KDU Journal of Multidisciplinary Studies (KJMS)
Volume 6. Issue 2 Nov 2024
DOI: https://doi.org/10.4038/kjms.v6i2.132

KJMS 2024 VOL.6 (2): 88-98

UNMANNED AERIAL SYSTEMS IN SRI LANKA: AN OPERATIONAL FRAMEWORK FOR LAND-BASED AIR OPERATIONS

MADCK Wijetunge

Defence Services Command & Staff College, Sapugaskanda, Sri Lanka,

ABSTRACT

The Nagorno-Karabakh war in 2020 demonstrated the unprecedented paradigm shift in aerial warfare, with the Azerbaijan military successfully employing attack Unmanned Aerial Systems (UAS), commonly known as drones, to destroy enemy troops and defence systems. This study underscored the importance of comprehending and keeping up with the evolving trends of drone operations in the security realm. The study addressed the knowledge gap by providing valuable insights into defining an operational framework and integrated approach for drone operations in Sri Lanka. It emphasized the importance of aligning drone utilization with a defined operational framework to achieve favourable outcomes in military engagements. The conceptual framework is based on the review of theoretical studies. Besides, the study established a statistical association between the integrated approach and the employment of drones in the security realm, highlighting the significance of collaboration between different state agencies and the military. The study resorted to mixed-method research while conforming to a survey strategy. Primary data was collected through questionnaires and interviews, while secondary data was collected from literature and doctrines. The study explored that the operational framework must be based on purpose, time, space, and resources in the land and maritime domains. Further, centralised command and integrated operational environment must be established while enhancing collaboration in research and development projects to advance the drone industry in the country.

KEYWORDS: *Unmanned Aerial Systems (UAS), Drone, Operational Framework, Integrated Approach, Centralised Command*

Corresponding Author: MADCK Wijetunge, Email:chamarawijethunga@gmail.com

https://orcid.org/0009-0008-6995-7456.

1. INTRODUCTION

In the new millennium, formidable militaries vigorously develop drone technology and enhance their arsenals. Simultaneously, multinational corporations also utilize drones for multiple purposes, aiming to lower human involvement (Priyamal, 2022). Therefore, Sri Lanka needs to gain insights and keep pace with these evolving trends to progress alongside the contemporary world. It is noteworthy to write that in the post-conflict era, limited attention has been given to enhancing the country's military capabilities. Drones have no exemption, either. Therefore, it is imperative to comprehend and study the applicability and significance of drone operations in current and future warfare. This understanding will enable the necessary reforms in the country's force structures to align them with the evolving trends in drone technology. Besides, using drones in the maritime domain would provide a solid basis for addressing existing gaps, such as reach and required capabilities.

Background of the Study

The Nagorno-Karabakh War in 2020 symbolised an unprecedented paradigm shift in aerial warfare. Azerbaijan successfully gained complete control of the skies against Armenia within the six-week war, utilizing attack drones at a relatively low cost. Hunting and eliminating ground troops has become easier than ever before, and it is, too, at a significantly lower economy of effort (Detsch, 2021).

Figure 1. Azerbaijan drones attacking Armenian tanks Source: EurasiaNet (2020)

Further, the widespread use of drones has facilitated targeting troops hiding inside trenches in mountainous areas (Dixon, 2020). This accessibility of drones has demonstrated their effectiveness in targeting enemy troops, tanks, and air defence systems compared to conventional manned fighters (Ahmad, 2022; Priyamal, 2022).

According to Wijetunge and Wanasinghe (2021; 2023),drones have emerged as a dominant force on the modern battlefield, presenting a glimpse into the future of warfare. Therefore, it becomes imperative to thoroughly examine and articulate the various pathways of drone operations within the context of the Sri Lankan security landscape within the land domain.

Statement of the Problem

Drones have witnessed an unprecedented increase worldwide in the second decade of the new millennium. Wijetunge and Wanasinghe (2021) emphasized the widespread adoption of drones by state and non-state actors due to their cost-effectiveness and relatively simple technology. The Sri Lanka Air Force (SLAF) and Sri Lankan Army (SLA) have also recognized the importance of employing unmanned aerial vehicles (UAVs) in security operations and enhancing its capabilities for future applications. However, researchers learned that collaboration or a unified mechanism currently needs to advance drone operations in the country.

Following the Nagorno-Karabakh War in 2020, notable armies, including the US and Britain, have developed a school of thought regarding drone operations (Priyamal, 2022). Detsch (2021) and Dixon (2020) argued that off-the-shelf air power would undergo significant changes and dominate future battlefields. Therefore, the researcher has concluded that keeping pace with the evolving warfare dynamics is crucial to avoid the predicaments of small militaries in developing economies, which could have detrimental effects on national security. Thus, it is imperative to discover the roles that drones can play in the security realm of Sri Lanka, including the maritime domain. However, this study mainly focuses on land-based air operations.

Despite the increasing prominence of drones in

security, there is an apparent absence of empirical studies exploring the practical application of drone operations in this context. This knowledge gap hinders the development of informed strategies and guidelines for utilizing drones optimally in security operations. Therefore, this study aims to address this gap by laying a foundational basis to explore the determinants of practical drone applications within the security landscape and their empirical associations. By doing so, it seeks to provide valuable insights and contribute to advancing practical and evidence-based approaches to implementing drones in security operations.

Research Questions

What air power roles can drones execute in the country's security operations within the land domain?

How to define an operational framework for drone operations in Sri Lanka's land domain?

What are the empirical associations between the employment of drones in the security realm and operational framework and an integrated approach?

Research Objectives

To explore air power roles that drones can execute in the country's security operations within the land domain.

To define an operational framework for drone operations in Sri Lanka's land domain.

To examine empirical associations between the employment of drones in the security realm and operational framework as well as an integrated approach.

Significance of the Study

This study offers valuable insights into the strategic development of an operational framework for the military utilization of drones in Sri Lanka. Establishing a well-planned, thoroughly forecasted, and efficiently organized mechanism is indispensable in this regard. The findings of this study will guide the implementation of an effective operational mechanism for the development, deployment, and utilization of drones in security operations within the land domain of the country. Researchers learned that no literature has been found concerning the operational framework for drone operations. Therefore, this will certainly add new knowledge to the existing limited literature and will help to bridge the knowledge gap.

Scope of the Study

The study mainly focuses on the application of drones in the security landscape of Sri Lanka. Besides, it involves exploring the roles and potential uses of drones for addressing security challenges in the country that encompasses land-based air operations. Thus, maritime security related air operations have not been discussed deeply. Hence, research has limited the scope to SLA and SLAF as the two principal drone operators in the country's land-based air operations.

2 METHODS

This section presents the methodology that supported the conceptual framework, the population, the sampling technique, the sample size, data analysis tools, etc. Besides, the researcher formulated hypotheses related to the study and subsequently discussed how these hypotheses were tested and data analyzed. The research design of the study was as follows.

***Research Approach*-** The study was based on a deductive approach to test hypotheses and correlations.

***Research Choice*-** The exploratory study employed mixed-method research.

***Research Philosophy*-** The researcher used interpretivism as the study philosophy to interpret the reasons and meanings of the observed phenomenon.
***Research Strategy*-** The study resorted to a survey strategy in view of exploring the views of Subject

Matter Experts (SME) on drone employment in Sri Lanka's security operations in the land domain.

Time Horizon- Cross-sectional time horizon was employed.

Technique and Procedure- Data collection and analysis are the techniques and procedures of the study. Primary data were collected through self-administered questionnaires and expert interviews, while secondary data were collected from previous research, journal articles, news, and web articles, as well as air power doctrines of regional/global Air Forces.

Conceptualisation

The schematically derived conceptual framework has reflected the prospects of the researchers. This study is structured around three research objectives and is designed to align with a deductive approach. Through an extensive review of the literature, a conceptual framework has been developed to guide the identification and testing of research hypotheses as well.

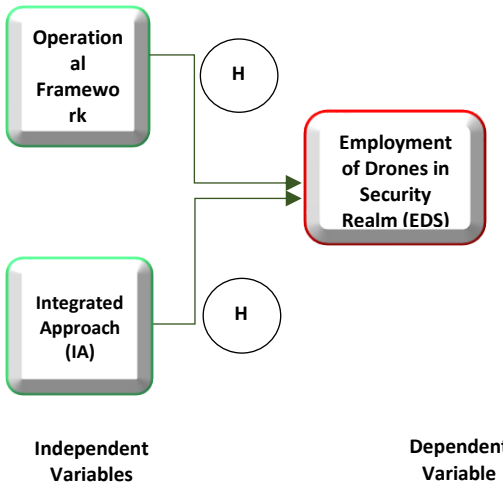


Figure 2: Conceptual framework
Source: Author (2024)

Operational Framework: The operational framework serves as a cognitive tool utilized by Commanders and staff to effectively visualize and articulate the application of combat power in terms of time, space, and purpose, with available resources during operations (US Army Doctrine, 2017; Priyamal, 2022). Successful employment of drones on par with the operational framework resulted in favourable outcomes for Azerbaijan's military in the Nagorno-Karabakh war (Destch, 2021). Thus, researchers explored that operational framework has a significant relationship with the employment of drones in the security realm.

Integrated Approach*:* Land forces rely on joint, inter-agency, and multinational relationships to effectively carry out military activities. The SLAF and Army have acquired small-scale drones to support civil and law enforcement agencies (Joseph, 2021). Priyamal (2022) has concluded that a joint approach to the application of drones in security operations exhibits a positive correlation. Therefore, researchers discovered that a significant relationship prevails between the integrated approach and the employment of drones in the security realm.

Employment of Drones in the Security Realm: The application of air power in three distinct situations categorised as peace, crisis, and war (SLAF Doctrine, 2022; BAF Doctrine, 2014). Land operations in peacetime involve two types of operations such as combat stability and Military Aid to Civil Authority (MACA) (British Army Land Operations, 2010). Consequently, the researchers have identified that the employment of drones should be done following the aforementioned operations.

Hypotheses

Researchers have devised three hypotheses based on the conceptual framework and identified variables.

H_1 : A significant relationship exists between the operational framework and the employment of drones in the security realm.

H_{1_0} : No significant relationship exists between the operational framework and the employment of drones in the security realm.

H_2 : A significant relationship exists between the integrated approach and the employment of drones in the security realm.

H_{2_0} : No significant relationship exists between the integrated approach and the employment of drones in the security realm.

Operationalisation

Table 1: Operationalisation

Variable	Indicator	Measurement
Demographic	Gender Age Service Experience in the Drone field	Nominal scale Ordinal scale Nominal Ordinal scale
Operational framework	Time Space Purpose Resources	Nominal scale Ordinal scale Ordinal scale Ordinal scale
Integrated approach	SLA operators SLAF operators Police State agencies	Ordinal scale Ordinal scale Ordinal scale Ordinal scale
Employment of drones in the security realm	Combat stability Peace support Humanitarian Assistance and Disaster Relief (HADR) MACA	Ordinal scale Ordinal scale Ordinal scale Ordinal scale

Source: Author (2024)

Population

Population of research refers to any group of people or objects that are the subject of study in a particular survey (Sekaran and Bougie, 2016). Researchers identified drone operators of the SLA/SLAF, decision-makers in drone operations, and entities that utilize drone information as the most appropriate individuals to obtain first-hand information about operational engagements. Thus, the population consisted of individuals at the operational and tactical levels concerning drone operations within SLA and SLAF.

Therefore, researchers considered the study population as the sum of five strata: Officers/Soldiers from the 15th Drone Regiment (100), Directorate of Operations (05), Directorate of Military Intelligence (05), Commando Officers from the anti-hijack unit (25), and drone pilots of the SLAF (35) (SLA, 2022; SLAF, 2022). Hence, the total study population (N) is considered to be 170 individuals (100 + 05 + 05 + 25 + 35).

Sampling Technique

A sample is a subset of the population and comprises only a few elements from the entire population. Besides, identifiable subgroups within the population may be expected to have different parameters for a variable of interest (Sekaran & Bougie, 2016). Therefore, the researchers have chosen simple random sampling and stratified sampling techniques.

This involved the process of determining the sample size and stratification and subsequently selecting subjects randomly from each stratum. The stratum was identified as described in the preceding paragraph, namely Drone Regiment Officers/Operators (n_1), Officers from the Directorate of Operations (n_2), Officers from the Directorate of Military Intelligence (n_3), Commando Officers from the anti-hijack unit (n_4), and drone pilots of the SLAF (n_5).

Sample Size

Researchers used the Morgan table to define the sample size from the population (Krejcie & Morgan, 1970). Since the study population size was 170 (N), the sample size (n) was derived as 118 following the Morgan table. Therefore, researchers used the following equation to derive the sizes of strata, respectively n_1, n_2, n_3, n_4, and n_5 (Doane and Seward, 2008).

$$n_i = (n/N)N_i$$

$$\therefore n_1 = (118/170)100 \approx 70$$
$$\therefore n_2 = (118/170)05 \approx 3$$
$$\therefore n_3 = (118/170)05 \approx 3$$
$$\therefore n_4 = (118/170)25 \approx 18$$
$$\therefore n_5 = (118/170)35 \approx 24$$

Data Collection and Analysis- Primary data were collected using a self-administered questionnaire and semi-structured interviews. Researchers extracted expert views from top brasses in regional AFs such as India, Bangladesh, and Pakistan. Doctrines, journal articles, conference proceedings and books were contributed in secondary data. Quantitative data were analysed using SPSS 27, whilst thematic analysis was employed as the tool for the qualitative data analysis. Interview data were coded using the open coding technique where the redundant codes were omitted whilst five themes were derived and presented hereto. Furthermore, the researchers have conducted reliability tests, validity tests, descriptive statistics, bivariate analysis, correlation analysis, and regression analysis concerning the study. The confidence level used for the analyses was 95%, and the precision value was 5%.

3 RESULTS

This section elucidated the findings of the analysis and the results derived from the questionnaires and interviews. Subsequently, hypotheses are tested and discussed, along with the impact of independent variables (IVs) on the dependent variable (DV).

Findings

The researchers collected data from 110 respondents, resulting in a response rate of 93%. The reliability test results indicated a Cronbach's Alpha value of 0.89, suggesting that the results could be generalized up to 89%. The KMO value of 0.657 indicated that the sample size was adequate for conducting a factor analysis and generalizing the results. Furthermore, the skewness values of all variables were within the accepted range of -0.5 to +0.5. Moreover, the normality test results indicated a normal distribution.

Table 2: Reliability statistics

Cronbach's Alpha	N of Items
.780	23

Source: Author (2024)

Demographic data revealed that the majority (58%) of respondents are within the age limit of 30-35 years. Further, more than 64% have engaged in drone operations between 0-5 years. Thus, it was explored that the majority of the sample have considerable experience in drone operations.

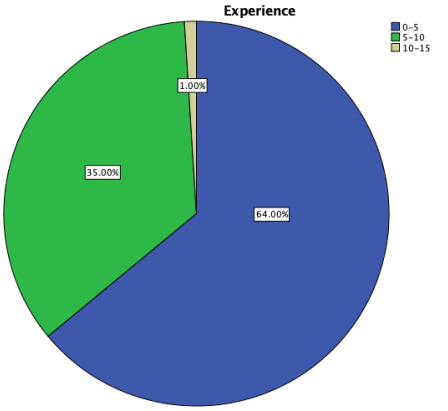


Figure 3. Experience in drone operations
Source: Author (2024)

Table 3: Association Analysis
Source: Author (2024)

		EDS	OF	IA
EDS	Spearman Correlation	1	.588**	.525**
	Sig. (2-tailed)		.000	.000
	N	110	110	110
OF	Spearman Correlation	.588**	1	.317**
	Sig. (2-tailed)	.000		.001
	N	110	110	110
IA	Pearson Correlation	.525**	.317**	1
	Sig. (2-tailed)	.000	.001	
	N	110	110	110

All the IVs exhibited a positive correlation with the DV, with p-values below the significance level of 0.05. It is important to note that in all cases, the Spearman correlation coefficient (r') values ranged from 0.5 to 1, indicating a strong relationship (Richard 1990; Sekaran and Bougie, 2016). Spearman correlation was considered since the study examined associations between ordinal variables (Saunders et al., 2018). Therefore, it is statistically

evident that strong relationships exist between the IVs of OF and IA with the DV of EDS.

The tolerance and Variation Inflation Factor (VIF) values obtained from the multicollinearity test confirmed that there was no risk of multicollinearity, indicating that the data was suitable for conducting multiple regression analysis. The tolerance values were above 0.2, and the VIF values were below 5. Besides, the minimum and maximum values of the standard residual statistic suggested that no outliers were present in the collected data. Furthermore, the ANOVA table indicated that the regression model provided a moderately good fit for the collected data.

Table 4- Collinearity Statistics

Model		Collinearity Statistics	
		Tolerance	VIF
1	OF	.892	1.121
	IA	.779	1.283

a. Dependent Variable: EDS

Source: Author (2024)

Hypotheses Testing

In accordance with the aforementioned correlation analysis, hypotheses testing was done to test the relationships between IVs and DV.

Table 5: Association between IVs and DV

	EDS	OF	IA
Spearman Correlation	1	**.588****	**.525****
Sig. (2-tailed)		.000	.000
N	110	110	110

Source: Author (2024)

H_1 : A significant relationship exists between the operational framework and the employment of drones in the security realm.

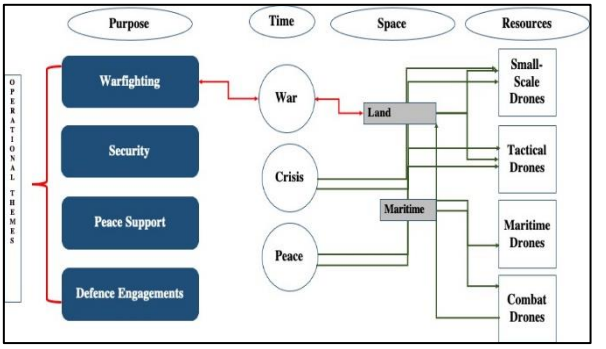
According to the respondents, a strong positive relationship prevails between OF and EDS. Further, the correlation coefficient of 0.588 with a p-value of 0.000 (P<0.05) signified that statistical evidence proved that **H_0 is rejected and H_1 is accepted** at 5% level of significance. Hence, it is implied that there is a positive relationship between the OF and EDS.

H_2 : A significant relationship exists between the integrated approach and the employment of drones in the security realm.

It was found that a strong positive relationship prevails between IA and EDS. Further, the correlation coefficient of 0.525 with a p-value of 0.000 (P<0.05) signified a strong relationship between the two variables. Thus, **H_2 is accepted and H_0 is rejected** at 5% significance level. Hence, it is implied that a positive relationship exists between JAI and EAD.

Interview Results

Operational Framework. SLA is currently operating small-scale drones with limited operational capabilities since 2016 (Priyamal, 2022). However, there is a lack of a specific operational framework for drone operations in the country. Thus, it is necessary to define an operational framework that takes into account aspects such as time, space, purpose, and resources, while providing insights on operational themes, including warfighting, security, peace support, and defence engagements. The future



expansions of SLA drone engagements should be tailored to operate across all operational themes.

Figure 4. Operational framework for drone operations in Sri Lanka Source: Author (2024)

Integrated Approach. Interview results suggested that an integrated approach would be beneficial to boost the research and development of drone programmes according to the national requirement. In this regard, SLA, SLN, and SLAF as well as other agencies such as Police, Customs, Wildlife, Forest Department etc. and universities

must work collectively. Further, establishing an integrated drone research and development center for that purpose would be a better option.

Types of Drone Operations. Drone operations supporting land operations can be done by upgrading existing assets though necessary to acquire new platforms equipped with optimum Infra-Red (IR) and camera sensors to operate in the maritime domain. Drone operations in Sri Lanka mainly can be split into two tiers such as land and maritime operations. However, current capacities and capabilities are insufficient to cater to these demands owing to the non-availability of assets (Wijetunge and Wanasinghe, 2022; Priyamal, 2022).

Centralised Command. SLA operators are still novel to the operational context and necessary to be aware of other considerations that are compulsory for a flight of an aircraft within Sri Lankan airspace. A centralized command post is necessary to log down all the drone requirements of SLA and SLAF as well as other agencies such as the Police, Customs, Wildlife, Forest department, etc. This operations center must be under the operational command of SLAF since airspace management directly comes under the purview of SLAF. Hence, establishing an integrated drone operations monitoring cell that is equipped with an essential communication network is pivotal.

Research and Development.

Research work must be aimed at developing ISR, capabilities and attack drones. Hence, SLAF and SLA collectively need to continue R&D work with respect to developing drones compatible with conducting ISR and attack operations. The main challenges in this regard are developing drone engines, data links, IR optical and highly sensitive cameras and other sensors. Foreign assistance may be necessary to avail given acquiring technical know-how. Wijetunge and Wanasinghe (2022), underscored that air diplomacy can be leveraged to acquire technical know-how from foreign-friendly Air Forces. Therefore, SLAF can employ air diplomacy to advance its R&D capacities through air diplomacy.

Attaining Research Objectives

To explore air power roles that drones can execute in security operations of the country within the land domain. The study found that principal air power roles, such as ISR (Intelligence, Surveillance, and Reconnaissance) and attack, can be employed. However, neither SLA nor SLAF has this capability and is unlikely to develop in coming years owing to the absence of external threats. Currently, ISR operations can be employed in the land and maritime domains, though there is a need to enhance capabilities and capacities specifically for maritime operations. These roles will greatly benefit state authorities such as the police, wildlife, forest, and customs departments. It is also important to adhere to air traffic control (ATC) and air defence (AD) instructions to operate within Sri Lankan airspace. Therefore, establishing an integrated operational environment would address issues related to flight safety and air defence.

To define an operational framework for drone operations in Sri Lanka's land domain.

The findings indicate that currently, the SLAF and SLA are operating in isolation when it comes to drone operations. Therefore, it is necessary to establish a joint drone operations monitoring cell equipped with a robust communication network to ensure effective and timely communication, as well as to prevent unauthorized drone operations. The authors suggested that the SLA, SLN, SLAF, Police, Wildlife, Forest Department, and Customs must work collectively, taking into consideration factors such as time, space, purpose, and available resources. Besides, the SLAF and SLA should collaborate on research and development efforts to develop drones that are capable of conducting ISR and attack operations, subject to the necessity. Based on these findings researchers have designed an operational framework that is illustrated in Figure 4.

To examine empirical associations between the employment of drones in the security realm and operational framework as well as an integrated approach.

Quantitative data analysis illustrated that operational framework and integrated approach have strong correlations with the employment of drones in the security realm. Spearman's coefficient of correlation (r_s) values, respectively 0.588 and 0.525 at a significance level of 0.000, delineated that strong positive association between IVs and DV. Further, hypotheses testing also proved that H_1 and H_2 are accepted whilst H_{1_0} and H_{2_0} were rejected.

4 RECOMMENDATIONS AND CONCLUSION

The following recommendations have been formulated on par with the objectives

A. To establish an integrated operational environment by integrating SLA, SLN, SLAF, Wildlife, Forest Department and Customs to cater to requirements being projected concerning all operational themes

B. To establish a centralized command that is led by the SLAF on drone operations.

C. To adapt the operational framework for drone operations of SLA and SLAF based on operational themes of warfighting, peace support, defence engagement and security on a par with time, space, purpose and resources.

D. To provide real-time drone picture-driven data to respective decision-makers to take prompt decisions that are driven by accurate data.

E. To conduct educational/awareness sessions for middle-grade Officers in SLA/SLAF about drone operations/technology in aerial warfare by expertise in the field.

F. To incorporate drone operations and technology into the training and education syllabuses of SLA/SLAF Officer Cadets and Officers' training/education programmes.

G. To conduct tactical air power missions concerning ISR in support of SLA land operations.

H. To establish a joint drone research and development (R&D) center with the collaboration of SLAF and SLA to develop an indigenous drone for SLA for operational and tactical purposes.

J. To study the development of an indigenous combat drone for Sri Lanka.

K. To study the operational framework for employing UAVs/ small-scale drones in the maritime domain of Sri Lanka as a future research area. Sri Lanka's extensive maritime domain remains pivotal as the country aims to thrive as a maritime nation. Studies in this area would focus on how UAVs can augment surveillance, SAR, fisheries management, maritime law enforcement and environment monitoring.

5. CONCLUSION

A new paradigm has emerged in respect of military drone operations, driven by the changing dynamics of warfare. The Nagorno-Karabakh War has provided esteemed insights into the effective employment of drones on the battlefield. Consequently, it is decisive to clearly define the types of operations, determine the extent of engagement, and identify the necessary apparatus required for security engagements. This strategic planning will ensure effective and informed decision-making regarding acquiring and deploying drones in the security realm.

The study explored the employment of drones in security operations (EDS), which has been determined by the operational framework (OF) and integrated approach (IA). Therefore, researchers conceptualised preceding determinants and operationalised the same to the collection of data through questionnaires and semi-structured interviews.

In conclusion, this research has shed light on the significance of developing a comprehensive operational framework for drone operations in Sri Lanka. The study underscored the global rise in drone usage and its impact on modern warfare, drawing insights from the Nagorno-Karabakh conflict. It

elucidated the need for SLA and SLAF to collaborate and establish a joint drone operation monitoring cell to facilitate effective communication and prevent unauthorized drone activities. Furthermore, the research emphasized the significance of joint efforts among various stakeholders, including SLA, SLAF, and other state authorities, in adhering to operational principles and optimizing the use of drones in different security domains. By tackling these key aspects, Sri Lanka can establish a robust and effective drone programme to bolster its security operations.

6. REFERENCES

Army Doctrine Publications, (2010). Land Operations. 3rd ed. Warminster: Land Warfare Development Centre, pp.3-1, 3-2.

British Joint Doctrine, (2017). Joint Doctrine Publication 0-30 UK Air and Space Power. 2nd ed. Swindon, Wiltshire: DCDC, Ministry of Defence, pp.43-45.

Bryman, A., (2012). Social Research Methods. 4th ed. New York: Oxford Press, p.809.

Detsch, J., (2022). The U.S. Army Goes to School on Nagorno-Karabakh Conflict. Foreign Policy. Available at: https://foreignpolicy.com/2021/03/30/army-pentagon-nagorno-karabakh-drones/ [Accessed 1 April 2024].

Dixon, R., (2020). Azerbaijan's drones owned the battlefield in Nagorno-Karabakh - and showed future of warfare. *Gulf News*. Available at: https://gulfnews.com/amp/world/europe/azerbaijans-drones-owned-the-battlefield-in-nagorno-karabakh---and-showed-future-of-warfare-1.75294614 [Accessed 3 April 2024].

Doane, D. and Seward, L., (2008). *Applied Statistics in Business and Economics*. 1st ed. New Delhi: Tata McGraw-Hill Publishing Hill Company Limited, pp.38-39.

IAF, (2012). Basic Air Power Doctrine. 12th ed. New Delhi, pp.94-95.

IAF, (2012). *Basic Air Power Doctrine.* 12th ed. New Delhi: IAF HQ, pp.117-124.

Joint Doctrine Publication, (2017). *UK Air and Space Power.* 2nd ed. Ministry of Defence.

Joseph, T., (2021). The other dimension of SLAF aerial observation. Daily News. Available at: https://www.dailynews.lk/2021/06/02/features/250627/other-dimension-slaf-aerial-observation [Accessed 1 May 2024].

Krejcie, R. and Morgan, D., (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*: 30(3), pp.607-610.

Mcneal, G., (2016). Drones and the Future of Aerial Surveillance. *The George Washington Law Review*: 84, pp.356-361.

Pallant, J., (2013). *SPSS Survival Manual.* 5th ed. Maidenhead: Open University Press, McGraw-Hill.

Priyamal, W., (2022). Conceptualising an operational framework for drone operations. Dissertation.

RAF, (2009). *British Air and Space Doctrine*. 4th ed. Swindon: RAF, pp.30-31.

RAF, (2009). *British Air and Space Doctrine*. 4th ed. Swindon: RAF, pp.30-31.

Richard, T., (1990). Interpretation of the Correlation Coefficient: A Basic Review. *SAGE Journals*. Available at: https://journals.sagepub.com/doi/10.1177/875647939000600106 [Accessed 28 May 2024].

Saunders, M. and Lewis, P., (2018). "Research Methods for Business Students" Chapter 4: Understanding research philosophy and approaches to theory development. ResearchGate. Available at: https://www.researchgate.net/publication/330760964_Research_Methods_for_Business_Students_Chapter_4_Understanding_research_philosophy_and_approaches_to_theory_development [Accessed 25 March 2024].

Saunders, M., Lewis, P. and Thornhill, A., (2018). Research Methods for Business Students eBook. 8th ed. Harlow: Pearson Australia Pty Ltd.

Sekaran, U. and Bougie, R., (2016). *Research Methods For Business: A Skill Building Approach*. 7th ed. New Delhi: John Wiley & Sons, pp.94-98, 146-149, 229-230, 239-242, 248-251, 315-319.

SLAF, (2018). Vision-2025. 1st ed. Colombo: AFHQ, pp.18-23.

SLAF, (2022). *SLAF's Basic Doctrine*. 2nd ed. Colombo: AFHQ, pp.175-181.

Sri Lanka Army, (2020). New 15th Drone Regiment of the Sri Lanka Artillery Inaugurated to Meet with Future Challenges. Sri Lanka Army. Available at: https://www.army.lk/news/new-15th-drone-regiment-sri-lanka-artillery-inaugurated-meet-future-challenges [Accessed 1 May 2022].

US Army, (2017). Operations. 3rd ed. Washington DC: US Army Headquarters, pp.4-8, 20-24.

Wanasinghe, N. and Wijetunge, K., (2021). Pragmatic response for maritime-air security a way forward: Conceptual framework from a strategic aerial perspective. In Proc: KDU IRC. Colombo: KDU, p.38. Available at: https://library.kdu.ac.lk/irc2021/Defence-and-Strategic-Studies-E.pdf.

Wijetunge, K. and Wanasinghe, N., (2021). Conceptualising an Air Diplomacy framework for Air Strategy of small Air Forces to strengthen foreign policy aspirations: Sri Lankan perspective and way forward. In Proc: International Research Conference, Ratmalana: KDU. Available at: http://library.kdu.ac.lk/irc2021/index.php [Accessed 10 September 2024].

Wijetunge, K. and Wanasinghe, N., (2021). Reforming Of Air Defence Systems Of Small Air Forces Through An Air Diplomacy Framework To Counter Contemporary Aerial Threats: Sri Lankan Perspective And Way Forward. In Proc: BCIS ESS. Colombo: BCIS, pp.61-62.

Wijetunge, K. and Wanasinghe, N., (2021). Reforming the air defence systems of small air forces through an air diplomacy framework to counter contemporary aerial threats: Sri Lankan perspective and way forward. ResearchGate. Available at: https://www.researchgate.net/publication/356726698_Reforming_the_Air_Defence_Systems_of_Small_Air_Forces_through_an_Air_Diplomacy_Framework_to_Counter_Contemporary_Aerial_Threats_Sri_Lankan_Perspective_and_Way_Forward [Accessed 3 June 2024].

Wijetunge, K. and Wanasinghe, N., (2022). Prevalence of Niche Air Forces Amidst Economic Turmoil: Opportunities and Way Forward. ResearchGate. Available at: https://www.researchgate.net/profile/Kasun-Wijetunge/publication/364057882_Prevalence_of_Niche_Air_Forces_Amidst_Economic_Turmoil_Opportunities_and_Way_Forward [Accessed 3 June 2024].

Wijetunge, K., (2023). Drone-Enable Security: Advancing an Operational Framework for Sri Lanka. ResearchGate. Available at: https://www.researchgate.net/publication/373767796_Drone-Enable_Security_Advancing_an_Operational_Framework_for_Sri_Lanka/stats.