability of aircraft were used judiciously during operation Desert Storm. Attributes of different forms of Air Power is shown in Figure 5. Though the attributes discussed about air power, but there are few disadvantages also when aircraft is used for softening ground. There is a possibility of fratricide with Land Forces. Enemy long-range SAM can also easily deter aircraft continuously and losing of single aircraft may have a huge

Figure-5: Attributes of Different Forms of Air Power



Source: Air Force–Navy Integration in Strike Warfare by Benjamin S. Lambeth

impact on overall operational environment. There is a complex chain of command also for receiving air support which may delay the operation. Air operations in high-threat environments are hindered by availability, mission priorities, weather, as well as prohibitive costs. Thus, a requirement for improved NGS is always felt¹².

b. **Technological Prowess:** A2/AD concept is threatening the existence of NGS. Anti-ship ballistic missiles of China can reach up to the Pacific Ocean and anti-aircraft missile can reach up to 600 km¹³. Such concept demands long-range precision guided weapon system to support landing force.

Figure-6: China's A2/AD Capabilities



Source: www.researchgate.net¹⁴

c. **Extended Range and Improved Accuracy:** NGS is now termed as NSFS which integrates missile and gun systems together. Ammunition of naval guns needs long-range to meet existing and future challenges. On the other hand, accuracy was the inherent limitation of ballistic munitions. High velocity is a characteristic of all naval gun systems which produces flat trajectories at short range with relatively small vertical dispersion. These characteristics need to be coupled with the penetrative capability of heavy naval projectiles. Employment of pointer fire capability can maximize gun laying accuracy¹⁵.

d. **Lethality for Hard Point Targets:** In the Korean War and WW II, the penetrative power of guns was limited to within 2 feet. The density and weight of fragments were very less¹⁶. Future status demands the capability of

ammunition, which will destroy hard point targets. Those targets include coastal defence posts, blockhouses, pillboxes, covered artillery positions, etc.

e. **Suppression of Soft Area Targets:** Naval guns are inherently effective against soft area targets. Fragmentation patterns and a high rate of fire are needed to counter future soft area targets. Pinpoint penetration with a guidance system would be much more effective than the conventional fire support.

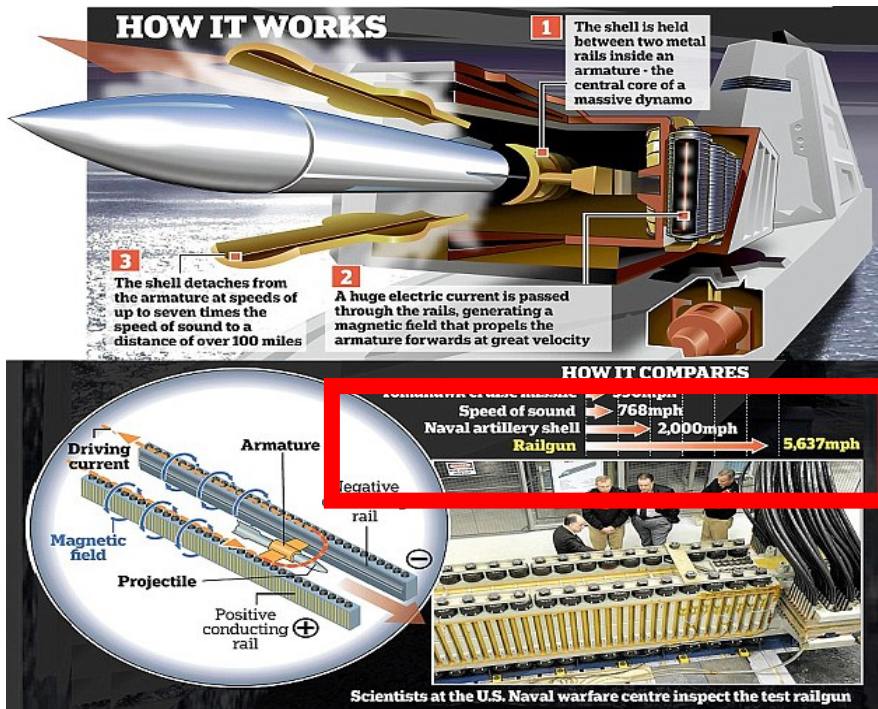
f. **Ship's Design:** Ships equipped with long-range guns can fire in support of land operations. Ships are designed to operate in multi-threat scenarios. The present complicated environment demands specific types of ships to generate firepower to support landing force operation. Ships are to be designed for specific missions with configured weapon systems.

Solutions to Meet Future NGS Requirement

a. **Ship's Design:** Ships need to operate close to the shore for NSFS. Draft, speed, and maneuverability of a ship determine distances from the shore. Relatively shallow draft, high speed, and quick turning ships are fitted for close NSFS. The magazine capability of a ship determines the probable duration of employment. For a NSFS ship, major limitations are to stay on station and deliver fire for a long time where an inadequate number of rounds is available relative to the actual requirement¹⁷. The future requirement calls for a technology-based solution for magazine capacity out of all those traditional munitions. Three-dimensional (3D) printing might be an option for producing the required ammunition onboard ships. Three-dimensional (3D) printing is an additive manufacturing process that creates a physical object from a digital design. It can solve the issue of limited magazine capability by allowing local fabrication of gun ammunition. It reduces the need for a long supply chain as well.

b. **Design of Gun:** Muzzle velocity and elevation of gun determine the range of ammunition. Guns with high muzzle velocity and low elevation are not effective against the target beyond the mask. Advanced Gun System (AGS) might be a solution which is introduced by the USA¹⁸. This gun can fire up to 10 rounds per minute from an automated 304-round magazine. Existing guns can be modified to meet future requirements of NSFS. The new variant was replaced by longer barrels to fire longer range munitions while retaining the ability to fire all types of existing ammunition. Thus, range is extended up to around 60 km for this gun. Another option is the railgun. A railgun projectile can reach several times the speed of sound, which is faster than a missile as shown in below figure.

Figure-7: Railgun Mechanism

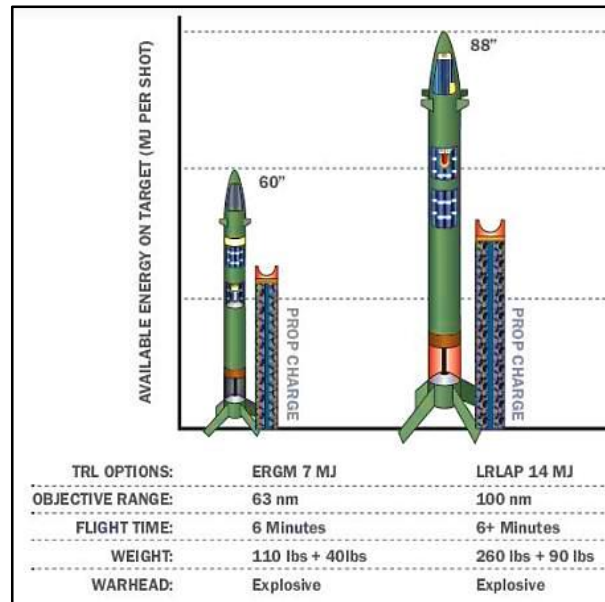


Source: www.dailymail.co.uk¹⁹

c. **Cluster and Loitering Ammunition:** Cluster munitions fired from a conventional gun might be an option for effective NSFS. This system is cost-effective and remains relatively more lethal compared with firing an equivalently large number of separate rounds or missiles. Loitering munitions might be another option that can home in on a detected target. Loitering munitions can attack targets after positive identification of a threat which reduces the number of engaged munitions at dispersed target.

d. **Long-Range Land Attack Projectile (LRLAP):** LRLAP is a precision guided 155 mm naval artillery shell. This is a rocket-assisted projectile and uses blast fragmentation type warhead. It is GPS/INS guidance projectile and can cover approximately 190 km. The project was cancelled by US Navy due to excessive cost. Extended Range Guided Munition (ERGM) and Ballistic Trajectory Extended Range Munition (BTERM) are precision guided, and rocket assisted 5-inch (127 mm) artillery shell. It was developed by Raytheon for the US Navy. This ammunition can reach up to 110 km with GPS guidance. It was developed to be used on ARLEIGH BURKE class Destroyer. Project was failed several times during development phase²⁰.

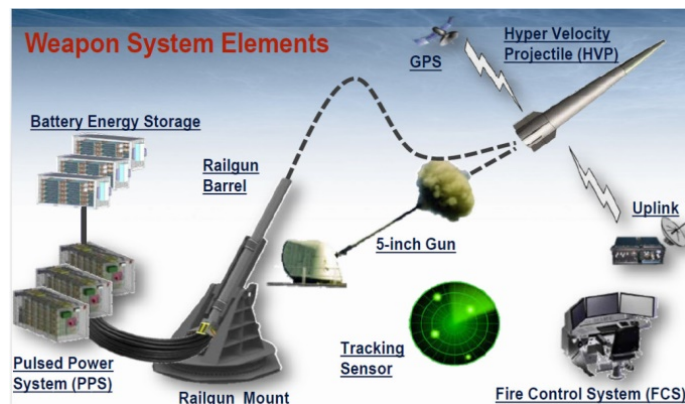
Figure-8: Comparison between LRLAP and ERGM



Source: www.dsiac.org²¹

e. **Hypervelocity Projectile (HVP):** HVP for guns also known as Gun Launched Guided Projectile (GLGP). HVP is a next-generation, common and guided projectile. GLGP can execute multiple missions for several gun systems. It can be used for 5-inch guns, 155 mm gun systems and railguns. It can be effectively used in NSFS role. Low drag aerodynamic design of GLGP can achieve high velocity, maneuverability, and decreased time to target. Accurate guidance electronics and low-cost mission made it more effective²².

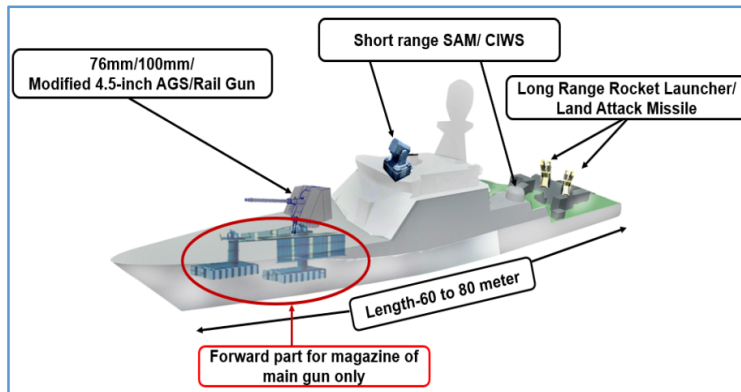
Figure 9: Launching Mechanism of HVP with Railgun



Source: [www.google.com/launching mechanism](http://www.google.com/launching%20mechanism)²³

f. **Materials to Improve Projectile and Gun Performance:** Materials called shape memory material have a memory that can be reshaped again after being heated or deformed. Nickel titanium is one of the examples of such material. Graphene is a two-dimensional form of carbon, which is electrically and thermally conductive and strong. Self-healing material might be used for a faster rate of fire. The inside coating of a gun barrel with self-healing material will automatically repair itself as this can be done without external human intervention. This is an artificial material and is available in polymers, metals, ceramics, and cement.

g. **Options for Smaller Navy:** The development of the navy depends on her vision and mission. Usually, smaller navies operate in and around the coastal area to maintain their territorial integrity. Often, smaller Navies need to adopt a strategy to counter threats from the sea. Those navies need to possess a credible force where the concept of NSFS may be introduced instead of NGS. A blending concept of Littoral Combat Ship and NSFS might be incorporated here. Those ships should be mission-oriented and should have the capability to operate near the coast. This includes a relatively shallow draft, high speed, and quick turning capability. Magazine capacity will also increase those ships once that will be built for specific missions. It is quite difficult for smaller navy to adopt the technology of AGS or railgun instantly. Traditional guns like 100 mm and 76.2 mm guns are not effective for countering the threat from shore as shore-based traditional artillery has got distant reach. At least, a modified railgun or AGS like Mk 45 gun may be considered for those mission-oriented ships. On the other hand, ships launched UAVs with suitable ammunition may fulfill the requirement of reconnaissance and can attack simultaneously. Presently, LRLAP, ERGM or BTERM are found costly for the large navies even. Thus, HVP for modified guns can be another option for smaller navies. Those can be used for distant support to landing forces in critical situations where integrated effort with a SOP may be considered for Army, Navy and Airforce. Smaller navies should not limit their initiative within the given thought rather endeavor should be taken to incorporate advanced technologies with time phase line as per the budgetary sustenance and expected threat environment. A diagram of suitable NSFS ship for smaller navy is given below. Options can be obtained based on budget and requirement from below diagram:

Figure-10: NSFS Platform for Smaller Navy

Source: Author's self-construct

Conclusion

Time, range, volume, accuracy, and cost of guided munitions act as fundamental substances for NGS. Presently, traditional NGS capability is questioned for technological advancement. The concept of OMFTS and STOM or STS asks for the presence of naval platforms at the enemy's doorstep. Smaller Navies were also blessed with a noble duty to maintain the territorial integrity of their sea areas. Maritime boundary disputes, control of chokepoints for smooth sea lines of communication or to deter potential enemies strongly demand supremacy over NGS to support landing forces when it is needed. NGS support is also necessary for LIC along the coastal area against state or non-state actors.

The influence of air power on the overall warfare domain is pursuing different thought on technology. Still, air operations in multi-threat scenario are hindered by availability and mission priorities. Thus, NSFS ships can fulfill the requirement in the right time and right place with advanced types of ammunition and gun system. A ship with less draft, high maneuverability and speed might be the best solution for close NSFS. Hence, necessity of huge magazine capacity is also felt for continuous fire support. Cluster or loitering ammunition can reduce the load on the ship's magazine, or a technology-based three-dimensional (3D) printing capability can surely enhance magazine capacity. This additive manufacturing process creates a physical object from a digital design. It allows local fabrication of gun ammunition onboard the ship.

Cluster and loitering ammunition can meet the requirement of distance and lethality also. Loitering ammunition can be used effectively against dispersed targets. Mentionable, modern projectiles like LRLAP, ERGM and BTERM were cancelled due to huge costs. Thus, HVP can be the best option compared to the mentioned

ammunitions. Outstanding aerodynamics with GPS guidance system made this munition a future hope for NSFS with a range of around 70 km. On the other hand, muzzle velocity and low elevation of gun are not effective against targets who all remain beyond the mask. Modified MK-45 gun can fire guided projectiles that can achieve ranges up to 40 nm. One of the finest creations in the present day is the railgun. This electric gun can achieve several times the speed of sound for their projectile. Though this gun requires additional power, it can augment the limitation of present NSFS. This gun can achieve up to 100 nm range even.

To keep pace with the technology, smaller navy might go for modified gun systems which will be able to comprehend their NSFS capability. HVP for modified guns might be an option for smaller navies. HVP can be fired in conjunction with aircraft and missile system in a layer to give distant support and close support can be given with cluster, loitering munitions, and modified gun. The concept of littoral combat ships for smaller navy might be incorporated here with a view to build a specific mission-oriented platform. That platform may carry a 4.5 inch/ rail gun or at least a 76 mm gun with a huge ammunition capacity in the forward part. Land attack missiles can be carried by the same ship for long-range engagement. This kind of mission-oriented littoral combat ship may be a suitable option for smaller navies.

Recommendations

Based on the research findings, following recommendations are made:

- a. A quantitative and qualitative analysis should be done to set the vision and mission of navy for enhancing NSFS capabilities.
- b. A SOP/ doctrine/ standard practices is to be introduced to the Army, Navy and Air Force to avoid fratricide and achieve maximum destruction capability.
- c. Additive manufacturing materials can be used to allow NSFS platforms in stations for longer periods.
- d. Modified guns with long-range guided projectiles, long-range land attack missiles and rocket launchers need to be used for NSFS to achieve range superiority, lethality, and accuracy.
- e. 3D-printed ammunition or ammunition like HVP should be used to increase the magazine capacity of a ship.
- f. Loitering ammunition needs to be used that will meet the requirement of distance, lethality, and effective targeting.
- g. NSFS mission-oriented ships are to be introduced.

h. Smaller navy might have a blending concept of littoral combat ship and NSFS mission-oriented ship.

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Brief Biography



Commander A T M Rijwanul Jannat, (G), psc, BN was commissioned on 01 Jun 2006 in the Executive branch of Bangladesh Naval Academy. He completed various basic courses and specialization courses on Gunnery from BNS ISSA KHAN, PWO(B) from SMWT, MCTC from FAC School, C-704 Missile Course from China, GTO Course from ISSB and EEZ protection Course from UK. He served onboard various ships of the Bangladesh Navy in different capacities. His staff appointment includes Deputy Director, Directorate of Naval Armament Inspection and Supply and Staff Officer (Training) at Naval Headquarters. He completed his UN mission as a Missile Officer onboard BNS ALI HAIDER in Lebanon. He has visited India, China, Lebanon, Turkey, Cyprus, Saudi Arabia, Malaysia, Scotland, and the UK. The officer is happily married and blessed with two daughters.

The Impact of GIS in Modern Warfare: A Historical Analysis and Future Implications

Lieutenant Colonel Md. Faizul Kabir, psc, Engineers

Abstract

Geographic Information Systems (GIS) have significantly transformed modern warfare, revolutionizing military strategies and operations. This research paper aims to comprehensively analyze the historical impact of Geographic Information Systems (GIS) on modern warfare and explore its future implications. It examines the historical development of GIS technology, tracing its integration into military cartography and evolution into advanced geospatial tools. The study utilized various methods for data collection, including a literature review, case studies, content analysis and document analysis to explore GIS's historical development, real-world applications and impact on military intelligence, planning and operations. The study highlights key milestones and technological advancements, demonstrating GIS's transformative role in enhancing situational awareness, decision-making, and operational effectiveness in military operations. Furthermore, it investigates the latest GIS advancements and their potential future implications, including unmanned systems, artificial intelligence, and big data analytics, envisioning possibilities for precision targeting, real-time battlefield visualization, and data-driven strategic planning. By providing insights into GIS's historical context and prospects in warfare, this paper aims to equip military planners and strategists with the knowledge to leverage their full potential and adapt to evolving warfare dynamics. Additionally, the research addresses challenges and proposes solutions for implementing a robust GIS platform within military organizations, emphasizing collaboration among military agencies, technology providers, and academic institutions.

Introduction

The use of technology has transformed the way wars are fought, with GIS being at the forefront of this revolution. As the world evolves, so does the nature of warfare, and GIS has become an essential tool in modern military operations. From intelligence gathering to battlefield management, the applications of GIS in military operations are vast and diverse. A GIS is a computer-based process that can record, store, explore, manage, and display geographic or geographical data. It integrates various data

sources to create visual representations of the data, enabling users to understand patterns, relationships, and trends.¹

The significance of GIS technology lies in its ability to provide reliable, accurate spatial data, which is crucial for decision-making in military operations. Military commanders rely on GIS technology to plan and execute operations efficiently and maintain control of occupied land. The availability of accurate and timely spatial information is critical to achieving success in military operations, and GIS technology provides this information in a clear and concise format. In addition to its use in operations, GIS technology also plays a vital role in logistics management and communication planning. Its ability to provide detailed, up-to-date information on the spatial extent of areas of interest is essential in mission briefing and command control.

The importance of spatial information cannot be overstated in modern warfare. With the availability of accurate spatial information, military commanders can anticipate and prepare for possible threats, enabling them to make strategic decisions that can turn the tide of battle in their advantage. Therefore, GIS technology has become an essential tool in modern military operations, helping military commanders to achieve success on the battlefield. GIS technology has revolutionized modern warfare, providing critical support for military decision-making, and enhancing operational effectiveness.

Objectives

The objectives of the research are:

- to analyze GIS technology's historical role and assess advancements,
- to explore future implications in military operations, and
- to propose solutions for establishing an effective GIS platform to enhance military effectiveness.

Methods of the Study

The research encompassed a detailed review of existing literature on the historical development of GIS technology in military contexts, augmented by in-depth case studies of real-world applications, employing content analysis and document analysis methods for investigation.

The Evolution of GIS Technology in Military Warfare

Use of GIS Technology in the Gulf War 1991

GIS technology has been used in various forms of military warfare over the years. One notable example is its use in the Gulf War in 1991. GIS played a crucial role in military operations, particularly in terms of intelligence gathering and planning. One of the most significant uses of GIS in the Gulf War was in the planning of the "Left Hook" maneuver by the US Army's VII Corps. GIS was utilized to create detailed maps that showed the terrain, the location of Iraqi forces, and potential routes for the VII Corps to take. This information was used to plan the attack and coordinate the movements of different units.² GIS was also used to track the movements of Scud missiles launched by Iraq. GIS data was collected from satellites and used to create maps that showed the trajectory and impact points of the missiles. This information was used to locate and destroy Scud launchers. Overall, the use of GIS in the Gulf War provided the military with critical information for planning and executing operations and helped to minimize casualties and damage.³

GIS Technology in the Kosovo War (1999)

During the Kosovo War in 1999, GIS technology played a critical role in the planning and execution of military operations. GIS was used by NATO forces to create maps and analyze data to plan and execute air strikes and ground attacks against Serbian military targets. One of the main uses of GIS during the Kosovo War was to identify and target key Serbian military installations and communication networks. GIS technology was used to create detailed maps that showed the location of these targets and their proximity to civilian areas. This information was used to minimize collateral damage and civilian casualties during air strikes. GIS was also used to monitor the movements of Serbian military forces and to plan the movements of NATO ground troops. GIS technology played a vital role in the Kosovo War, providing the military with critical information for planning and executing successful operations, minimizing casualties and collateral damage, and supporting humanitarian relief efforts.⁴

GIS Technology Used in Military Operations in Afghanistan (2001-2021)

In Afghanistan (2001-2021), GIS technology was used to create detailed maps of the region and to help plan military operations.⁵ GIS was used to analyze satellite imagery to identify potential targets.⁶ GIS technology has been extensively used by the military forces deployed in Afghanistan since the start of the War on Terror in 2001. GIS technology has been used to analyze the terrain and geography of Afghanistan, which

is critical for military planning and operations. GIS-based terrain analysis has been used to identify potential ambush sites, assess the feasibility of helicopter landings, and determine the best routes for ground troops.⁷ According to a report by the National Geospatial-Intelligence Agency (2012), GIS technology has been used to analyze satellite imagery and other geospatial data to identify potential targets, track enemy movements, and monitor border areas.⁸

Use of GIS Technology during the Iraq War (2003-2011)

In the Iraq War, GIS technology was used to map the country's infrastructure, including roads, bridges, and power grids.⁹ One of the key applications was for intelligence gathering and analysis.¹⁰ GIS was also used to track troop movements and to analyze satellite imagery for reconnaissance purposes.¹¹ GIS technology was also used in Iraq for resource management purposes. For example, GIS was used to track the distribution of humanitarian aid, monitor the status of infrastructure projects, and manage the allocation of water resources.¹² Additionally, GIS technology was used in Iraq for post-war reconstruction efforts. GIS was used to identify areas of damage and prioritize reconstruction efforts, as well as to manage the allocation of resources and monitor progress.¹³

GIS Technology Used in the Syrian Civil War

GIS technology has been used by various groups to map conflict zones, track troop movements, and monitor humanitarian needs.¹⁴ GIS technology has played a significant role in the Syrian Civil War. GIS technology has also been used for urban planning and damage assessment, as well as for identifying potential targets and monitoring the movement of forces.¹⁵ In addition, GIS technology has been used to analyze satellite imagery and other forms of geospatial data to track and monitor the conflict, including the movement of refugees and displaced populations.¹⁶ One specific example of the use of GIS technology in the Syrian Civil War is the work done by the United Nations High Commissioner for Refugees (UNHCR) to map and monitor the movement of refugees and internally displaced persons (IDPs).

GIS Technology in the Russia-Ukraine War

The Russia-Ukraine War has witnessed extensive use of satellite imagery, which has played a significant role in providing key intelligence to the Ukrainian forces. Earth observation satellites have been critical in gathering information on the movements of the Russian forces, enabling the Ukrainian side to coordinate and organize defense operations more effectively. Companies such as Maxar, Black Sky, and Planet have

provided high-resolution optical data to the Ukrainian government, with the help of industry partners like EOS Data Analytics.

Figure-1: A satellite Image Depicting a convoy of Russian military vehicles



Source: <https://gogeomatics.ca/ukraine-at-war-impacts-of-geomatics-geospatial-earth-observation-technologies/>

Synthetic aperture radar (SAR) technology has been used to monitor troop movements at night during the Russia-Ukraine War. Canadian company MDA announced on 8 March 2022 that they were granted permission to share near-real-time SAR imagery with Ukrainian officials. The use of SAR technology in night-time monitoring is a critical tool for gathering intelligence in modern warfare.¹⁷

GIS Technology in Peacekeeping Operations

GIS has been utilized in peacekeeping and combat. GIS was used to map rebel factions and arrange peacekeeping forces in the Democratic Republic of Congo. Peacekeeping operations use GIS technology to develop and implement effective methods to maintain peace and security in conflict-affected regions. The UN uses GIS for peacekeeping efforts around the world. GIS technology is used to identify the most vulnerable areas and populations and to plan and implement relief operations effectively. Moreover, GIS technology is also used in peacekeeping operations to monitor ceasefire agreements, track troop movements, and maintain situational awareness in the conflict zone. Overall, GIS technology has proven to be a valuable tool for peacekeeping operations, helping to facilitate effective planning, decision-making, and implementation of peacekeeping strategies.¹⁸

Advancements in GIS Technology and Future Implications in the Military

GIS technology has become an essential tool in military operations, providing commanders with the ability to analyze and visualize data in a spatial context. GIS technology has evolved rapidly over the years, with new advancements providing the military with more efficient and effective ways of managing geospatial data.

Integration of GIS with Satellite Imagery and Remote Sensing

GIS technology can be seamlessly integrated with high-resolution satellite imagery and remote sensing technologies. This integration enhances the accuracy and detail of geospatial data, enabling better intelligence gathering, target identification, and terrain analysis.

Predictive Analytics and Modeling

GIS platforms now incorporate predictive analytics and modeling capabilities, allowing military planners to simulate different scenarios and assess their potential outcomes.¹⁹ This aids in mission planning, risk assessment, and resource allocation, improving operational effectiveness.

Interoperability and Data Integration Advancements

Advancements in GIS technology have improved interoperability and data integration between different systems and platforms. This allows for seamless communication and collaboration between military units, enhancing command and control capabilities and enabling more efficient information sharing.

Mobile GIS Applications

The development of mobile devices and applications has brought GIS capabilities to the field, allowing for real-time data collection, mapping, and analysis on handheld devices.²⁰ Mobile GIS applications enable field personnel to gather data in the field and instantly integrate it with the central GIS database.

Unmanned Systems and the Internet of Things (IoT)

GIS technology has played a critical role in integrating and managing data from unmanned systems and IoT devices.²¹ By leveraging GIS capabilities, military organizations can collect, analyze, and visualize data from drones, sensors, and other connected devices, enabling real-time monitoring, intelligence gathering, and decision-making.

GIS Integration with Autonomous Systems

The Future of GIS in the military will involve greater integration with autonomous systems, such as unmanned ground vehicles and drones.²² This integration enables autonomous data collection, analysis, and decision-making, reducing human risk and enhancing operational efficiency. The GIS technology enables precise targeting, minimizing collateral damage, and improving overall operational effectiveness.

Cloud-Based GIS

Cloud-based GIS technology has revolutionized the way military organizations manage and analyze geospatial data. With the advent of cloud computing, the military can now store and access vast amounts of geospatial data from anywhere in the world through a cloud-based GIS system. Cloud-based GIS systems also offer scalability, flexibility, and cost savings. One of the major future implications of cloud-based GIS technology in the military is the ability to integrate data from various sources. Cloud-based GIS technology provides a platform to integrate and analyze this data, enabling military organizations to generate more accurate and detailed situational awareness information.²³

Real-time Data Processing

Advancements in GIS technology have enabled the military to process geospatial data in real time, allowing commanders to make informed decisions on the fly. For example, real-time satellite imagery can be used to track enemy movements and anticipate attacks.²⁴ The future implications of real-time data processing in the military include faster decision-making processes, reduced response times, and improved situational awareness.

Artificial Intelligence and Machine Learning

AI refers to the broader concept of creating intelligent systems that can simulate human intelligence, while ML is a subset of AI that focuses on algorithms and models that enable machines to learn and improve from data. The military has been utilizing AI and ML technologies to process and analyze large amounts of data. For example, predictive analytics can be used to anticipate and prevent enemy attacks.²⁵ AI and ML technologies enable the military to automate decision-making processes, reduce the risk of human error, and improve operational efficiency.

3D Modeling and Simulation

3D modeling and simulation technology enable the military to create virtual representations of the battlefield and test different scenarios.²⁶ The military has been

utilizing 3D modeling and simulation technology for training purposes and to test equipment and tactics before deploying them in the field. For example, virtual simulations can be used to train soldiers for urban warfare scenarios.²⁷ 3D GIS technology plays a crucial role in urban warfare scenarios and complex operational environments.

Big Data Analytics

As the volume of data continues to grow exponentially, GIS technology plays a crucial role in managing and analyzing big data in military operations. By integrating GIS with big data analytics, military organizations can extract valuable insights from diverse data sources, such as social media, sensor networks, and open-source intelligence, enabling better decision-making and improved situational awareness.

Augmented Reality (AR) and Virtual Reality (VR)

The merging of AR and VR technology with GIS completely transforms military training, simulation, and mission planning. By overlaying geospatial data onto the real-world environment, military personnel can have a virtual representation of the battlefield, enabling them to visualize terrain, identify key features, and rehearse complex operations, ultimately enhancing situational understanding and mission effectiveness.

Challenges and Ways Forward to Establishing a GIS Platform in the Military

Challenges to Establishing a GIS Platform in the Military

Establishing a GIS platform in the military can be a challenging task, as it requires significant investment, technical expertise, and coordination between different departments and agencies. Some of the key challenges to establishing a GIS platform in the military are shown below.

Interoperability and Data Integration Challenge

The military uses data from various sources, including satellites, drones, and ground-based sensors, to generate accurate geospatial data.²⁸ Military operations involve different departments and agencies that may use different GIS platforms or software. The challenge lies in integrating this data into a unified platform that can be accessed and analyzed in real time. This requires developing standardized protocols and data models to ensure that data from different sources can be integrated into the platform. Establishing a GIS platform that is interoperable with different systems can be a challenge.²⁹

Data Security

Military operations involve sensitive information, and ensuring data security is critical. Any GIS platform used by the military must have robust security features to protect against data breaches, cyber-attacks, and other security threats.³⁰ This includes encryption, access controls, and regular security audits.

Technical Expertise

GIS platforms require technical expertise to set up and maintain. The military may need to invest in training its personnel or hiring outside experts to develop and manage the GIS platform.³¹

Funding and Resource Allocation Challenge

Establishing a GIS platform can be expensive, and the military may need to allocate significant resources to procure hardware, software, and personnel.³² In addition, establishing a GIS platform in the military requires adequate funding and resources.³³ This includes investing in hardware, software, and personnel to manage the platform. The military can explore the use of cloud-based GIS platforms to reduce the need for hardware and software infrastructure.

Resistance to Change

The military is a large organization with established procedures and systems. Introducing a new technology like GIS may face resistance from personnel who are used to working with traditional methods.³⁴

Complexity

GIS platforms can be complex, requiring a significant amount of data management and analysis. Military personnel may need to learn new skills or adapt their workflows to effectively use GIS.³⁵

Maintenance

GIS platforms require ongoing maintenance and updates to ensure optimal performance. The military will need to allocate resources to ensure that the GIS platform is updated and maintained regularly.³⁶

Ways Forward to Mitigate the Challenges

Overcoming these challenges requires careful planning, coordination, and investment. The benefits of a GIS platform in enhancing military operations and decision-making

justify the effort and resources required to establish and maintain it. The way forward for establishing a GIS platform in the military includes:

Investment in Training and Development Programs

To overcome these challenges, military organizations can invest in training and development programmes to equip personnel with the necessary skills to use GIS platforms effectively. This includes providing GIS training to all personnel and developing specialized training programs for personnel with specific roles.

Partnership with GIS Technology Providers

Military organizations can partner with GIS technology providers to develop customized solutions that meet their specific needs. This can include customizing GIS software to meet the unique needs of the military, such as integrating data from different sources and improving security measures.

Phased Implementation

Furthermore, military organizations can adopt a phased approach to implementing GIS platforms, starting with small pilot projects before scaling up to larger projects. This approach allows for testing and refining the platform before rolling it out across the entire organization.

Developing a Clear Plan and Budget

Developing a clear plan and budget is crucial to the successful implementation of a GIS platform in the military. The plan should outline the goals and objectives of the GIS platform, as well as the technical requirements, including hardware, software, and personnel. The budget should consider all costs associated with the GIS platform, including hardware and software procurement, personnel costs, and ongoing maintenance and upgrades. It is essential to allocate sufficient resources to ensure that the GIS platform is fully functional and operational.

Conducting Thorough Risk Assessments and Developing Robust Security

Conducting thorough risk assessments and developing robust security protocols are critical to ensure the protection of sensitive information when establishing a GIS platform in the military. The risks associated with the GIS platform should be identified, ranked, and mitigated to minimize potential security breaches. By implementing strong security protocols, the military can ensure that sensitive information is protected against unauthorized access, theft, or misuse.

Establishing a Culture of Innovation

The military can also establish an innovation team or committee tasked with identifying new technologies and workflows that can be incorporated into the GIS platform. This team can work closely with personnel to identify areas of improvement and develop solutions that meet the needs of the military. By establishing a culture of innovation and continuous improvement, the military can ensure that the GIS platform is continually evolving to meet the changing needs of the organization. This can help the military to stay ahead of the curve and maintain a competitive edge in the ever-changing landscape of modern warfare.

Allocation of Adequate Resources

Allocating resources for ongoing maintenance and updates is crucial to ensuring the Military GIS platform remains up-to-date and effective. This includes regularly updating the software and hardware components of the system to ensure that it is running smoothly and efficiently. It is also important to have a dedicated team responsible for maintaining and updating the platform, ensuring that any issues are resolved promptly, and that new features and functionalities are added as needed. In addition, allocating resources for ongoing training and development is also critical. This will enable personnel to keep up to date with new technologies and workflows, ensuring that they can use the GIS platform effectively.³⁷

Findings of the Research

In past conflicts, GIS has played a vital role in intelligence gathering, strategizing maneuvers, monitoring enemy movements, and facilitating post-war reconstruction efforts. GIS technology has rapidly evolved, integrating satellite imagery, predictive analytics, mobile apps, unmanned systems, AI, cloud platforms, real-time data processing, big data analytics, augmented reality, and virtual reality, bolstering military operations with better intelligence, precision targeting, heightened situational awareness, and streamlined decision-making. The research highlights crucial strategies for implementing a GIS platform in the military. It underscores the significance of investing in training and development programmes to equip personnel with GIS skills, fostering operational efficiency and decision-making. Collaboration with GIS technology providers enables customized solutions that integrate diverse data sources and enhance security measures. Phased implementation, clear planning, and budgeting ensure successful deployment while minimizing risks. Thorough risk assessments and security protocols safeguard sensitive information, while a culture of innovation drives continuous improvement. Adequate resource allocation for

maintenance, updates, and training sustains the platform's functionality, enhancing operational readiness.

Conclusion

Geographic Information System is a valuable technology that encompasses components, functions, and benefits essentially in various sectors, including military warfare. The evolution of GIS technology in military warfare has revealed a remarkable progression from its early integration in military cartography to its current state as a sophisticated tool for enhancing situational awareness, decision-making, and operational effectiveness. GIS has evolved from basic map overlays to advanced geospatial tools, enabling military commanders to obtain a comprehensive understanding of the battlefield and make informed decisions based on accurate geospatial data.

The evolution of GIS technology in military warfare has been significant, with advancements revolutionizing the way military operations are planned and executed. Emerging trends such as unmanned systems, AI, and big data analytics offer tremendous potential for integrating with GIS, leading to precision targeting, real-time battlefield visualization, and data-driven strategic planning. The incorporation of these technologies can significantly enhance military capabilities and shape the future landscape of warfare.

Nevertheless, challenges exist in establishing a robust GIS platform in the military. Issues related to data interoperability, security concerns, and training requirements need to be addressed for successful implementation. Collaboration between military agencies, technology providers, and academic institutions is crucial for overcoming these challenges and establishing a comprehensive GIS framework. By addressing these obstacles and working towards standardization, the military can fully leverage the power of GIS in its operations.

Recommendations

Following the study, the researcher proposes the following recommendations:

- a. Prioritizing comprehensive GIS training programs to equip personnel with essential skills, including both basic and specialized training for specific roles in the military.
- b. Establishing partnerships with GIS technology providers to access tailored solutions, such as software customization, data integration, and enhanced security features, aligning with the military's distinct requirements.

c. It is imperative to conduct thorough risk assessments and implement robust security protocols to safeguard sensitive information on GIS platforms, thereby ensuring protection against unauthorized access and potential data breaches.

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Brief Biography



Lieutenant Colonel Md Faizul Kabir, psc, Engineers was born on 08 Oct, 1982 in Barishal, Bangladesh. He was commissioned with 50 BMA Long Course in the Core of Engineers on 28 June 2004. He attended several courses at home. He is a Graduate of the Defence Services Command and Staff College (DSCSC), Mirpur Cantonment. He has completed Masters in Defence Studies from Bangladesh University of Professionals (BUP), Mirpur Cantonment with distinct credentials. He has a diverse experience of service in different units and Organizations. He served in different units and held all the regimental appointments within his capacity. In his service career, he has served as General Staff Officer-Grade 2 at Headquarters 19 Infantry Division. Besides the mandatory courses for his professional career, he attended Basic Intelligence Course. He has participated in the United Nations Peacekeeping in South Sudan (UNMISS). He is happily married. Presently, the officer is serving as General Staff Officer Grade-1 (Research) in MIST, Mirpur Cantonment.

Grading Consciousness vis-à-vis Cognitive Development of Junior Officers: Causes, Effects and Ways Forward

Major Md Ahteshamul Haque Niaz, psc, Engineers

Abstract

Grading consciousness in military courses is a handicapping phenomenon that retards the cognitive development of junior officers. The research has been carried out to propose a holistic approach for enhancing the cognitive development of junior officers by eradicating grading consciousness in military courses for the organisational benefit of the Bangladesh Army. Initially, the paper specified the cognitive skills required for junior officers, which are deteriorating due to grading consciousness. To understand the gravity of the problem, the researcher has identified the reasons and negative impacts of grading consciousness. Subsequently, the study explored organisational, institutional, and individual approaches to eradicate grading consciousness. A total of 247 officers from all arms and services participated in the study through the completion of two surveys. Additionally, interviews were conducted with seven senior officers, and two focused group discussions were conducted with junior officers. This research proposes a few organisational approaches, along with shaping individual psychology, encompassing both command and institutional responsibility, aimed at enhancing the cognitive development of junior officers of the Bangladesh Army.

Introduction

Bangladesh Army (BA) provides quality military training to the officers through various courses at different training institutions. The ultimate purpose of military courses is to create opportunities for officers to enrich their professional knowledge and enhance their cognitive domain.¹ In these courses, the performance of officers is evaluated based on a traditional grading system.² In BA course grading is regarded as a standard for both professional and organisational criteria and grades achieved in military courses are often considered a yardstick for evaluating an officer.³ Thus, junior officers (JO) are gradually exposed to grading consciousness from the beginning of their careers and start prioritising good grades over cognitive development (CD).⁴ Grading consciousness can be defined as awareness and worry about one's academic performance and grades. Within the training culture of the BA, grading consciousness seriously affects attention, participation, reasoning skills, critical thinking, and creativity development.

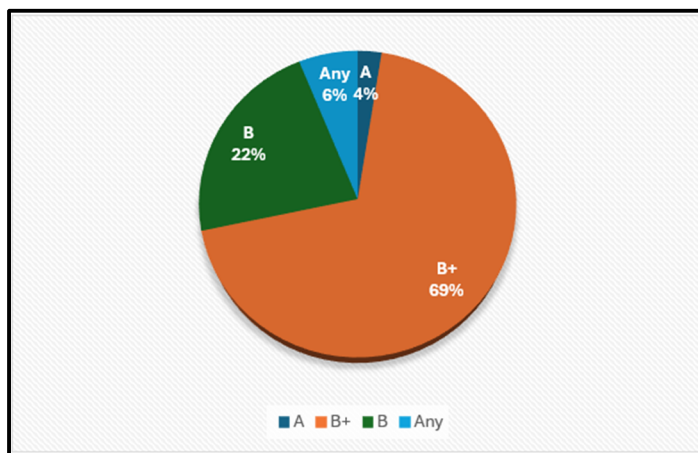
As a result of this overriding priority for grades, the officers' focus switches from 'learning' to 'just getting a grade'.⁵ Grading consciousness is the psychology for which students value their academic achievement, especially in terms of grades, above other learning objectives, such as in-depth comprehension and enhancement of the cognitive domain.⁶ The minor sense of accomplishment that comes with getting good grades vis-à-vis the enormous loss of opportunities to improve cognitive domains in military courses is a matter of concern for the entire organisation. Therefore, finding feasible measures to eradicate grading consciousness among junior officers to enhance their CD is greatly important. In this paper, JO denotes officers at the rank of Lieutenant and Captain with a maximum service limit of 7 years.

Against this backdrop, the paper has initially evaluated the indicators and causes of grading consciousness among JO in BA. After that, the effects of grading consciousness on the CD of JO have been analysed. Moreover, the paper has also identified the negative impacts of grading consciousness on learning. Finally, the paper has proposed a few plausible measures to enhance the CD of JO by eradicating grading consciousness through a systematic organisational approach.

Causes of Grading Consciousness among JO in Military Courses

In the military essence of BA, the strong desire to obtain a predetermined grade during the course, compromising the intrinsic value of learning, can be defined as grading consciousness.⁷ A survey among BA officers shows that 69% consider B+ (BEE Plus) as their desired grade in any course. However, both A (Alpha) and B+ (BEE Plus) are considered good grades by JO.⁸

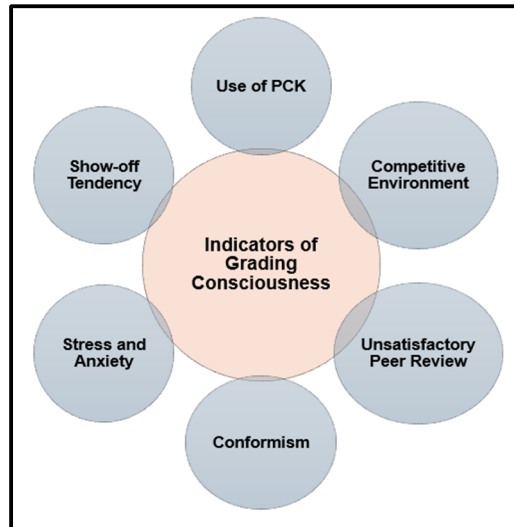
Chart-1: Grading Expectations of Officers from Courses



Source: Researcher's Own Construct Based on Survey Question 6

- a. **Indicators of Grading Consciousness:** An indicator is a sign, symptom, or piece of evidence that provides information about the presence or severity of a condition, problem, or phenomenon.⁹

Figure-1: Indicators of Grading Consciousness



Source: Researcher's Own Construct Based on FGD and Interview

- b. **Categories of Grading Consciousness:** Considering the presence of these indicators among the student officers, grading consciousness can be divided into three broad categories.

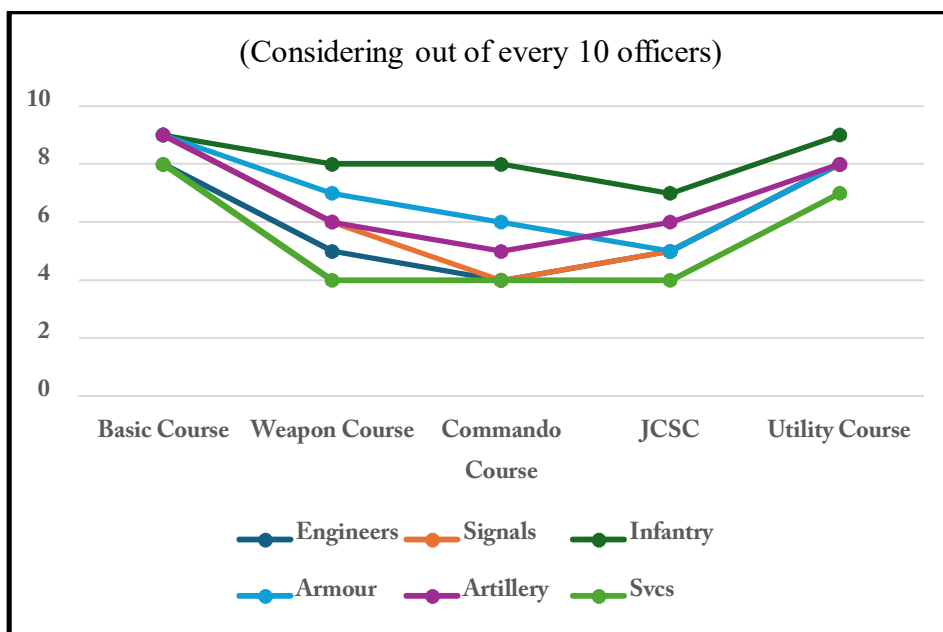
Table-1: Categories of Grading Consciousness

Serial	Indicators of Grading Consciousness	Presence of Indicators		
		Excessive Grading Consciousness	Limited Grading Consciousness	Not Conscious about Grades
1.	Unsatisfactory Peer Review	√	X	X
2.	Show Off Tendency	√	X	X
3.	Irrational Behaviour	√	X	X
4.	Conformism	√	√	X
5.	Stress and Anxiety	√	√	X
6.	Highly Competitive Attitude	√	X	X
7.	Use of PCK	√	√	X

Source: Researcher's Own Construct Based on FGD and Interview

c. **Grading Consciousness Graph:** The expectation of grades among JO differs from corps to corps. For example, maximum officers of the Infantry expect a B+ grade in all the mandatory courses. In contrast, many Engineers, Signals, and Services Corps officers often do not worry about a B+ grade in the weapon, commando, and Junior Command and Staff courses.

Chart-2: Corps wise Grading Consciousness Graph

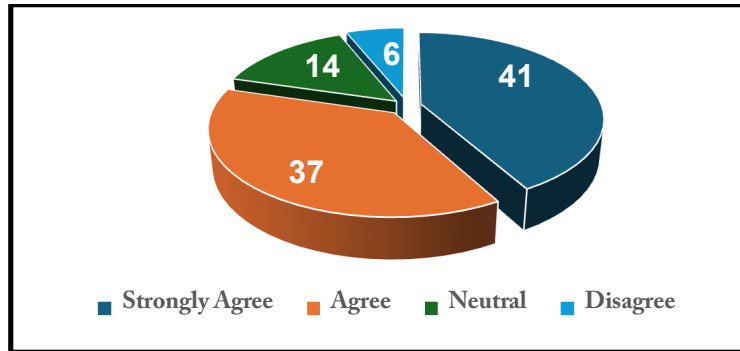


Source: Researcher’s Own Construct Based on FGD and Interview

Causes of Grading Consciousness Related to Individual Psychology

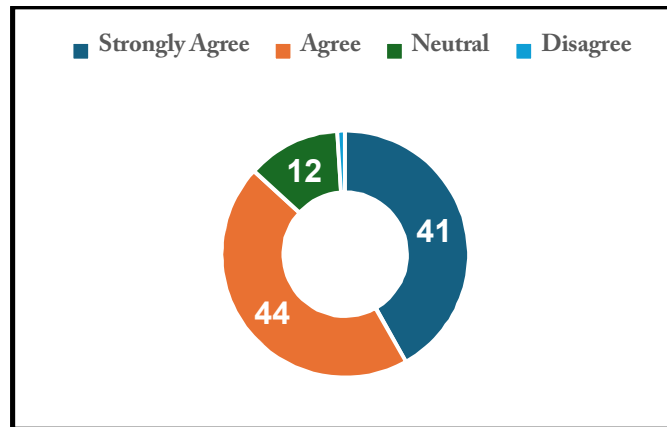
Individual desires and aspirations are often the root cause of grading consciousness.¹⁰ There are also causes related to organisational limitations.

a. **Public Education Culture:** Bangladeshi public education culture often emphasises the achieved grade or GPA, which can naturally make students more grading-conscious.¹¹ This psychology from early childhood does not disappear quickly from the mind of JO. Once they undergo military courses, aspiration for good grades remains among them, and they display grading consciousness.¹² The survey shows that according to 78% participants, the public education culture of BD is a cause of grading consciousness.¹³

Chart-3: Public Education Culture as a Cause of Grading Consciousness

Source: Researcher's Own Construct Based on Survey

b. **Aspiration for Individual Glory:** The sense of individual glorification in military courses can make students grading-conscious because they see their grades as a reflection of their success and worth.¹⁴ For example, for obtaining three A (alpha) grades in army-level courses, officers are awarded "Sena Parodorshita Padak". Many JOs consider this a sign of individual glory and become desperate for higher grades. 85% of officers in the survey opined that a sense of individual glory is a cause for grading consciousness.

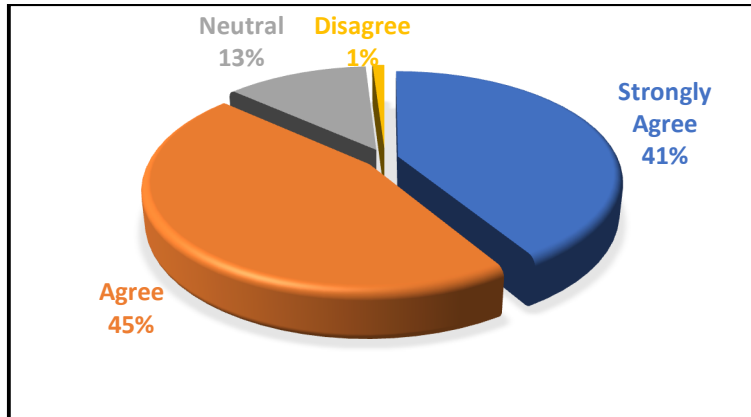
Chart-4: Individual Glorification as a Cause of Grading Consciousness

Source: Researcher's Own Construct Based on Survey

d. **Fear of Low Self-Esteem:** It is a common practice in BA that JO are often asked about their course results, especially their grades, and JO are often judged by their grades.¹⁵ Thus, the fear of low self-esteem can drive JO to be grade-conscious because they believe that their worth as individuals is

directly tied to their course performance.¹⁶ Students may worry that receiving low grades could lead to feelings of inadequacy, embarrassment, or disappointment, which could in turn negatively impact their self-esteem.¹⁷

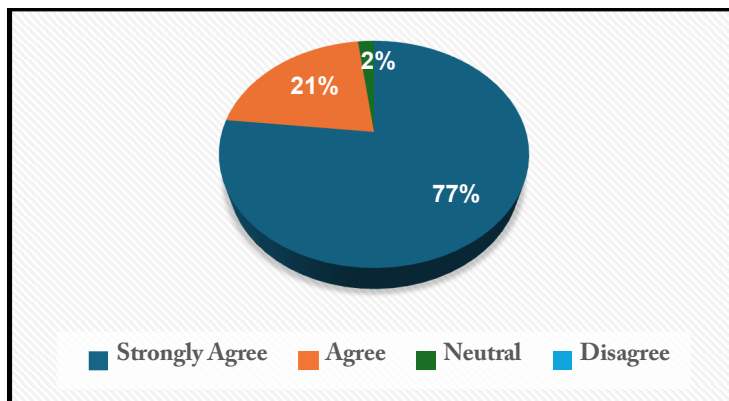
Chart-5: Fear of Low Self-Esteem as a Cause of Grading Consciousness



Source: Researcher's Own Construct Based on Survey

e. **Impact of Grades on Career/ TRACE:** Maximum JO perceive grades as the sole determinant of success, and they become excessively grade-conscious because they believe that their entire future hinges on their course performance.¹⁸ The TRACE contains a weightage of 30 out of 100 for performance in the courses. However, it is calculated only based on the percentage achieved, not the grade. Even though JO are focused on the grade itself, not the percentage achieved, due to a lack of knowledge of TRACE.

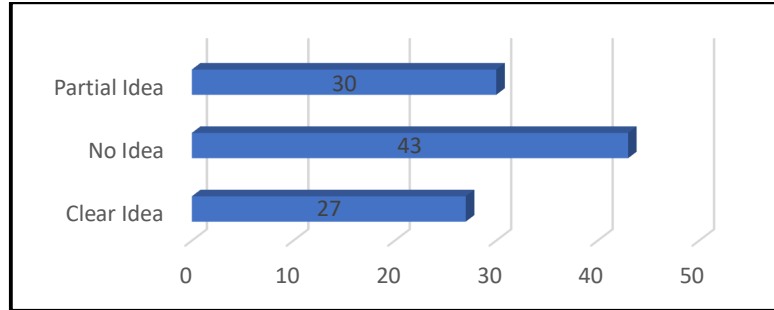
Chart-6: Impact of Grades on TRACE as a Cause of Grading Consciousness



Source: Researcher's Own Construct Based on Survey

However, only 27% of officers in the survey thought that JO had a clear idea about the impact of course grading on their careers.

Chart-7: JOs' Idea about the Impact of Course Grading on their Career

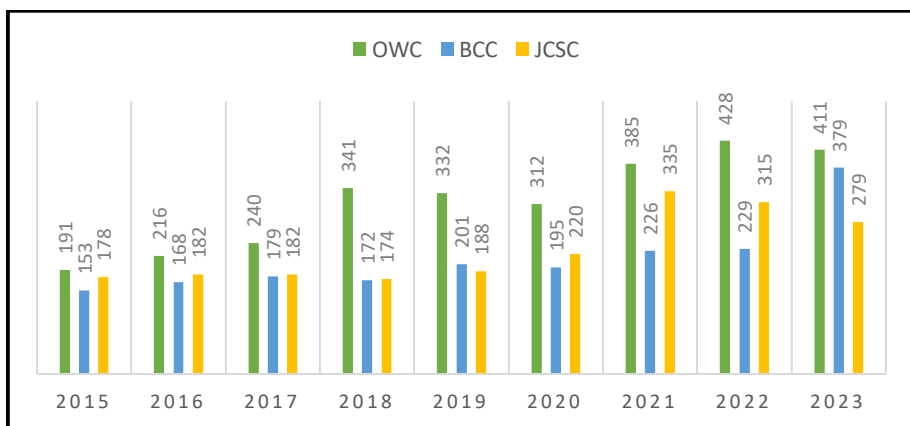


Source: Researcher's Own Construct Based on Survey

Causes of Grading Consciousness Related to Organisational Culture and Limitations of the Training Institutions

a. **Limitations of the Training Institutions:** Proper assessment is not always possible with increased student officers in military courses and decreased course duration.¹⁹ Evaluating the students on every aspect of CD is very difficult due to the absence of a formative assessment system.²⁰ The training institutions rely on written examination marks to evaluate the officers.²¹ The recent state collected from SI&T shows a steep rise in participants in the last few years.

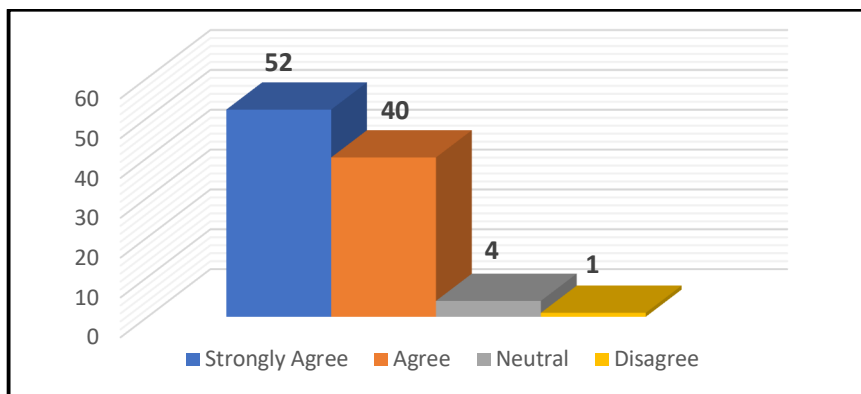
Chart-8: Course Strength of Courses Conducted at SI&T in Recent Years



Source: SI&T Tactics Wing, Weapon Wing and Special Warfare Wing

b. **High Expectations from Commanding Officers:** High expectations from the Commanding Officers can significantly contribute to a JO's grading consciousness.²² When JO feel pressure to meet or exceed these expectations, they may become hyper-focused on their grades as a measure of success and approval.²³ According to 92% of officers, high expectations from the Commanding Officers are a prime cause of grading consciousness.

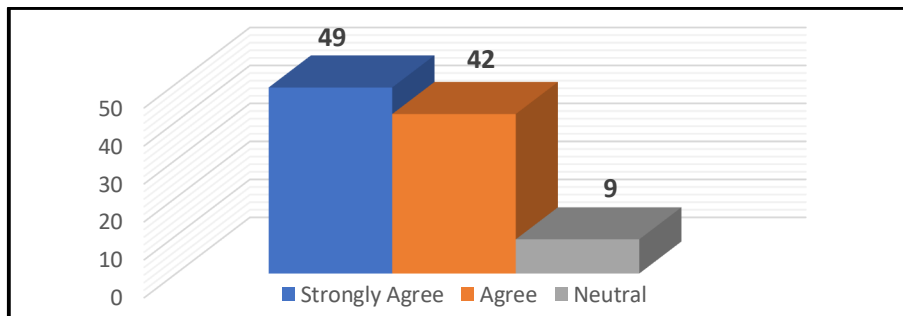
Chart-9: High Expectations from Commanding Officers as a Cause of Grading Consciousness



Source: Researcher's Own Construct Based on Survey

c. **Good Posting and Foreign Assignments:** When JO see their coursemates being rewarded with materialistic benefits, such as good posting or foreign courses, for doing well in courses, it can create a competitive environment that increases grade-consciousness.²⁴ Witnessing others receive tangible rewards for course achievement can motivate JO to strive for similar recognition. They may perceive high grades not only as a measure of personal success but also as a pathway to receiving desirable rewards.²⁵

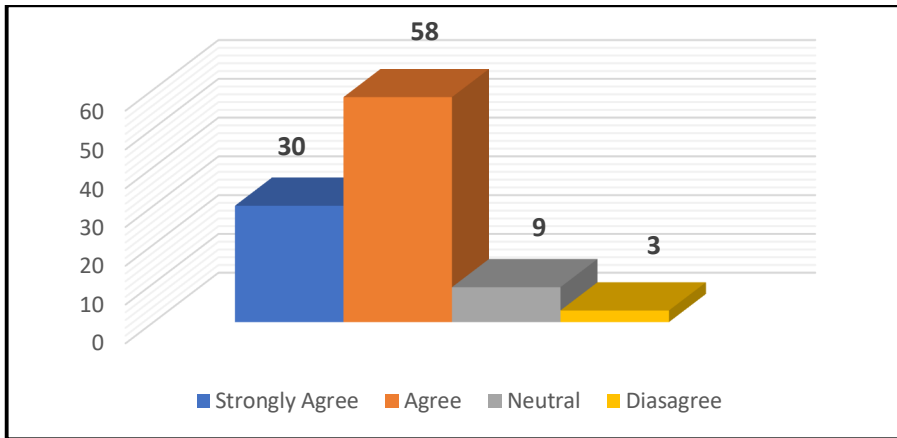
Chart-10: Good Posting and Foreign Assignments as a Cause of Grading Consciousness



Source: Researcher's Own Construct Based on Survey

d. **Reflection of Course Grading in OPR (Halo Effect):** JO nowadays think that Commanding Officers are biased towards officers with good grades when initiating the OPR.²⁶ Thus, JO emphasise more on achieving good grades in courses rather than being involved more in unit affairs.²⁷ Moreover, they think that JO who work hard on the ground but fail to achieve good grades in courses are marked less in the OPR than the officers who achieved good grades in the OPR.²⁸

Chart-11: Halo Effect of Course Grading on OPR as a Cause of Grading Consciousness



Source: Researcher’s Own Construct Based on Survey

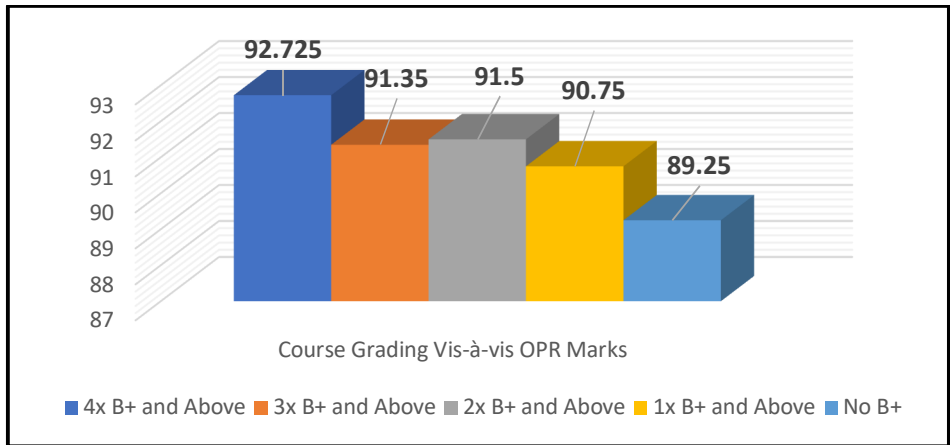
The study on the OPR marks of 30 officers, 6 from each category, shows that officers with good course grading get good OPR.

Table-2: Course Grading Vis-à-vis OPR marks

Results	B+ and above results in 4 military courses	B+ and above results in 3 military courses	B+ and above results in 2 military courses	B+ and above results in 1 military courses	Officers with no B+ results in military courses
Average OPR	92.725	91.35	91.50	90.75	89.25

Source: Researcher’s Own Construct Based on Information Collected from Individual Officers

Chart-12: Course Grading Vis-à-vis OPR marks



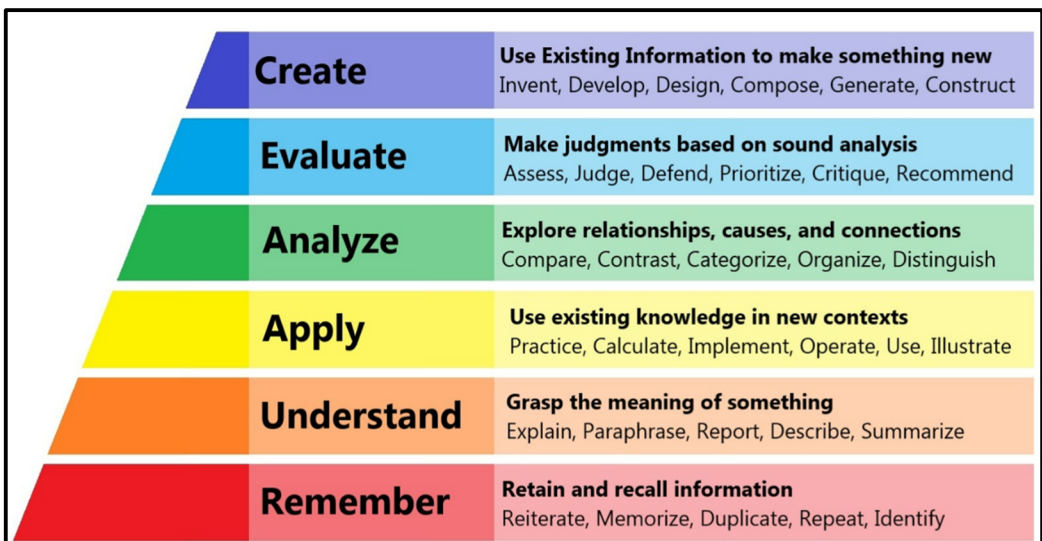
Source: Researcher’s Own Construct Based on Information Collected from Individual Officers

Effects of Grading Consciousness on the Cognitive Development of Junior Officers

Prime Cognitive Skills

Critical Thinking, Problem-Solving, Creativity, Communication, Collaboration, Metacognition, Memory, and Understanding are the prime cognitive skills an officer needs to master through the military courses.

Figure-2: Bloom's Taxonomy of the Cognitive Domain



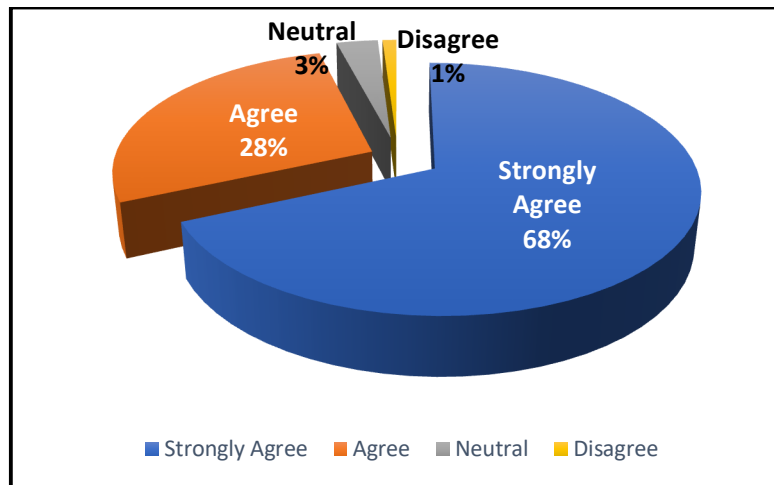
Source: <https://eclass.yorku.ca>

Effects of Grading Consciousness on Cognitive Development of JO

The impacts of Grading Consciousness on the cognitive development of JO are appended below:

- a. **Problem-Solving Skill:** Grading Consciousness can discourage students from thinking creatively and developing novel solutions. They might be less likely to experiment or try new approaches for fear of getting a bad grade for an "incorrect" answer, even if it is part of the creative process.²⁹ When prioritising grades, students might be more concerned with getting the "right" answer than the critical thinking and exploration process needed for effective problem-solving.

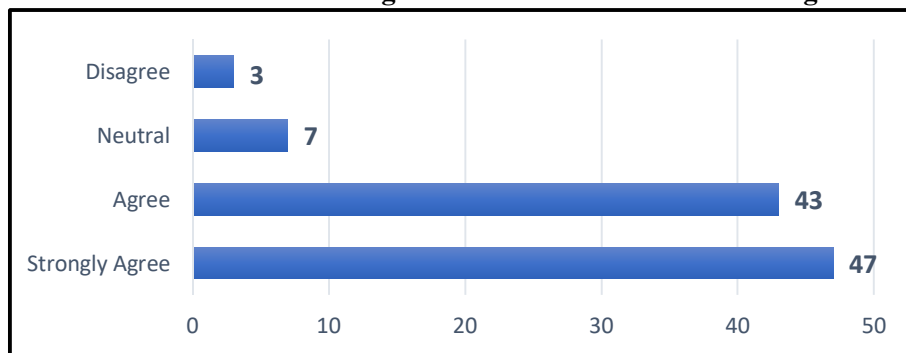
Chart-13: Effect of Grading Consciousness on CD: Problem Solving Skill



Source: Researcher's Own Construct Based on Survey

- b. **Reasoning Skill:** When prioritising grades, students might focus on getting full marks rather than exploring different possibilities and reasoning through problems.³⁰ This limits their ability to analyse situations, weigh evidence, and develop logical arguments. Focusing on grades can reduce reasoning skills, which is essential for exploring new approaches and finding innovative solutions.³¹ Students might be less likely to think outside the box or come up with creative solutions if they are worried about getting a bad grade for an unconventional answer.

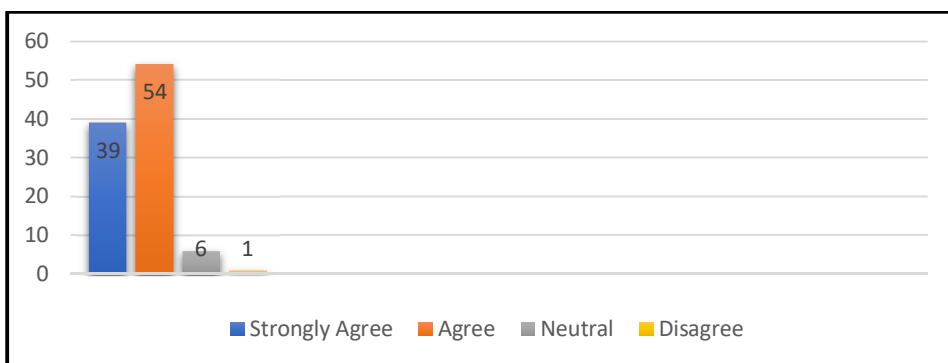
Chart-14: Effect of Grading Consciousness on CD: Reasoning Skill



Source: Researcher’s Own Construct Based on Survey

c. **Creativity and Ingenuity:** Memorisation-focused learning discourages ingenuity, creativity and exploration.³² Students are less likely to think outside the box or make connections between different ideas. The fear of bad grades can discourage students from taking risks, experimenting with different approaches, or tackling challenging problems.³³

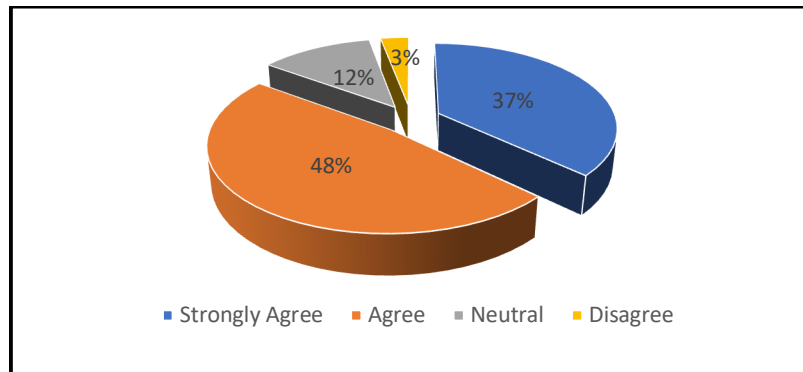
Chart-15: Effect of Grading Consciousness on CD: Creativity and Ingenuity



Source: Researcher’s Own Construct Based on Survey

d. **Critical Thinking Ability:** Critical thinking requires building knowledge over time and connecting ideas and is hampered for a focus on immediate results. There is little emphasis on analysing, questioning, or critically evaluating information, which inhibits critical thinking. Out of grading consciousness, JO prioritise getting good grades over genuine learning, which can hinder critical thinking ability. When students are overly concerned with grades, the emphasis shifts from the learning process to the outcome (the grade itself).

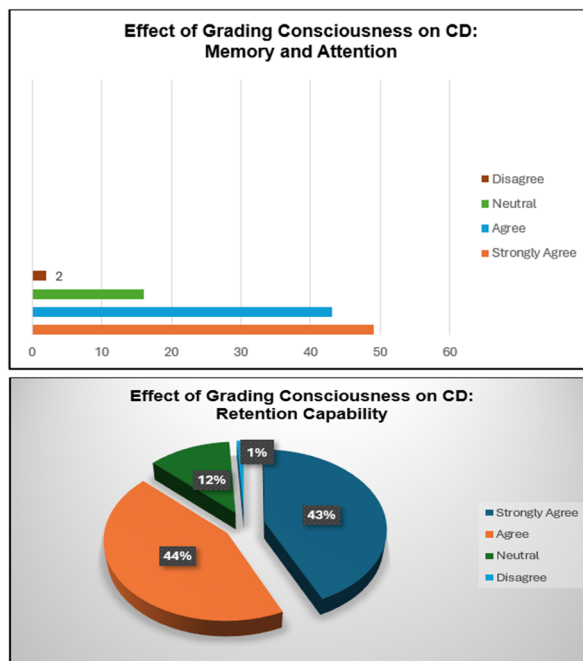
Chart-16: Effect of Grading Consciousness on CD: Critical Thinking Ability



Source: Researcher’s Own Construct Based on Survey

e. **Memory and Attention:** Facts are memorised in isolation, without context or connection to other subjects, for the sake of writing in the exams.³⁴ This makes it difficult to see the bigger picture and how different areas of knowledge relate. Thereby, the memory is short-lived and fades after the exams.³⁵ Though the JO memorise the answers for examinations, they fail to cement their learning, causing cognitive development to be absent.

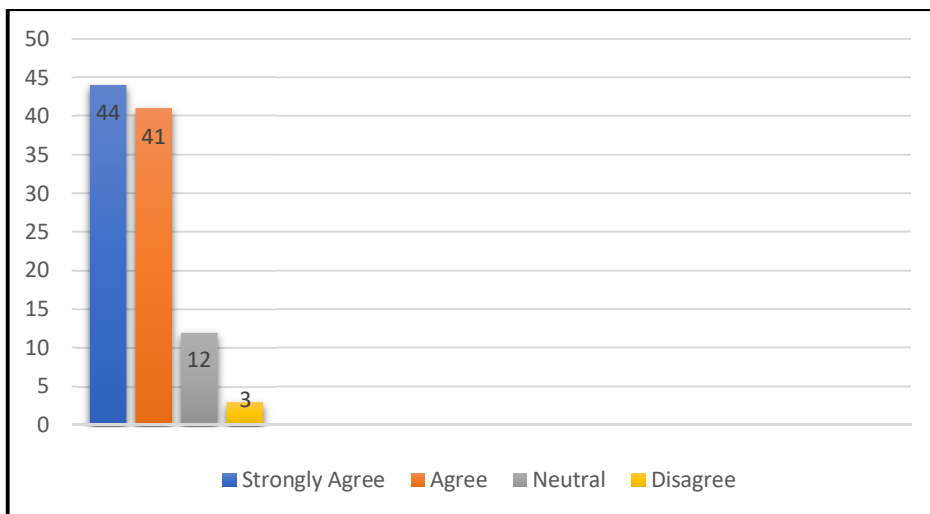
Chart-17: Effect of Grading Consciousness on CD: Attention and Retention



Source: Researcher’s Own Construct Based on Survey

f. **Understanding:** Officers memorise information just long enough to pass a test but do not develop a deep understanding of the concepts.³⁶ This makes it difficult to apply knowledge to new situations or build on it for future learning. Grading Consciousness thus affects the understanding ability of the JO.³⁷ 85% of officers opined that grading consciousness affects the understanding capability of JO.

Chart-18: Effect of Grading Consciousness on CD: Understanding



Source: Researcher's Own Construct Based on Survey

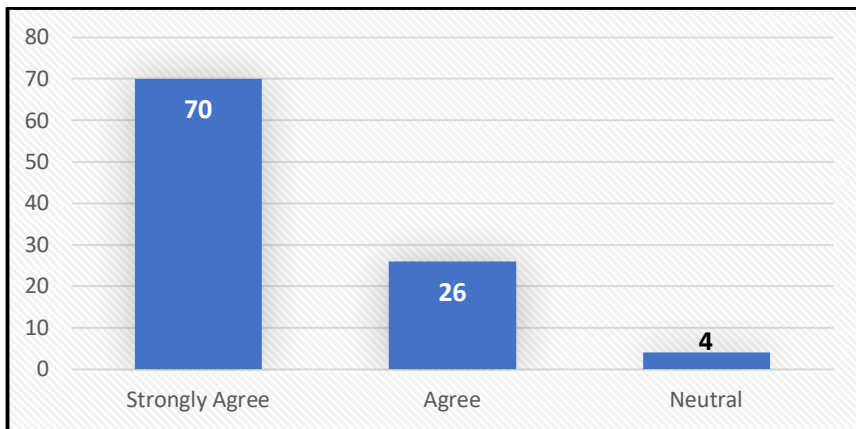
Ways Forward to Enhance the Cognitive Development of JO by Eradicating Grading Consciousness

This section will initially discuss the measures to eradicate the grading consciousness among the JO. Subsequently, a few approaches to enhance the CD of the JO will be highlighted.

Remedial Measures to Eradicate Grading Consciousness among Junior Officers

a. **Reduction of Objective Assessment:** Assessment of JO based only on the marks obtained in the written examination makes them biased towards grades, and they do not pursue individual development aspects.³⁸ Training institutions should utilise formative assessments that provide feedback and opportunities for improvement rather than just summative assessments that solely measure final grades.³⁹

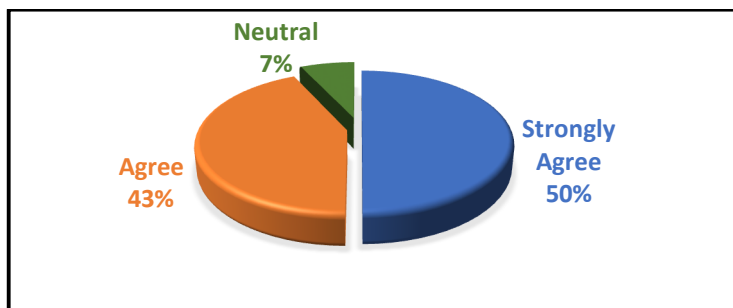
Chart-19: Reduction of Objective Assessment as a measure to Eradicate Grading Consciousness



Source: Researcher's Own Construct Based on Survey

b. **Educating Junior Officers about the Impact of Grades on Career Progression:** Nowadays, the JO possess a shallow idea about their career progression and the implications of TRACE.⁴⁰ Though course performance is important in the TRACE, it is comprised of a very small portion.⁴¹ Nevertheless, many JO perceive course grading as the prime determiner of their career, which is not. Formation headquarters should arrange study periods on TRACE and the career prospects of JO.

Chart-20: Measures to Eradicate Grading Consciousness: Educating JO on the Effect of Grades on Career Progression

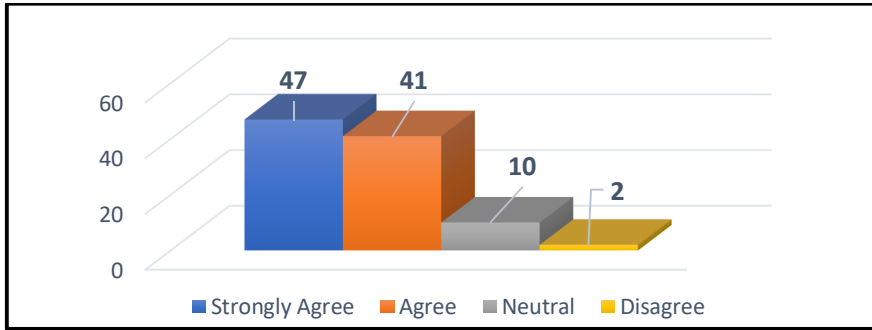


Source: Researcher's Own Construct Based on Survey

c. **Modification of Course Report:** In the existing BA course reports, the grade achieved is the priority. The course report does not assess and highlight many important aspects of the CD.⁴² Formative assessments to provide ongoing

feedback without the pressure of final grades need consideration.⁴³ Emphasising effort, strategies, and progress rather than just grades encourage a growth mindset, fostering a positive attitude toward learning and cognitive challenges.⁴⁴

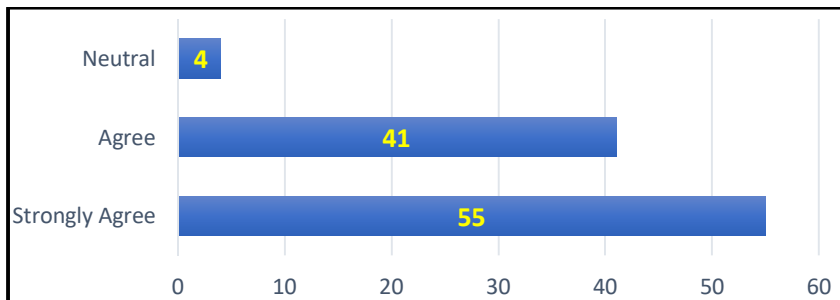
Chart-21: Emphasis on Percentage instead of Grade to Eradicate Grading Consciousness



Source: Researcher's Own Construct Based on Survey

d. **Avoidance of Halo Effect of Grades while Writing OPR:** The Halo Effect refers to a cognitive bias where an observer's overall impression of a person, often based on a single characteristic, influences their perception of other attributes of that person.⁴⁵ In the context of COs writing Officers' Performance Reports (OPR) of officers, the Halo Effect can significantly impact the accuracy and fairness of these evaluations. Many COs often take the course grading of an officer into cognisance while writing the OPR and might overlook areas where the officer did well.⁴⁶ COs may use standardised criteria and rating scales for evaluations, which will help ensure that all aspects of performance are considered.

Chart-22: Getting Rid of the Halo Effect of Grades on OPR as a Measure to Eradicate Grading Consciousness

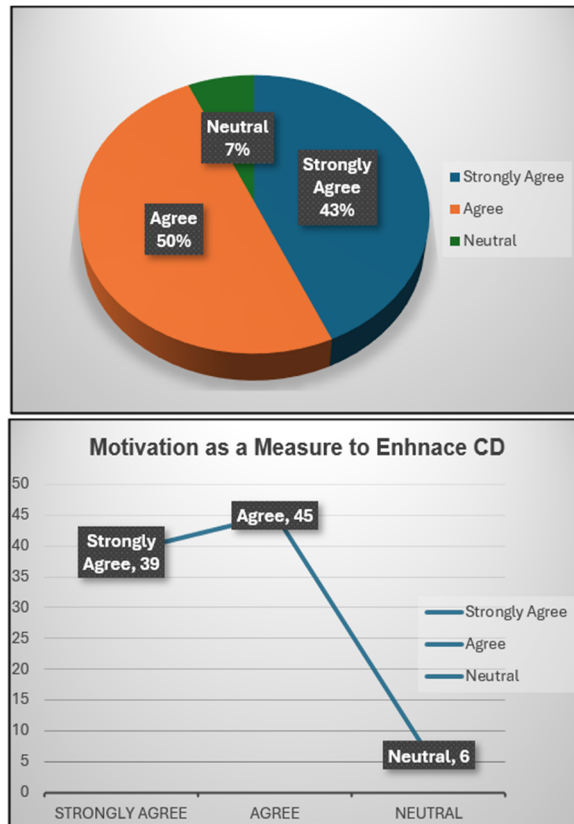


Source: Researcher's Own Construct Based on Survey

Measures to Enhance Cognitive Development of Junior Officers

a. **Emphasis more on the CD of the Officers, not the Grades:** By shifting the focus from only grades to a love of learning and growth, instructors and COs can help students develop resilience, embrace mistakes as learning opportunities, and move away from a zero-error mentality.⁴⁷ JO should understand the reasons behind concepts and facts, not just memorise them. Learning should be a continuous process where students build upon their understanding over time.⁴⁸ Moving away from a purely "materialistic" approach and fostering a deeper understanding, units can create a learning environment that promotes cognitive growth and a lifelong love of learning.⁴⁹

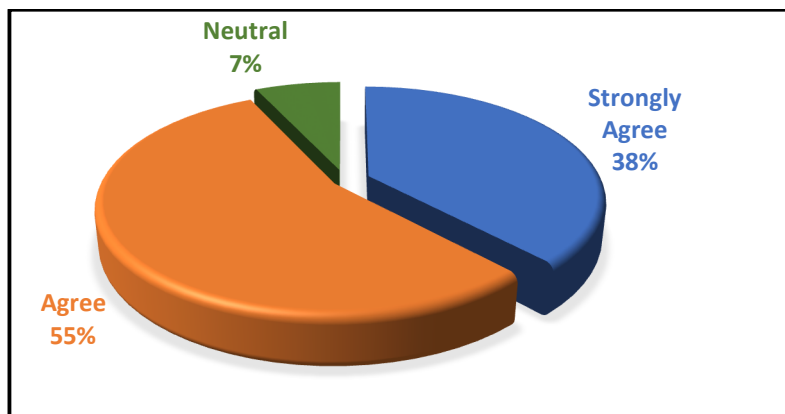
Chart-23: Emphasis on CD by the COs and Motivation as a Measure to Eradicate Grading Consciousness



Source: Researcher's Own Construct Based on Survey

b. **Emphasis to be given on Practical Aspects of Learning:** Practical-oriented training can significantly enhance the cognitive development of trainee officers by engaging them in real-life scenarios, which improves critical thinking, problem-solving, decision-making, and adaptability.⁵⁰ Moreover, practical training encourages active participation, where JO engage directly with tasks, scenarios, or problems. This active involvement stimulates deeper cognitive processing, leading to better retention and understanding of the concepts.⁵¹ Practical training often involves unpredictable elements, requiring JO to adapt to new information or changing circumstances.

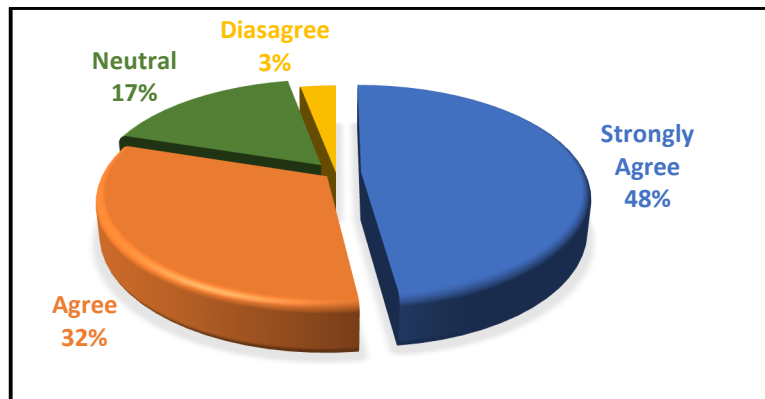
Chart-24: Emphasising Practical Aspects of Training to Reduce Grading Consciousness



Source: Researcher's Own Construct Based on Survey

c. **Reviewing Materialistic Benefits for Achieving Good Grades:** When material rewards such as foreign courses, medals or monetary benefits become the primary motivation for achieving good course grading, JO focuses more on the reward than the learning process itself.⁵² Military Training Directorate record shows that 1394 officers participated in foreign courses in 73 countries from 2017 to 2023. The Military Secretaries branch nominates these officers based on their TRACE and mostly previous course results. These courses often change the motivation from self-development to determination for foreign courses.⁵³ When material rewards are removed, individuals are more likely to explore different approaches to problems and think outside the box.

Chart-25: Discontinuing Materialistic Benefits to Reduce Grading Consciousness



Source: Researcher's Own Construct Based on Survey

d. **Emphasising the Professional Reading List of BA:** BA Professional Reading List was circulated in 2023 to develop and continue the reading habits of the JO. However, most BA officers are unaware of such a list, and no visible approach has been seen to implement the professional reading list.⁵⁴ Incorporation of reading into training programs, reading assignments and reports, book reviews, or presentations can also be encouraged, where officers can discuss what they have learned, which can help to instil the reading habit among JO.⁵⁵ Moreover, Incentives and recognition, leadership Involvement, and Integration of books into Operational Practices can inspire JO to read more books and enhance their CD. The progress of feedback books read by individual officers may be tracked by recording it in a feedback form by the CO.

e. **Incorporation of Cognitive Skill Assessment System in the Training Institutions of BA:** Cognitive skill assessment tools are widely used worldwide in military and civilian training institutions to evaluate and enhance cognitive abilities, such as problem-solving, decision-making, critical thinking, and adaptability.⁵⁶ BA can review some tools to assess JO's cognitive skills. For instance, Task Load Index Method (TLX) is widely used in various military and civilian institutions to assess cognitive load during tasks. It measures perceived workload across six dimensions: mental demand, physical demand, temporal demand, performance, effort, and frustration.⁵⁷ Other than this, Dual-Task Performance Tests, Complex Problem-Solving (CPS) Tasks, Military Situational Judgment Tests, Structured Behavioral Interviews, and Cognitive Task Analysis (CTA) are a few of the methods used

in both military and educational institutions, which require individuals to solve complex, dynamic problems, often within simulated environments.⁵⁸

Assessment and feedback systems of various countries were studied, and the findings are as follows:

Table-3: Assessment, Feedback System and Contents of Course Report of Various Countries

Serial	Type of Feedback/ Assessment in the Course Report	India	Sri Lanka	Kuwait	USA	Nigeria	BD
1.	Percentage	Yes	Yes	No	Yes	No	Yes
2.	Grading	Yes	Yes	No	No	Yes	Yes
3.	Qualified/Unqualified	Yes	Yes	Yes	Yes	Yes	No
4.	Cognitive Skill	No	No	Yes	Yes	Yes	No
5.	Recommendations	Yes	Yes	No	No	Yes	Yes

Source: Course Report of Different Countries

Table-4: Organisational Good Practices in Different Countries

Serial	Country	Good Practices	Remarks
1.	India	No indication about position or grade is given during the course	
		Examination scripts are shown at the end of the course to avoid bias	
2.	USA	Practical heavy courses and realistic	
		Nobody asks or discusses the course result/grading	
		Officers can express their ideas without any fear of humiliation	
		Growth mindset	
		Pride taken for service to the country, not for grade	
3.	Kuwait	Every officer completing a course becomes eligible to serve as instructor of that course	
		No course grading or percentage; only qualified or Unqualified	
4.	Nigeria	Course results or grading are considered personal matters; nobody discusses it	
5.	Sri Lanka	Fear free environment	

Source: Researcher's Construct Based on Interview with OCPs of DSCSC

Conclusions

The professional competence of JO is instrumental to an army's mission performance and organisational growth. Competence depends on knowledge, application of knowledge and CD. Due to various reasons, the CD of JO is hindered, and grading consciousness is one of them. Grading consciousness is a barrier to effective learning and a retarder of the CD. The diverse challenges of modern warfare warrant JO to be creative, reasonable, and innovative, which are the components of the cognitive domain. Enhancing the CD of JO is impossible without reducing the psyche for grading in military courses. The organisational culture within BA, limitations in the training institutions, and individual psychology all contribute to this issue. Moreover, officers often lack a clear understanding of career progression and the impact of their grading on future opportunities, which exacerbates their focus on grades.

Grading consciousness has several detrimental effects on the cognitive development of JO. It fosters a culture of materialistic learning, where officers memorise information solely for exams, leading to poor retention and understanding. This mentality discourages critical thinking, creativity, and problem-solving skills, all essential for effective military leadership. The research identifies a significant correlation between grading consciousness and a decline in these cognitive abilities, confirming the negative impact of the current grading system on the professional growth of JO.

The researcher suggested a few feasible measures based on interviews, surveys and FGDs to reduce grading consciousness among JO. Modifying organisational culture, formative assessment of cognitive skills, reviewing the existing course report format, initiating a post-course evaluation report, etc., will effectively enhance the CD of JO. A few measures, such as emphasising practical aspects of learning, reducing micro-management, implementing the professional reading list of BA, and developing a growth mindset, will enhance the CD of JO. A systematic method of evaluating the CD of JO needs to be designed and implemented in the BA training institutions.

Recommendations

Based on the findings of the research, the following recommendations are made:

AHQ, MS Br, may direct the formation headquarters to conduct study periods on a half-yearly basis to educate officers on career planning parameters and the impact of course grading on the TRACE, taking guidance from MS Branch. These study periods need to start in July 2026.

AHQ, GS Branch, MT Directorate may conduct a feasibility study by July 2026 on modification of the existing BA course reports where only the achieved percentage

Grading Consciousness vis-à-vis Cognitive...

may be highlighted, and feedback on cognitive skills may be incorporated. The study may involve the HQ ARTDOC, AHQ, GS Br, Education Directorate, and training institutions. Moreover, a post-course evaluation report may be initiated for every officer by the commanding officers after 3 months of returning from any course. A draft course report format is suggested here.

CONFIDENTIAL				
<u>COURSE REPORT</u>				
Number: BA xxxx		Rank:	Name:	
Arms/Services:		Course:	Duration:	
Rating Scale	Professional Competence		Assessment of Cognitive Skills	
	Attributes	Rating	Skills	Rating
1 <i>Exceptional</i>	Attendance and Motivation		Reasoning Skill	
2 <i>Excellent</i>	Knowledge		Creativity and Ingenuity	
3 <i>Very Good</i>	Oral Expression		Analysing Ability	
4 <i>Good</i>	Writing Skill		Critical Thinking	
5 <i>Satisfactory</i>	Practical Application		Problem-Solving	
6 <i>Average</i>			Memory and understanding	
Performance in the Class				
Ability to Grasp Instruction				
Participation in Class Activities				
Potential as Instructor				
Attendance, punctuality and discipline				
Remarks on Academic Performance				
Marks Obtained				
Recommendations (Only for Military Secretary's Branch):				
Staff				
Instructor				
RUSSEL CROW Lieutenant Colonel Officer in Charge		ANGELO MATHEWS Colonel Chief Instructor		CHRISTIAN BALE Major General Commandant
CONFIDENTIAL				

To record JO's yearly performance, an activity assessment report for major tasks they complete with may be maintained at the unit level. Commanding Officers must be advised at the Command Conference of the Formation Commander to avoid the Halo Effect of course grading while writing the OPR. This should start by January 2026.

AHQ, GS Branch, Military Training Directorate may conduct another study by December 2025 on the effective assessment method of the JO' cognitive skills within the existing military training curriculum. The study may also involve the HQ ARTDOC and all the BA training institutions.

*** Notes:

1. The paper should provide Objectives (after the introductory section)
2. Before the Conclusion, there should be a section called 'Findins'

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22. Brigadier General Md Humayun Kabir, Director Military Training Directorate, Interviewed on 25 June 2024 by the author.
23. Brigadier General Syeed Ahmed, Commandant ECSME, Interviewed on 26 June 2024 by the author.

24. Brigadier General S M Zakaria Hussain, Commander 14 Independent Engineer Brigade, Interviewed on 24 June 2024 by the author.
25. Commander Zahid Hossain, Principal Navy Anchorage School and College, Dhaka, Interviewed on 29 June 2024 by the author.
26. Lieutenant Colonel Gazi Abdullah-Al- Razi, Commanding Officer, 21 Engineer Battalion, Interviewed on 06 July 2024 by the author.
27. Col Abdul Aziz Al Awadhi (Kuwait Army), Maj Nivanka (Sri- Lankan Army) and Lieutenant Colonel Martin Ozbolt (German Army), Overseas Course Participants of DSCSC-2024.

Focused Group Discussions

28. FGD-1, Officers of 14 Independent Engineer Brigade, 2024.
 29. FGD-2, FGD-2, Student Officers of JCSC-74, SI&T, 2024.
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1. Brigadier General Md Humayun Kabir, Director Military Training Directorate, Interview on 25 June 2024 by the author.
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Brief Biography



Major Md Ahteshamul Haque Niaz, psc, Engineers, was born on 16 October 1993 in Mymensingh. He passed both the Secondary School Certificate and Higher Secondary Certificate examinations from Mirzapur Cadet College. He was commissioned from Bangladesh Military Academy (BMA) with 69 BMA Long Course in the Corps of Engineers on 24 December 2012. He has diverse experience serving in units, as staff, and as an instructor. He served in the 8 and 21 Engineer Battalion in different regimental appointments.

As an instructor, he served as Instructor Class ‘C’ at the Engineer Centre and School of Military Engineering. He has also served as an Explosive Ordnance Disposal Officer in Operation Kuwait Punorgothon-2. He graduated from the Defence Services Command and Staff College with DSCSC-2024. He is married to Lieutenant Commander Homira Asima Prapty and is blessed with a daughter, Nusaifa Yazrin Amayrah. His hobbies include sports, reading books, and travelling.