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A Small Air Force: Way Forward in Achieving Future Vision

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Reshaping the Air Strategy Through Technology, Synergy and Innovation to Mitigate the Limitations of a Small Air Force – Sri Lanka Air Force Context

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ABSTRACT

A Small Air Force is seen as an Air Force that whilst holding the ability to apply itself across the spectrum of air power, is limited in its ability to conduct prolonged operations as well as to the desired extent. Thus, in times where a country is transiting from war to peace such a force takes a heavy toll in terms of organizational sustenance and growth which further affects its outcome. Undeterred it must be in the best interests of the nation as well as the Air Force to forge through whatever the conditions imposed to meet the security challenges that the nation may face and warrants a response through the third dimension. The appreciation of the threats in face, the identification of the action needed and best course of action forward would be the resultant of a carefully thought out strategy which involves technology, synergy and innovation which helps to mitigate the limiting factors of a small Air Force.

Keywords: Small, Synergy, Air Power

I. INTRODUCTION

Following the resounding success it precipitated at the end of World War II, Air Power was here to stay. And since then, has been essentially growing in stature and presence. The quantum leaps in technology and rapid advancement of battlefield methodologies as well as tactics have brought the role of Air Power to a hitherto unassailable platform in the present day context. In short, it could be contended that Air Power is here to stay and it will be the prime factor in deciding victory or defeat in all wars, irrespective of magnitude and nature.

Second World War Era British Prime Minister; Sir Winston Churchill once stated

“Not to have an adequate air force in the present state of the world is to compromise

the foundation of national freedom and independence”.

The phenomenon of this enduring statement, which emphasizes the importance of a potent air force in national security is relevant even today and echoed in contemporary air power literature where it states

“Air Forces should understand their **National Security Environment** and position themselves to provide the government with **multiple response options** to emerging crisis. This is especially critical for **Air Forces that are limited by resources** to operate across the spectrum of conflict at the required level and for the duration necessary. Otherwise, they face the threat of **strategic oblivion**”.

In this context, it is no secret that not every country is at liberty to raise and maintain the large Air Force which is capable of executing the full spectrum of air operations. With tightening budgets, fluid political and geo-political landscapes and evolving national sentiments the constraints placed in maintaining an expensive military arm such as an Air Force can be a challenging task for any developing country.

In the post-Humanitarian operation era, the Sri Lanka Air Force finds itself in a similar situation. Post 2009 have brought new security challenges, which deems new Air Power responses. However, an aging and depleting fleet with an unbalanced force structure are posing many challenges including socio-economic compulsions in a post-war era to spend public money to maintain or equip an expensive air arm in a perceived peace environment.

On the other hand, this aversive notion is alarmingly widening the **capability gap** between the expectations from Air Power and National Security Imperatives. In this context, SLAF is required to re-define an Air Strategy incorporating **Synergy, Technology** and **Innovation** to mitigate the challenges encountered by a small air force and bridge the capability gap.

II. AIM

The aim of this paper is to re-define the Air Strategy within the context of a Small Air Force with specific emphasis on the requirements of the Sri Lanka Air Force to reduce the capability gap

III. SMALL AIR FORCE

The term “Small Air Force”, tends to infer a numerical inferiority in terms of assets, resources and capability. In contrary, there are Air Forces, which are comparatively numerically inferior, but fully capable of executing full spectrum of operations to achieve political end states in conflicts thus securing their national interests.

Nevertheless, there are large Air Forces who are numerically superior but failed to bring political end states to conflicts and continuing to be entangled in protracted wars.

In year 2008, Former Afghan President Mr. Hameed Karzai stated,

“This war has gone on for seven years. The Afghans don’t understand anymore how come a little force like Taliban can continue to exist, can continue to flourish, can continue to launch attacks. With forty countries in Afghanistan, with entire NATO force in Afghanistan, with entire international community behind them, still we are not able to defeat the Taliban.”

In this context, it seems, delineation of a small air force and a large air force is still blurred.

However, for argument sake, defining and demarcation of contours between a Small Air Force and a large Air Force should be based on the strategic facts of,

- The ability to execute full spectrum of Air Power Operations in pursuit of National Interest.
- The ability to achieve desired level of effect through Air Operations and political end state.

- The ability to sustain an air campaign to an extended period of time.

It is therefore the continuous and inalienable duty of the strategic leadership to devise the appropriate Air Strategy to carefully steer a Small Air Force through the numerous constraints that comes across yet ensuring national security.

IV SRI LANKAN CONTEXT

Air strategy of a nation is based on the strategic context and corresponding national security strategy of that nation, which is inevitably influenced by both internal and external factors.

Sri Lanka is a focal point in the Indian Ocean Region considering the geo-strategic disposition of the country in midst of the global power shift and growing geo-strategic and geo-economic power rivalries.

Like other littoral states in the region, Sri Lanka too will encounter her own challenges in this evolving global security landscape and Air power been a tool of national interest, will always be influenced by the changing dynamics of this strategic context.

At a time country has transited from war to peace, the evolving security land scape has brought many security challenges.

In this changing environment, as for any nation, Sri Lanka Air Force holds its own collection of strengths and weaknesses. Many are common with Small Air Forces worldwide but some maybe unique to us alone. These limitations could be taken as the key shapers in re-defining the Air Strategy. They are

- Budgetary Constraints
- Geo-political sensitivities
- Capability gap

Devising the right strategy will always begin by analyzing the National Security challenges,

V NATIONAL SECURITY CHALLENGES FOR SRI LANKA

In the context of national security challenges for Sri Lanka, the year 2009 draws a sharp dividing line. Prior to this lies an era where the country was engulfed in hybrid warfare against a terrorist element termed the world’s most ruthless. In this pursuit, virtually the full spectrum of Air Power was employed resulting in a resounding success. Post 2009; there is a mark paradigm shift in national security landscape where the focus has shifted from land to maritime domain.

Along with cyber terrorism, contemporary non-traditional threats, which includes transnational terrorism and asymmetric air threats have also gained ground in present national security environment.

Maritime security is the most important National Security concern in the post – 2009 era. In this front several challenges can be identified.

- The organized trafficking of persons or human smuggling is a significant maritime security issue. The mechanisms of human trafficking have made this country a breathing ground and safe haven for transnational terrorism too.
- One of the challenges Sri Lanka currently facing is pirate fishing in Sri Lankan waters. Protecting our waters from these fishermen and their criminal activities such as drug smuggling as well as from others who might seek to exploit our other oceanic resources including oil and gas, will be one of the key maritime security challenges for Sri Lanka in the future.
- The perceived threat of international piracy is also a concern for Sri Lanka's maritime security. This factor undermines the security of the Sea Lines of Communication and could pose a serious problem to shipping in the region in the future. This will have an impact on the country's economic security as well, and is therefore another challenge that needs to be monitored.

Further to Maritime concerns, the Easter Sunday attacks highlighted shift of global terrorism towards South Asia region subsequent to ISIS defeat in Syria and Iraq. These terrorist attacks have invariably dragged Sri Lanka to the Global War on Terrorism and caused a total paradigm shift in the national security landscape.

In addition, current global security landscape indicates that dynamics of air power are changing with new emerging asymmetric air threats such as use of drones as offensive weapons.

It is pertinent to mention at this juncture, that the SLAF is an Air Force who learnt the hard way to counter asymmetric air threat.

VI DRONES – A NEW PARADIGM

Drones have transformed from recreational flying objects to weapons with strategic effect. The attacks in Syria, the President of Venezuela, and Saudi oil refinery have shown, the ingenious use of

the simple drone can have strategic security implications. These attacks have leveled the strategic playing field amongst drones where only military grade drones such as Predator and Global Hawk had achieved.

The ability to concentrate a large number of drones within a narrow corridor of time and space known as a swarm attack, could result in strategic paralysis of a nation and sometimes, propagating global effects as well.

The technical ability to achieve such level of control has already been demonstrated in the recent Saudi oil field attack where Saudi oil production capacity was dropped by 50% creating a domino effect where global oil production dropped by 5%. As a result, global oil prices surged by 16%.

The augmentation of open source technological innovations such as facial recognition, programmability through smart communication devices, autonomous navigation through GIS platforms in the public domain, etc will have lethal effects in the paradigm of drones being used as weapons with strategic effect.

VII CYBER, INFORMATION AND PSYCHOLOGICAL WARFARE

On a similar front, cyber, information and psychological warfare has created a new battle space making it also a force to be reckoned with.

Misinformation, fake news, hate speech and public sentiment manipulation are serious issues that need to be looked into. It is no secret, but pertinent to mention at this juncture that it has resulted in colour revolutions in some parts of the world ousting their leadership.

In addition to devising strategies to National Security concerns, the ever present aspect of human security needs in the face of disasters or calamities cannot be overlooked in the scope of HADR operations.

Considering the above threat perceptions, the far reaching national security interests of Sri Lanka could be laid down as

- Territorial integrity of the nation, sustenance of peace and security.
- Security over the air and maritime domain to ensure economic stability and prosperity.
- Elimination of all forms of extremism.
- Defence diplomacy and international collaboration.

- Swift Response for all forms of disasters and situations warranting humanitarian assistance.

VII RE-DEFINING AIR STRATEGY

These national security interests and threat perceptions will shape the corresponding Air Strategy, which will be formulated in compliance to National Security and Defence Strategies.

In this context the corresponding Air Strategy should be based on deterrence and pro-activeness.

Accordingly, fundamental air power roles of the SLAF as a small air force are,

- Protecting National Airspace
- Maritime Domain Security
- Air Mobility Operations
- HADR Operations
- Cyber, Information and psychological Warfare
- Responses to non-traditional threats, which includes transnational threats and asymmetric air threats
- Involvement in UN Peace Keeping operations
- PROTECTING NATIONAL AIRSPACE – The protection of national airspace deems the need to exercise the ability to conduct the full spectrum of air operations. The air force needs to carry out a cognizant appreciation of the air domain and plan an operational posture to protect airspace from both traditional and asymmetric air threats.
- MARITIME DOMAIN SECURITY – Considering geo-strategic disposition and been in the cross roads of vital global energy highway with an exclusive economic zone which is approximately 9 times the size of the landmass and a Search and Rescue region where the furthest point is 800 nm away from land; the maritime responsibility of the country entails the air power to protect the maritime domain, which is not only national imperative but a regional and global commitment as well.
- AIR MOBILITY OPERATIONS–Though the dimensions of the country’s landmass may favour a tactical airlift capability, the ability to project forces is mandatory when the circumstances are time and space sensitive. Hence, a strategic reach in limited scale must be considered within this scope.
- INTELLIGENCE AND SITUATIONAL AWARENESS – The /importance of ensuring continuous situational awareness and sharing integrated intelligence picture does not have

any boundaries at any level and at any time. In this light, the country should continue to invest in ISR capabilities which would be synergized along with surface forces for integration and augmentation.

- HADR OPERATIONS–The /nation will always hold high levels of expectations for relief in times of disasters and humanitarian calamities from the defence establishment. Thus maintaining a ready state for HADR operation, though considered a secondary role, will remain in high importance.
- CYBER, INFORMATION AND PSYCHOLOGICAL WARFARE –In the present day’s context the battles are fought not only in the field but also in cyberspace with equal ferocity. Mobilising the public sentiment through effective psychological warfare comes hand in hand due to the intensive reach of social media and other alternates to mainstream media outlets.
- PARTICIPATION IN UN PEACE KEEPING OPS – Abiding by our commitment to Global Security and Peace, the SLAF has deployed two Air Contingents in United Nations Peace Keeping Operations in the African continent. The SLAF pilots are performing an exceptional air role to maintain peace and order in these conflict areas by harnessing their expertise gained from flying in the counterinsurgency air operations in the country. Peace keeping operations is one of the key areas SLAF will develop in the future.

National Security concerns have stipulated the fundamental air power roles that should be incorporated in the air strategy of the SLAF. Been an Air Force in transition to the next generation in an evolving national security landscape, but challenged by the limitations of a small air force, SLAF deems a pragmatic approach as the way forward.

VIII WAY FORWARD

The way forward illustrates how a small air force with an evolving national security landscape can bridge the capability gap through Technology, synergy and innovation. In this context, the recommendations would be

- INSTITUTIONALIZATION OF NEW AIR STRATEGY – Most important factor for a small air force, especially in a shift from war to peace, deems disseminate strategic guidance regarding the re-orientated mission and vision.

This re-orientation should be institutionalized through doctrines and policy documents.

Further, the force structure and the human resource should be re-structured to meet the new organizational orientation.

- PLANNED, SMART AND STRETCHED RE-FLEETING– Re-fleeting to complement the newly devised Air Strategy is a daunting challenge to a small Air Force given the geopolitical, economic and conflicting public perceptions; especially during a transition from War to Peace. Such an exercise which needs to be carefully scaled across a wide time scale to minimize the burden on a battered national economy without compromising national security.

A stretched, well thought acquisition plan is the best solution in such circumstances. This denotes the necessity to possess long term plans, which will ensure the required air power capabilities are accomplished over a period of time.

Platforms with multi role capability would offer a significant degree of synergy providing greater return on investment.

Multi-mission platforms are also potent force multipliers in a resource constrained situation.

A rational analysis taking all factors into account would provide for the requirements of Air Defence, Strike, ISR and Airlift.

- HARNESSING TECHNOLOGICAL SUPERIORITY – Technology is a proven capability gap filler in the air domain. Flight simulators and Computer Based Training (CBT) are substitutes for many physical platforms, which are cost, infrastructure and resource intensive.

- JOINT FORCE EMPLOYMENT– Air power is the only element capable of projecting power in all three domains of warfare; thus demanding the omnipresence in protection of national security. In resource constraint environment, a small air force can mitigate its capability gap through joint operations with Land and Naval Forces, which will ensure synergetic employment of assets in respective domains.

The SLAF holds an excellent track record of joint operations which were executed during the pre-2009 era.

The deck operation in collaboration with the SLN and increasing presence of the SLAF in the maritime domain indicates the importance of the presence of air power in present security landscape of the country.

- AIR DIPLOMACY. Air power is highly sensitive to technological advancements and not every nation is capable of acquiring modern advanced technologies. This technological and capability gaps of small air forces can be mitigated through Air Diplomacy, which includes bi-lateral and multi-lateral military cooperation agreements and multinational collaborations, mutual exchange programmes, technological transfers, training, exercises, defence dialogs and deliberations based on the nation's foreign policy.

IX CONCLUSION

In conclusion, it could be broadly stated that the challenges of being a small Air Force will never cease and will continue to evolve just as well as all other circumstances do. It is therefore, the most suited approach to utilise and harness on synergy, technology and innovative approach to bridge the capability gap.

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**THE ASYMMETRIC THREAT : A WEAK ACTOR'S PERSPECTIVE AND
RESPONSES FOR AN AIRFORCE**

*A destroyer, even the brave might fear,
She inspires horror in the harbour and the open sea,
She goes into the waves flanked by arrogance, haughtiness and fake might,
To her doom she progresses slowly, clothed in a huge illusion,
Awaiting her is a dingy, bobbing in the waves.*

*Osama Bin Laden
Speaking on the USS Cole incident ¹*

1. Who can forget the chilling images of airliners crashing into the Twin Towers of the World Trade Centre on 11 September 2001? The attacks shook the Western World, and in particular the United States, as for the first time its main land had been attacked by a entity operating from another continent. Unable to launch conventional military strikes using conventional weapons against targets in Continental United States, Al Qaeda operatives used commandeered civil airliners, camouflaged as disoriented civilian aircraft to approach their targets and finally used the platform itself as the weapon.

2. While the attack has been condemned as a terrorist attack, from a purely military point of view it offers us some valuable lessons on how asymmetric aerial attacks can be prosecuted. Classic air operations tenets like exploiting surprise, maintaining a high tempo of operations, using morale and motivation as a force multiplier, operating within the OODA loop of the enemy were used to deadly effect. The actual attack also shows that the terrorists had a very definite targeting idea. Firstly, it was deemed necessary not only to hijack the aircraft, but to also dispense with the flight crew. The hijackers needed to be able to fly the aircraft themselves. This ensured precision guidance to the target and increased the chances of a higher success rate. Secondly, the hijackings must take place almost simultaneously so as to create a favourable air situation to carry out the mission. Yes! The Americans did lose momentarily control of the air over New York and Washington.² This shows that the terrorists did understand the need to gain control of air and retain control till the weapon had been delivered. This is a basic tenet of air power. Simultaneity of attack and speed were employed to operate inside the OODA loop of the American Air Force Commander on duty at that time as well as that of the political leadership. Thirdly, the aircraft were to be hijacked soon after takeoff and crashed into the targets. This ensured proximity of the weapon to the target and also increased the lethality of the weapon .

¹ Video Recording Jan 2001 speaking at his Eldest Son's wedding. Reuters, Seattle Times, March 2, 2001. USS Cole is a US Navy warship that was attacked and severely damaged by a suicide bomber in a small dingy in Aden harbour.

² For more information on achieving Indirect Air Superiority see article written by Lt Tim Larribau, French Air Force. *A New Form of Air Warfare*. Air & Space Power Journal. Fall 2007

3. Ivan Arreguin–Toft in his book “A Theory of Asymmetric Conflict”³ has done a review of all asymmetric wars fought between the years 1800 to 2003. The data that he has reviewed reveals an interesting comparison. While there is no doubt that strong actors have won 71.5 per cent of all asymmetrical conflicts fought from the year 1800 onwards, it is **the figure of 28.5 per cent of all victories in favour of the weak actors** that interests us. This is indeed a large percentage as it indicates that **a weak actor has a better than one fourth chance of winning a conflict**. He also makes a strong argument that whenever a same approach strategy was adopted by both sides the stronger actor invariably won, whenever the weak side adopted an opposite approach strategy the chances of it winning or forcing a stalemate increased dramatically.⁴ His study also assessed that the percentage of failure, of strong actors to prevail over weaker actors is on an increasing trend. From the period 1800 to 1850 strong actors won 88.2 per cent of all asymmetric conflicts. However in the period 1950 to 2003 this percentage had come down to 48.8 per cent. **That is to say the weak won more number of times over strong actors. And the list of the vanquished had all major colonial powers and both the Super Powers.**

4. Asymmetry means the absence of a common basis of comparison in respect to a quality, or in operational terms, a capability. This asymmetry is very much applicable to the air domain and asymmetrical air operations against a force possessing a conventional air force have been conducted in the past (Sri Lanka Air Force operations against the terrorist outfit LTTE Air Tigers) and continue to do so even today (Yemini Houthi rebels using drones against the Saudi Arabian coalition forces). These **Sub or Non-conventional aerial threats are only increasing in number and becoming more potent and combating these aerial threats is likely to become a major task for conventional air forces (big and small) in the future**. In fact, most air forces have not even evolved a tried and tested response mechanism against these sub-conventional aerial threats and almost all expect to use conventional platforms and tactics to counter these threats. This paper seeks to show, from a weak actor’s perspective how asymmetric threats in the aerial domain will continue to evolve and what response should conventional air forces develop to counter these threats. It will also mainly concentrate on the interplay of asymmetric aerial threats with modern day air power operational tenets such as control of the air, information dominance, precision attacks, effect based operations etc rather than viewing asymmetric warfare as just a tactic adopted by the weak.

Why asymmetric warfare in the aerial domain?

5. There is no such thing as a fair fight. Everyone would like to fight on terms and in an environment that favours them. Ranging from individual duels, small scale battles to complex theatre-level conflicts, each side strives to create an overwhelming asymmetry vis a vis the other that will ensure victory for them. When it comes to a matter of life and death on the battlefield everyone tries to load the dice in their favour. Asymmetric conflicts therefore range over a much larger spectrum including the aerial domain. To

³ Ivan Arreguin Toft ‘*Theory of Asymmetric Conflict*’ Cambridge University Press, 2005.

⁴ Ibid. pp 38-47

understand the extent of this spectrum we need to understand the various forms of asymmetry that can develop between two opposing parties, one of whom is a conventional armed force. *Asymmetric warfare is very much a matter of perception and that means, where you stand with respect to the proverbial fence will have a direct bearing on how you would define asymmetry.* A superior and modern military force may classify operations as sub conventional, but for the side facing them it may be total war as their very survival may be at stake. These forms of asymmetry apply to all land, maritime and air operations but for the purpose of this paper are focussed on air forces.

Forms of Asymmetry in Air Operations

6. The most visible form of asymmetry is the asymmetry of 'force' to include both numerical strength and technology. This has traditionally been the measure of symmetry or parity between any two opposing sides. This measurement of parity for example makes the US Armed forces the most 'Asymmetric Power' in the world when compared to the armed forces of any other nation. But air forces need to understand that Asymmetric warfare has many forms which apply even to the air domain (**Refer Fig 1**) and these needs to be studied and understood well by air forces. Let us examine these:

(a) **Asymmetry of Force.** This has been the traditional measure of asymmetry and is based on numerical or technological superiority or a combination of both.

(b) **Asymmetry of Methods.** Asymmetry of methods is often a reaction to asymmetry of forces. The asymmetry of methods approach is unique as it is not bounded by resources or technology. The human mind is always innovative and the possibilities to come up with alternate methods to conduct operations are boundless. It involves the following:

(i) Strategy and tactics outside the bounds of conventional war. It would imply an offensive ability that is not defensible by the conventional force. 'Idiosyncrasy' (ability to generate eccentric patterns) in approach, 'Surprise' in terms of ways, means and objectives, unorthodox application of force, and target selection could help achieve decisive results. The 9/11 aerial attack is a good example of this form of asymmetry in which an unconventional weapon was used in an unconventional manner on an improbable target.

(ii) The strategy of 'Indirect Approach' taken to a somewhat higher level. While the 'Direct Approach' addresses 'force' and 'value' targets, the Indirect Approach aims to destroy the adversary's will and capability to resist. The 'methods' adopted in this strategy would be highly unconventional, perhaps 'unethical', and beyond the capability of the adversary to replicate.

(c) **Asymmetry of Battle Spaces.** In a traditional conflict, the two opponents fight in similar battle spaces of topography, air, sea, cyber etc. In an asymmetric engagement, the battle space chosen by the opponent may be completely different. For example, an attack in the topography space could be countered by an attack in cyber space or an air force may have an excellent network of AD

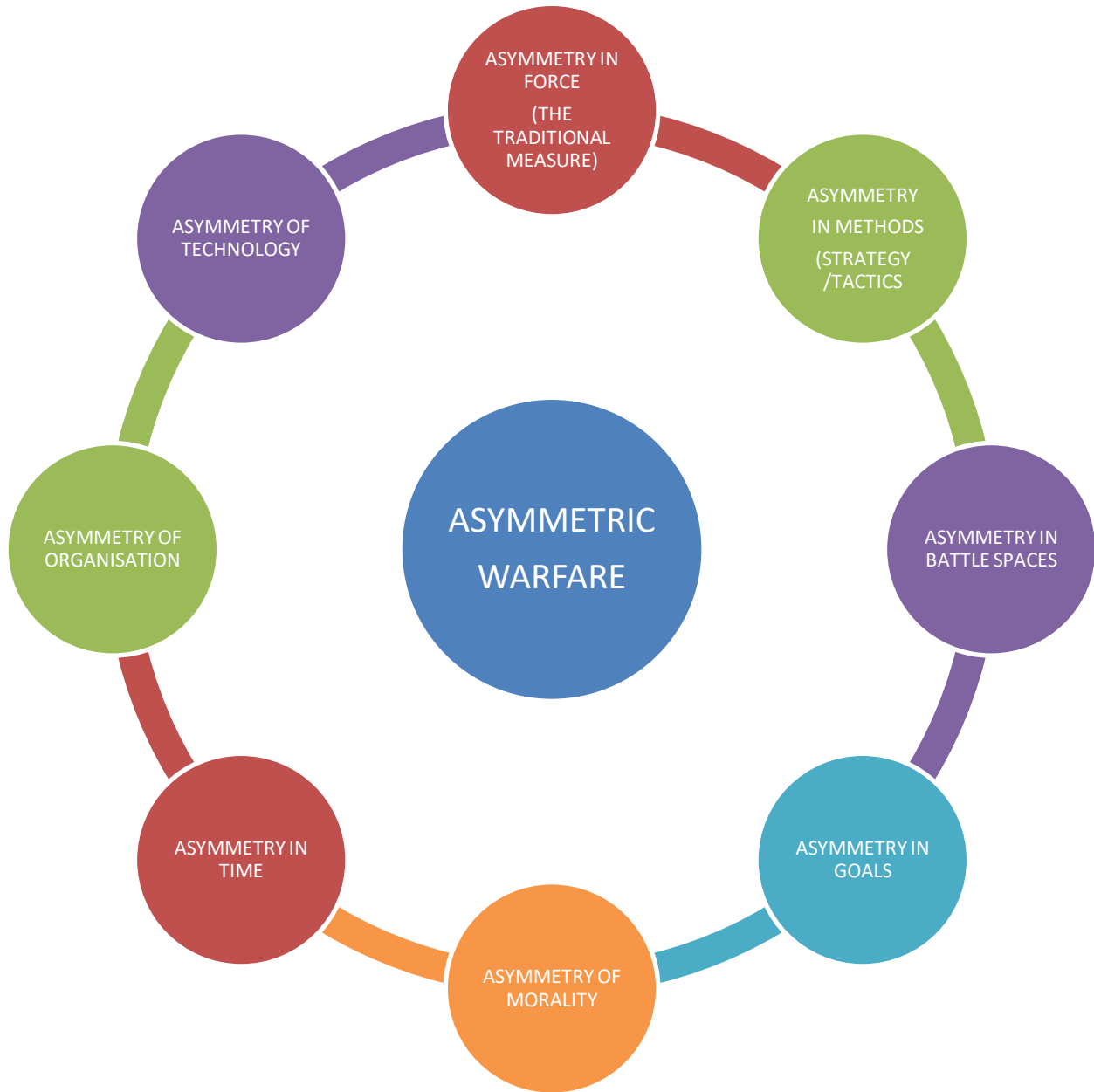


Fig 1 FORMS OF ASYMMETRIC (AERIAL) WARFARE

radars, but the adversary may choose to operate drones at 30 metres in an urban environment which may negate any advantage the radar network offers.

(d) **Asymmetry of Goals.** Traditional conflicts were for reasonably similar goals such as territory or resources. However, in Asymmetric Warfare, the goals may be widely different and may not even be connected. For example the goal of the US led alliance in Iraq post the Gulf war's was to establish a friendly democratic regime thus ensuring its energy security (a very traditional goal) while their opponents may have completely differing goals such as wanting to

extend Shia influence (the Iranian goal), compelling US forces to exit ⁵ (Iraqi insurgent goal) or retain and bleed US forces (Al Qaeda goal).

(e) **Asymmetry of Organisation.** Countries and conventional forces have visible shapes and hierarchical organisation structures with clear lines of command and supply and they function in keeping with national objectives and doctrines. The organisation structures of most asymmetric players are difficult to determine and their organisation goals are also nebulous. They present no clear cut targets and their cellular organisation and diffuse leadership make them both highly resilient and effective in their chosen form of warfare. Their organisation structure may be flatter allowing for quicker decision making vis a vis conventional air forces or the armed forces.

(f) **Asymmetry of Morality.** For a non-state actor as also for some states including super powers, all means can be taken as fair means. This lack of moral, legal and ethical constraints coupled with a total disregard of public opinion gives an asymmetry of morality. Thus, where such an asymmetry exists, battle spaces can easily be extended beyond military targets and recourse to attacking civilian targets may also be easier to contemplate.

(g) **Asymmetry of Time.** The pressure to end an engagement is on the conventional forces, whereas '*A guerrilla wins by not losing*'. In an asymmetric engagement the time dimension can be exploited by the weaker side to deny victory. For example, it is highly unlikely that US public opinion would allow their forces to stay in Afghanistan indefinitely. The 'Taliban forces' are not limited by this constraint. They have to just wait it out and sustain their operations till US forces leave Afghanistan.

(h) **Asymmetry of Technology.** Asymmetry of technology is more often than not, related to asymmetry of force. However there are examples of weaker sides being able to defeat stronger enemies by adopting superior technology. The Israeli Air Force has historically used better technology to blunt the decisive numerical strength of the Arab air forces.

The Threat

7. The Asymmetric aerial threat over the last two to three decades has become a predominant challenge to many countries. Technology, infrastructure availability and several innovations by adversaries have fundamentally changed the nature of the battle space. While this sub conventional threat has traditionally been seen as something an army or police had to deal with, it has manifested itself in the maritime and air domains as well. Therefore it is imperative that air forces facing an asymmetric threat need to adapt and improvise accordingly to provide credible options to their governments and enhance National Security. Air Force Operation planners need to understand that the farther the 'weak' depart from the conventional, the better are the chances of them

⁵ For asymmetric opponents the goal may not be to defeat the superior power but to provoke and shape the exit policy. To this end operations by the no-state actor would concentrate on high media visibility and in shaping and influencing public opinion.

overwhelming the superior force and hence conventional air forces need to tailor their responses to meet this challenge.

8. Potentially all that flies, commercial aircraft, drones or UAVs, training aircraft, para-motor gliders, hover /fly boards⁶ can be used to deliver an attack. If a flying platform, manned or unmanned, has reasonable range, endurance and payload capacity it can be turned into a weapon. As to the question “Why the aerial route”? Well we have to look no further than Col Wardens “Basic Five Ring Model”. Weaker actors planning a response to a superior force or power would endeavour to avoid contact with the outermost ring i.e. “The Fielded Forces”. Contact with forces having superior firepower and organisational backing leads to attrition which is detrimental to a weaker entity. Therefore non-state groups are likely to increasingly look to the aerial route to adopt non- conventional means to drive home an attack. It allows them the means and freedom to attack the inner rings. Their capacity to use the aerial route is assisted by the vast commercially and publically available aviation, media and communication infrastructure which they exploit to carry out basic functions like recce, surveillance, precise coordinate extraction and post attack monitoring. Easy availability of manufacturing technology like 3D printers, Commercial of the Shelf (COTS) payloads , and explosive materials aid non state actors to create and exploit the air power attributes of these platforms. The concepts of use of aerial platforms for an asymmetric attack can be divided into three broad categories **(Refer Fig 2)**.

- (a) Firstly, threats emanating from commercial platforms like airliners, training / sports aircraft, UAVs fitted with COTS sensors like thermal devices, radars, night vision devices to carry out a whole range of tasks. We have seen such platforms being used to carry out recce and surveillance tasks (Hezbollah recce missions over Israel), air space interference (Gatwick and Heathrow airports Dec 2018), and direct kinetic attacks (kamikaze attack on Sri Lanka AF Headquarters in Feb 2009).
- (b) Secondly, the Weaponised Use of Commercial platforms. This is the deliberate conversion of a civil use aerial asset to deliver a lethal payload. This is of great concern and some common threat scenarios include the employment of a small aircraft or a UAV to deploy explosive devices, whether an IED or repurposed conventional ordnance like hand grenades or mortar projectiles or the direct use of an UAV as an airborne IED, with explosives integrated into the UAV itself⁷. A less common option for weapons payload is the integration of small arms, likely a pistol or other lightweight, small caliber firearm, with an UAV or the Use of a small aircraft to fire automatic weapons is also a distinct possibility.⁸ Chemical or biological payloads dispersed from COTS UAVs/ aircraft ⁹ could prove devastating against vulnerable open-air targets, such as large crowds or

⁶ <https://www.independent.co.uk/life-style/gadgets-and-tech/news/bastille-day-france-hoverboard-military-flyboard-parade-paris-a9005276.html>

⁷ Assassination attack on President Maduro with an IED equipped drone

⁸ Jun 2107, helicopter attack on Venezuela Supreme court with grenades

⁹ Aum Shinrikyo unsuccessful attempt to use a UAV helicopter to deliver sarin gas in 1994

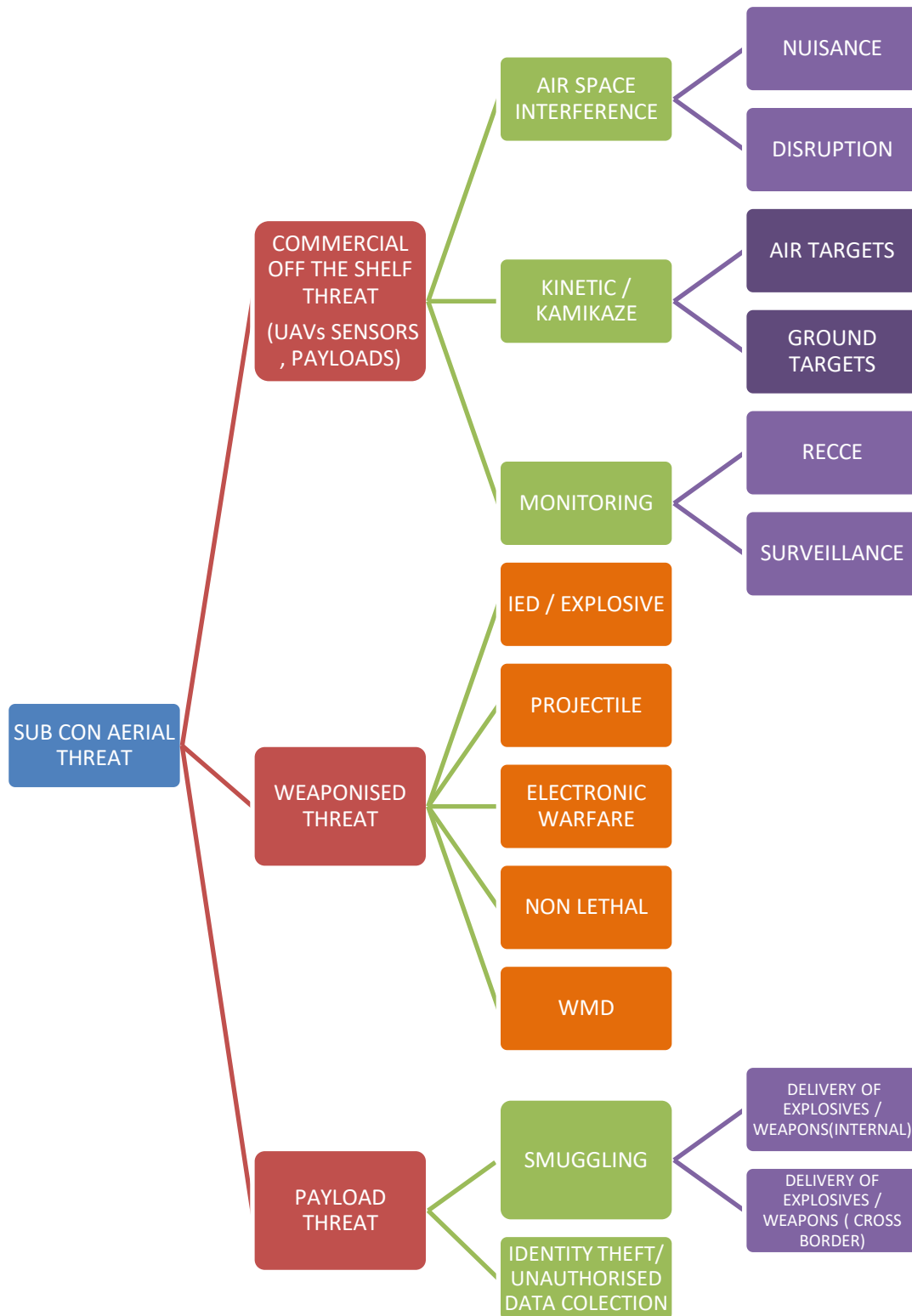


FIG 2 : CONCEPTS OF USE OF AERIAL PLATFORMS IN ASYMMETRIC THREAT SCENARIOS

water reservoirs. Other scenarios include using certain RF devices for offensive purposes like jamming signals for aircraft navigation, law enforcement, transport networks potentially causing widespread damage and disruption. Non-state armed groups may not even require a lethal payload to successfully employ a COTS UAV in an offensive capacity. One of the key threats posed by COTS UAVs in swarm mode is the possibility of a 'bird strike' type attack, wherein a UAV is intentionally flown into the jet engine of a passenger aircraft.¹⁰

(c) The third risk is using civil aerial platforms/ UAVs to smuggle lethal payloads across borders or within a country. While aircraft have traditionally been used to smuggle contraband in many areas of the world the potential expansion of commercial UAVs in the domain of commercial delivery services is an added risk that needs to be catered for. These platforms have stealth features like low Radar Cross Section, low engine sound, low observable features making detection difficult, they will not require airstrips or other infrastructure to land and take off, yet the delivery can be accurate and time bound making policing difficult. The modification of such platforms to deliver explosives and weapons to terror groups, bypassing law enforcement agencies is high. In today's data driven and dependent world using aerial platforms to collect or steal data for further exploitation and terror usage is another emerging threat.

Weak actor responses to air force operations

9. So how does a weak or non-state actor respond to the strengths of a conventional air force? It is important to understand these responses, for these are the key to a conventional air force developing its future force and organizational structure, training concepts and curriculum to counter the growing asymmetric threat.

10. Firstly, Classic concepts or doctrinal precepts of air power such as control of the air, interdiction, precision attack, dominating land or sea control are not even contested. **There is no fight for air superiority. It is conceded, as is dominance of land and sea control.** Another classic role of air power, Interdiction is largely negated as there are no regular lines of communication, logistic nodes or infrastructure to hit. **The effort, money and time that goes into planning the force structure and training for such campaigns such as the fight for air superiority or interdiction is a strong actor requirement.** But these concepts have no bearing on an asymmetric campaign. In fact non-state actors are very likely to use the very same infrastructure governments are dependent on to govern their societies and the very same media, financial markets and demographic base to sustain their campaigns as established powers and societies are hardly likely to shut down or deny spaces which are vital to their own survival. So for an air force, the use of a large part of its weapon systems (fighters, radar networks, EW systems) are negated due to the adversary not offering any resistance in roles for which these systems were designed, bought or trained for.

11. Another conventional and vital role for air forces is attack, preferably precision attacks. The concept prevalent is '**Effects Based Operations**' (EBO) where all

¹⁰ University of Dayton tests impact of a 1 kg Quadcopter with a commercial aircraft flying at 380 kmph which assessed major damage to the aircraft.

operations are conducted to achieve stated desired effects.¹¹ **The emphasis is on the 'effects'** and to prosecute EBO any modern armed force will have to resort to **'Time Sensitive Targeting'**. This in turn requires **accurate target data such as target coordinates, good target contrast with respect to the background, and the ability to see the target for a reasonable amount of time**. If any or all of these can be denied by a weaker adversary it will blunt a stronger opponent's attack capability. An asymmetric opponent facing a strong military threat, understands this over dependence on intelligence gathering systems, the limitations of Precision Guided Munitions (PGMs) and most importantly recognises the thought process that guides planners using EBO concepts. Exploiting the timing aspect of targeting becomes the only viable option open to them. If a weak actor can negate the effects of PGMs then he negates the strategy of effects based operations and is able to turn the control warfare loop to his advantage

12. The next response is the weak actors approach to Control warfare. **A weak actor has his own OODA loop¹² but how does he view the strong actors OODA loop? When the asymmetry is in terms of force ratios, technology and economic power, a weak actor, will in all likelihood, view all four parts of any strong opponent's OODA loop seperately.** Out of the four, the one part over which he has the least chance of influencing or affecting is 'Act' since the strong actor has an overwhelming superiority in force. Since he has no ability to counter the 'Act' phase of the strong actor's OODA loop, **a weak actor must concentrate on the phases preceding 'Act'**. He must influence the decision making phase. The decision making phase in turn relies on the 'Orientation' and 'Observation' phases. The strong actor must be able to observe targets so as to be able to decide to attack them. Hence logically, if a strong actor is unable to observe targets, he is unable to use his superior attack capability. Therefore the weak will always adopt various methodologies to defeat a strong actors'Observe' and 'Orient' phases.

13. Another method which weak actors adopt to counter control warfare at the operational and strategic level **is to enlarge their own OODA loop to extremely long time intervals**. The core of John Boyd's OODA theory is to shorten the OODA loop so as to give commanders an unnatural advantage in the decision cycle vis a vis their opponents. The prime focus being to operate within the enemy's OODA loop, thus, putting him always out of phase and reactive. A weak actor understands that he will not be able to match the OODA loop of a stronger opponent. In response he enlarges his own OODA loop to an extremely long time frame. This means from the time he observes an opportunity and to the time that he acts on it, the time elapsed will be long, maybe, months or years. He has longer and longer gestation periods for his operations thus taxing the resources of the stronger opponent. The planning and execution process may be in small increments to avoid detection, there may be unconnected redundancies built in, leading to information over load, the resources used maybe positioned months or years before or simply taken at the time of execution from the attack site itself. So

¹¹ See *Effect Based Approach to Operations*, conference held at Brussels from 29 Nov to 01 Dec 2006 www.marcusevansdocs.com

¹² John Boyd's OODA Loop theory evolved out of his experience as a fighter pilot in the Korean War, where he observed the effect that "fast transient manoeuvres" had on enemy pilots. See en.wikipedia.org/wiki/John_Boyd.

though the strong actor has the ability to operate well within the weak actors OODA loop but, by keeping it large the weak actor is insulated from going out of phase. It is the strong actor who goes out of phase and becomes reactive.

14. A weak actor has therefore a wide range of responses on how to counter operations by a conventional airforce, many options to convert these responses into tangible tactical threats and many forms of asymmetry to exploit to ensure the success of these tactical threats. *The weak actor's approach always attempts to function in a space where the weapons, training and organisational infrastructure that a conventional air force generally possesses to deal with threats is rendered ineffective.* Air forces therefore need to develop a completely different set of responses to the asymmetric warfare approach, induct suitable weapons and systems to give teeth to those responses and train and organize themselves differently for this role. It needs to be seen as a completely different subset of air power responses. While most modern air forces do acknowledge this requirement, there are some recommendations on how this may be achieved.¹³

15. **Bring Doctrinal Clarity.** Most modern air forces (big or small) have clearly defined roles in counter insurgency, counter terrorism and counter infiltration operations, which is backed up and tempered with operational experience. Many believe these capabilities will suffice to conduct all types of operations at the lower end of the air power spectrum including the asymmetric aerial threat. However, the asymmetric aerial threat problem is more complex and countering this threat is likely to dominate the air power capability spectrum of the future. Viewing it solely as a capability at the lower end of the air power spectrum dilutes the answer to a problem and does not allow an air force to really tackle and offer solutions. *This therefore requires that doctrinal clarity be brought into the sub conventional domain of air operations.* One possible solution to increase doctrinal clarity would be to separately include asymmetrical operations under the Air Defence, Counter Surface and Combat Support campaigns of the all-encompassing Air Campaign matrix (**See Fig 3**). For example, air defence operations to tackle a small drone threat, rogue airliners or civil aircraft in cities are totally different from the air defence set up to tackle up a more conventional threats like enemy aircraft. The control and reporting organization, procedures, weapon systems and decision making process is different. Hence a separate subheading for asymmetric threat handling under the Air Defence campaign will allow better focus and resource management. Doctrinal clarity will also allow better technology assimilation, give an impetus to research and development and allow better synergy and jointmanship between the air force and the other arms as well as civil and paramilitary forces.

16. **Introduce a paradigm shift in viewing the problem.** An air force can no longer afford to view asymmetric air operations as a purely policing or anti-terror operation where they will only offer a supporting role from the outside. Asymmetric warfare will call for both defensive as well as offensive air missions and therefore these calls for a

¹³ . The Indian Air Force in chapter 8 of its basic air power doctrine says this “ *In light of the rapidly changing nature of warfare, the reduced possibility of large scale conventional conflict and the increased proliferation of sub conventional warfare, air power is a powerful tool that the state could employ to win the war against the non-state actor.*”

paradigm shift in how an air force views these operations. Classifying these operations under law and order prevents an air force from exploiting its inherent air power strengths and also allows the narrative of formulating the correct response to an asymmetric aerial threat/ operations to be controlled by law enforcement organisations that may not fully understand air power requirements. This will certainly lead to a sub optimal response to tackling an asymmetrical aerial threat. An air force needs to take joint ownership of the problem along with law enforcement agencies and be part of the policy making bodies guiding these responses.

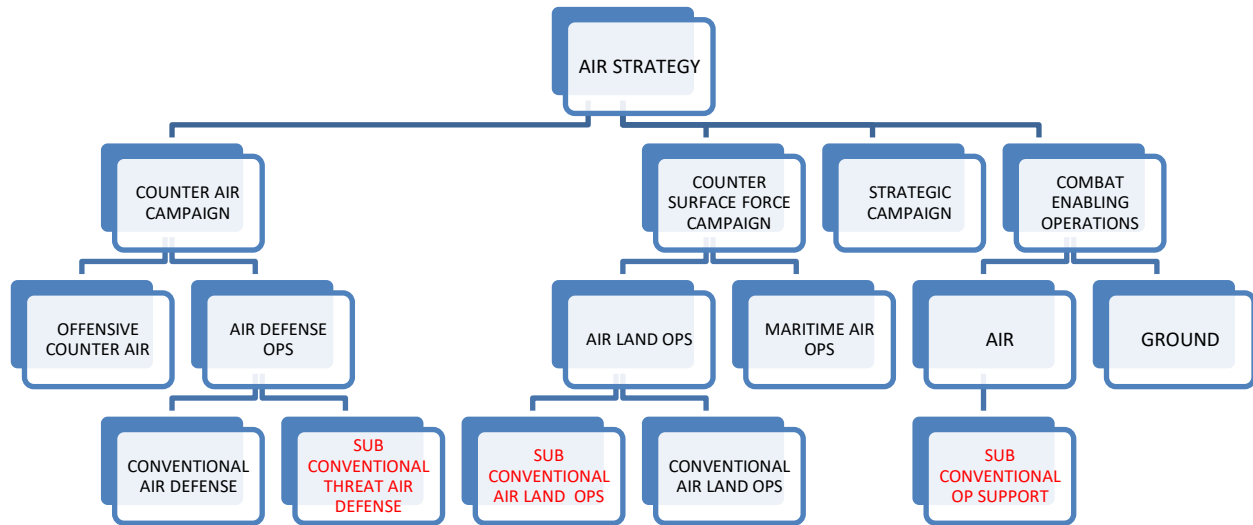


FIG 3: THE SUB CONVENTIONAL THREAT IN AIR CAMPAIGNS

17. **Involvement in Framing Legislation.** Technology and commercial interests are already driving unmanned aerial technology to ever expanding capabilities and proliferation. Countries are being hard pressed to keep up with devising legislation, rules and business models to keep these technologies and capabilities under their control and watch. Businesses will view emerging technologies and capacities from a commercial perspective rather than how these capacities can manifest into a threat. Including professional military air men at the inception of the rule framing process to assess and evaluate aspects like limiting factors for licensing, suggesting tracking and monitoring methodologies, creating compliance monitoring agencies, laying down training requirements for law enforcement agencies to assist in tackling the threat needs to be an important air force function to ensure that national security concerns are balanced with commercial concerns.

18. **Expanding Air Force Special Operations capability.** Modern air forces should also be concerned that asymmetric aerial warfare as a strategy is likely to and will be resorted to by other air forces as well. A smaller air force may elect to adopt an asymmetric approach as a more efficient and effective method to counter a larger enemy air force. For example swarm drone attacks on enemy air bases/ AD radars as part of counter air operations, using commercial UAVs to gather Intelligence etc. Strengthening and expanding the existing special operations roles or creating special

units to tackle the asymmetric threat both in a defensive and offensive roles will allow correct and suitable force accretion, capability building and better training without impinging on the conventional operations capability. Also re-designating existing intelligence gathering units, air defence and attack units with a specific asymmetric ops role, and reworking training methods will be an essential immediate step. Creating asymmetric warfare aggressor units that can simulate such attacks will allow development of tactics and strategies to counter the threat.

19. Finally, asymmetric approaches to conflicts are like most struggles, a mind game. The ideological theories and physical attacks are all done with the ultimate aim of controlling human minds. No matter how much more technologically advanced a nation is, how much of material wealth it possesses, and how advanced a society thinks it is; it all gets equalised within the confines of the human brain. The survival instinct, the power to think, rationalise, devise, change, invent, improvise, learn and adapt runs in all human beings. Man is a thinking animal, and any change that must occur must have its roots within the human mind. **An asymmetric approach is the rational approach when one faces overwhelming odds.** Only when this is understood can a true counter strategy to the asymmetric approach be developed.

“Avoiding defeat is not victory”

Anon

SMALL AIR FORCES – AT THE CRITICAL JUNCTURE

PROFESSOR SANU KAINIKARA, PhD

Introduction

International political developments and the relative power equations that they create between nations are always in a state of flux, influenced both by domestic compulsions of a nation and changes that take place externally. Within this complex situation, nations strive to achieve an assured basic stability in order to ensure that their national priorities are not swept aside by other stronger nations. In turn, the need to assure the veracity of their national sovereignty requires these nations to maintain competent military forces. In most cases these forces will be medium or small in size and their capacity to influence political developments will vary with a large number of factors.

Air forces form a critical element within the military forces. Therefore, in any assessment of the calibre of a military force, the proficiency and skill of its air power element will always be a yardstick for measuring the overall capability of the force. Aviation and its related activities are extremely resource-intensive and therefore air forces of most nations tend to be medium to small in size. So the first step in examining the challenges that face medium and small air forces is to be able to categorise air forces into small, medium and large through examining a number of holistic characteristics.

This paper examines the factors and capabilities that must be considered to categorise air forces and elaborate on the key elements that determines the status of an air force. It will then go on to analyse the main challenges that face contemporary small air forces, which if not comprehensively ameliorated will inevitably lead to irrelevance.

Categorising Air Forces

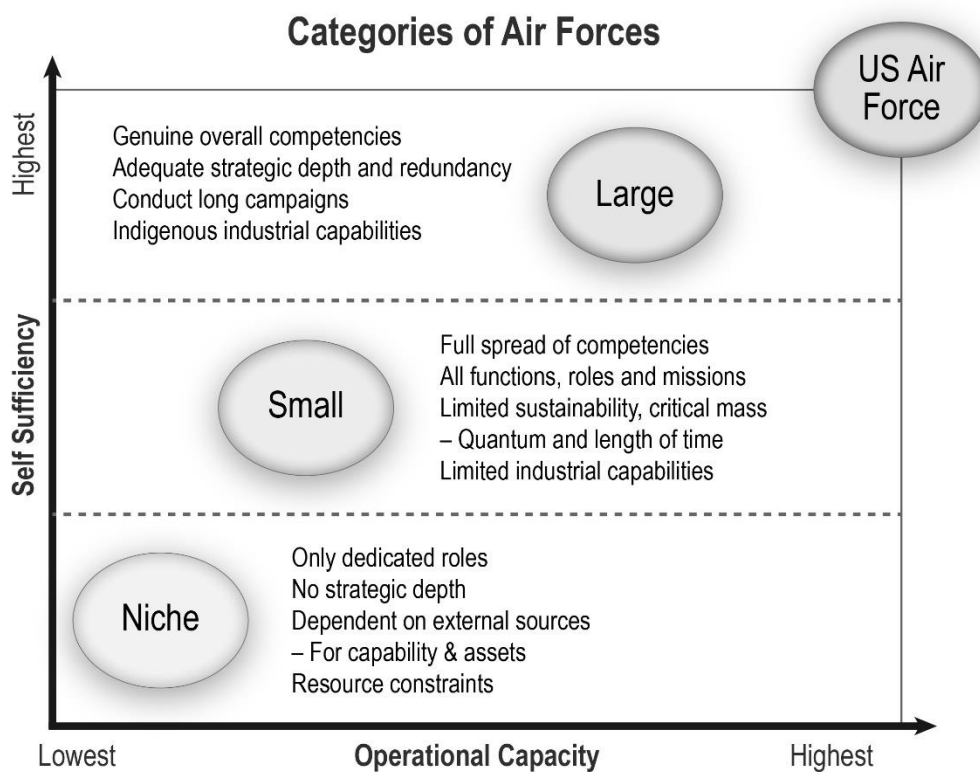
The true measure of an air force is its capability spread and its ability to be effective across the spectrum of conflict, when and where required. It is universally accepted that air power is a technology-driven and resource intensive capability to acquire, employ and maintain. These two aspects—technology and resources—individually and in combination also act as constraining factors in middle power nations being unable to develop air power capabilities on their own. In contemporary terms only a few nations have the sophisticated expertise and resource-base to embark on aviation-related research and development, which is a pre-requisite for subsequently developing adequate air power capabilities. Some nations have also embarked on collaborations to ensure sustainable air power developments, forming an exclusive group of air power capable nations. Since all these groups are resident in the more industrialised world, there is a distinct disparity between air power capabilities of these nations and those of the developing world, which is reliant on the manufacturing nations for their air power needs.

In a very broad manner contemporary air power could be considered to fall into two categories—one, that of the United States and the other, that possessed by other nations. There is a clear separation between air power projected by the United States and that projected by the rest of the world. Therefore, the USAF is not being considered in subsequent discussions.

Air forces around the world can be categorised into three major groups—large, small and niche—by evaluating their capabilities in terms of sufficiency and staying power. Large air forces are the ones that have genuine overall competencies across the entire spread of air power capabilities in sufficient quantities with adequate redundancy built-in to conduct long-drawn campaigns independently. These air forces will need to have a robust indigenous industrial capacity to support them and at least a collaborative research, development and manufacturing capacity.

On the other end of the spectrum are air forces that do not possess the full spread of air power capabilities and are able to carry out only a few dedicated roles and functions, in a limited manner and for a limited period of time. These are called niche air forces. The reasons for the restricted capability spread could be many and varied, ranging from political decisions to resource constraints. Niche air forces would normally be completely dependent on external sources for building the necessary air power capability, even though they are limited, and would not be supported by any indigenous industry. From a national security perspective, niche air forces will only have very limited influence on the national security strategy.

Situated between these two extremes is a small air force. Small air forces have resident capabilities to undertake the full spread of air power operations independently but are limited in their sustainability, both in the quantum of air power they can produce in one time as well as in terms of the length of time they could operate at the desired level. The indigenous technological, industrial and infrastructural support available to these air forces would also be limited in both capacity and sustainability. However, these air forces will be balanced and with all-round capabilities, albeit with limitations and therefore they would make capable allies, able to contribute substantially to coalition operations.



Small Air Forces – Explained

A single definition will not be able to encompass all small air forces, other than one that is sufficiently broad and generic in nature. The factors that contribute to making an air force large, small or niche are many, multifaceted and could even be contextual in their influence. There are four key factors that must be considered when categorising an air force. However, there could also be other minor factors that could influence the status of an air force that may apply to some air forces. These unique factors are not being discussed since they do not have universal application. The common factors are—size, capability, national technology base and maturity of doctrine.

Size. Size of an air force—both in numbers of air assets and personnel—influences the status in a double-sided manner. An air force that has insufficiency in numbers leading to limited sustainability and only marginal ability to bring sufficient weight of attack would always remain a small, or even a niche, air force. However, the corollary is not true. Possession of a large fleet of aircraft and other airborne systems and/or having a large number of personnel in the force does not automatically confer the status of a large air force. Numerical strength must be considered in relative terms to the quantum of air power that a force can generate. The influence of numerical preponderance will only be felt if the individual systems have a minimum assured capability. Lenin’s famous dictum, ‘Quantity has a quality all its own’, will have to be qualified when being applied to air power—the ‘quality’ of the ‘quantity’ will determine the influence that numbers can bring to bear in determining the status of an air force. In assessing the size, it must also be borne in mind that size is relative. An air force that is considered highly capable vis-à-vis size and numbers in a regional context need not be able to achieve the same status in a global context. The importance of size as an influential factor in categorising an air force rests on the fact that, all other factors being equal, numbers would become the prime consideration in ascertaining the overall capability of a force. However, even such an appreciation would be open to variation since a number of integral and extraneous factors impinge on the influence of numbers in determining the capability or categorisation of an air force. It is obvious that size, both actual and relative, cannot be used as an independent benchmark to determine the categorisation of an air force, even though it will remain a crucial contributory determinant.

Capability. The capability of an air force is determined by its ability to achieve the laid down objectives and the context of the operation being undertaken. The context assumes great importance in assessing capability since a small air force may be very effective in a regional context and only marginally effective in a global situation. Context is more applicable to the assessment of the capabilities of small air forces. Four key elements influence the capability spectrum of air forces—equipment, sustainability, training and attrition tolerance.

- **Equipment.** An air force must possess air power systems of adequate sophistication in sufficient numbers in order to produce the necessary mass to make the application of air power effective. For small air forces the ability to create mass will always be a function of availability of the systems necessary, which in turn will depend on resource availability and the political environment. This statement is premised on the fact that smaller economies are unlikely to have the necessary indigenous industrial capability to create and/or sustain air power capabilities independently. The national economy and international political

influence will have a direct bearing on a small nation's ability to field an air force of calibre, even if it is a small air force.

- **Sustainability.** A definitive measure of an air forces calibre is its ability to sustain operations across the spectrum of conflict at the necessary tempo for the duration that is required. In the case of small air forces this duration could be measured in days or weeks and cannot be indefinite. It is true that small air forces are normally developed to sustain an anticipated operational tempo for a pre-calculated duration. However, a number of disparate elements influence this capacity, making the production of sufficient quantum of air power of the needed calibre and sustaining its application for the necessary duration the biggest challenges that small air forces face. For a small air force, assurance of sustainability is the touchstone on which its calibre is measured. A correct balance of resident capabilities that have been developed taking into account national security imperatives and ensuring that a base level of national support infrastructure for aviation activities are available are two measures that would go a long way in ensuring sustainability in small air forces.
- **Training.** The increasing sophistication of the systems that generate air power makes training a cornerstone in developing and sustaining a capable small air force. Such training will have to be technology-oriented and intensive, thereby making it relatively more expensive. The current concept of training is to rely heavily on simulation and virtual training, which is also extremely high-tech and expensive. In certain cases, virtual training environment may not be within the reach of small air force, which would then have to rely on allies to ensure adequacy and quality of training. Even though there is no way around this conundrum, such a situation is not an optimum solution. The age old adage, 'you fight as you train' should be kept in mind while creating the training regime, especially for a small air force. Ideally, a small air force's training regime should be tested and flexible in order to ensure that its operational efficiency is maintained at the required level. The absorption of training is dependent on the calibre of personnel. Since small air forces would be numerically limited, the need to recruit, train and retain personnel of the right calibre assumes much greater importance. Further, the calibre of air force personnel would be directly influenced by the national technical educational base and affects a small air force more than a large one.
- **Attrition.** Attrition—both of own forces as well as those of the adversary—has become both a political and moral issue in recent times. There is an increased sensitivity towards attrition, especially in democratic nations, which is equally applicable across the board irrespective of the category of the air force. From a purely academic point of view, there are two facets to attrition—attrition absorption and attrition tolerance.
 - **Attrition Absorption.** Attrition absorption is a function of the numbers in an air force in that it is an analysis of the percentage loss that an air force could accept and yet function without diluting its warfighting capabilities. The point at which an air force would suffer operational deterioration because of operational losses can be calculated fairly accurately. When an air force, irrespective of its status, reaches this pre-calculated point, it would be come strategically unviable. It is obvious that small air forces are more susceptible to such degradation than a large air force, purely because of the numerical constraints that it operates under. Attrition

absorption capacity is also affected by extraneous factors such as the strength of political alliances and the assurance of resupply.

- **Attrition Tolerance.** The moral and psychological reactions of a nation to its own human casualties forms an indelible part of what could be termed ‘attrition tolerance’ of an air force. In turn, the acceptance of attrition is a function of a number of non-quantifiable factors that include, but is by no means restricted to, the force’s own attitude to casualties; the nation’s ethos towards war and the support for the conflict being undertaken; the context of the war; and whether the conflict is one of choice or necessity. In the case of small air forces, loss of trained personnel will have a much greater impact than in the case of larger air forces. Small air forces will have to ensure that they retain the ability to operate at the required tempo and intensity for the duration specified by national security imperatives irrespective of attrition

A balanced combination of attrition absorption and tolerance capabilities is necessary for a small air force to function efficiently. Both these facets are intertwined and clearly indicate the status of an air force. Small air forces are particularly prone to the vagaries of attrition and must evaluate the impact of attrition absorption capabilities and its tolerance capacity on the overall performance graph of the air force being evaluated.

National Technology Base. Since air power is almost completely technology-enabled, the technology base of a nation can be used as a benchmark to assess the status of its air force, along with other elements that are being considered. The national technology base, in turn, is a product of three other factors—technology acceptance capability; indigenous industrial development; and resources.

- **Technology Acceptance.** This is a function of the national education system and its orientation towards technology. The availability of a technology-oriented workforce is a direct function of the national education system and impacts the capacity of the nation to support a credible aviation industry as well as an air force. The availability of a workforce that is capable of absorbing technology is a fundamental requirement for the development of a capable air force.
- **Indigenous Industry.** The capability of the local industry to support the operation and maintenance of technologically sophisticated systems will determine the air force’s operational effectiveness. Even when air power systems have been obtained from allies, the state of the indigenous industry will have a salutary influence in ensuring the logistical adequacy and a level of self-sufficiency that is important to maintain the status of the air force.
- **Resources.** Most nations are constrained in the amount of resources that can be devoted to industrial development. Aviation is resource-intensive in its developmental needs and also in its operations and so the development of technologically advanced air power systems cannot be undertaken by all nations. Aviation industry therefore becomes an exclusive enterprise undertaken by only a few nations, forming a sort of exclusive group. Non-availability of national resources influences the status of air forces indirectly.

A nation would need to have a minimum defined level of technology acceptance based on its educational system, a sufficiently developed industrial base and the ability to expend the necessary resources in order to support a small air force. The sustainability of such an air force would depend on the robustness of these three factors, considered in the broader national socio-economic environment.

Doctrine. Doctrine is the statement of an air force's fundamental beliefs and philosophies and plays a central role in its operational ethos. It is also the link between defence policy and national security strategy and influences the operational capabilities of a force. Philosophical level air power doctrine has two distinct components—one that is universal and the other that is specific to an air force. Within the second component, the fundamental truths get adapted and adopted, and the variations between two air forces become apparent. An air force derives its own concepts of operations and lower level doctrine from its specific philosophical doctrine. An air force of calibre, irrespective of its status, must be able to evolve its own doctrine, based on unassailable foundational tenets that have been distilled from national experience, which has been adapted and fine-tuned in a unique manner to cater for national requirements. Imaginative doctrinal ideas will always underwrite operational success and flawed doctrine will generally bring about tactical failure. It is necessary, irrespective of the status of the air force, to ensure that the planning and conduct of air campaigns must be shaped by doctrinal concepts that should provide the 'left and right of arc' for the campaign.

Challenges to Small Air Forces

Irrespective of their status, all air forces face challenges, the difference only being the impact that these challenges have on the operational efficiency of the force. A particular challenge that could be debilitating for a small air force might be absorbed without much difficulty by a large air force, which would continue to function at the required tempo and intensity while ameliorating the challenge internally. This requires strategic depth that is only available to large air forces. Lacking the strategic depth necessary to contain major challenges, small air forces will have to anticipate possible challenges that could emanate and analyse them in advance in order to have the necessary solution already available. This is not an easy task, especially when the challenges themselves are products of uncertainties that cannot be controlled.

Challenges to small air forces could materialise from a number of factors, the primary ones being the volatility of the broader security environment, geo-strategic issues that impact the employment of air forces, air campaign planning and execution constraints and the inevitable need for small air forces to entrench their relevance within the broader national security equation.

Security Environment

The effectiveness of small air forces depends equally on its inherent capabilities and the impact and effects that it can create within the overall security environment. The emerging security environment within the context of developments in the international geo-political, economic and strategic concepts are therefore direct challenges to the efficiency of small air forces. Foreseeing the strategic direction of the emerging security environment is critical for small air forces to operate effectively as independent entities. The security environment will be directly influenced by five major issues that individually and in different combinations determine the concept of national

security. Although the perception of national security is always evolving, in turn it determines the build-up of national power elements, including the military forces. The large outlay required to sustain even a small air force makes this a critical factor in its development. The five issues that influence the security environment are: economic globalisation, alliances, international power balance, future wars, and technology.

- **Economic Globalisation.** Economic globalisation started nearly two decades ago and is still an on-going process. Depending on the manner in which globalisation impacts the well-being of a nation, it could be considered a double-edged sword. It could debilitate smaller economies, especially ones that are already weak and fragile. The progress towards an interdependent global economy has also led to the globalisation of security concerns, which has led to a change in the manner in which national security is perceived. National security is no more the mere protection of the nation's geographical borders but the protection of national interests, which could be far-flung. Small air forces might find it difficult to achieve their objectives when protecting national interests may necessitate action to be initiated in more than one front or theatre.
- **State of Alliances.** The international security environment is becoming increasingly complex, uncertain and dangerous leading to national security requirements itself being transformed on a continuous basis. Since the changes will not affect every nation in the same manner, they are bound to emphasise bilateral and multilateral tensions that might otherwise have been dormant. Changing national security needs also manifest in altering domestic compulsions on the one hand, while also determining the direction of foreign policy development. Added to this is the increased proclivity to intervene militarily in the pursuit of national security imperatives. In order to ensure that the intervention has popular acceptance, most nations prefer to do so in coalitions and with allies. Small air forces would of necessity be configured for adaptable employment within a broad coalition. Since coalitions are determined through the immediate political needs, small air forces may be forced to operate in tandem with partners who have limited interoperability. Flexibility therefore becomes the key to a small air force being a viable entity.
- **Power Balance.** There is a noticeable shift away from conventional conflicts, especially by the smaller powers, mainly because of the high probability of intervention by major powers. This trend has been further embedded on the concept of asymmetry that tends to neutralise the overwhelming advantages that large and more capable conventional military forces possess. The inherent power imbalance increases the chances of small powers and less structured non-state actors to initiate irregular actions, making asymmetric warfare the preferred modus operandi for small powers. Countering irregular warfare will stretch a small air force almost beyond its capacity. The versatility required to cater for full spectrum operations within the realm of irregular warfare, when assets are finite and system availability is limited, is of a very high order. Small air forces need to orchestrate their development to cater for the contingency of having to be fully engaged in an irregular conflict of indeterminate duration.
- **Future Wars.** It is a cliché to state that the character and conduct of war are continuously changing, reinforcing the unpredictability and complexity of all conflicts. Unpredictability of war and its ever-changing conduct necessitates the formulation of flexible and adaptable

doctrine and operational concepts that will be able to guide the military forces to achieve their primary aim of assuring national security under all circumstances. In the increasingly complex environment, the manner in which air power is employed will be contextual and influenced by the desired end-state. In an irregular warfare scenario, especially in an urban setting, only military forces with a highly developed joint operational capability will be able to prevail. The inherent flexibility and adaptability of a balanced small air force is invaluable in these conditions. Focused application of air power capabilities, at the right time and place, will be critical to the success of joint operations in the emerging environment. In countering an irregular adversary, air power's technological edge becomes a crucial element, bringing to bear its own asymmetry, to overcome even a determined adversary. Awareness of the challenges that small air forces face in these circumstances and the need to develop these air forces in a balanced manner are the first steps in ensuring that a conventional force is guaranteed success in irregular warfare.

- **Impact of Technology.** Technology has always been the catalyst for the continuous changes that are taking place in the conduct and characteristics of war. It has been the primary driving factor in the development and evolution of tactics, strategy, doctrine and broad concepts of operations. Similarly, developments in technology and its unbridled proliferation indirectly influence the emerging security scenario, making it volatile and dangerous. At the same time, improvements in technology also creates an issue that will always challenge small air forces. Technological breakthroughs increase the capability of individual systems, thus facilitating a reduction in the number of systems required to achieve a laid down task. In small air forces, the increase in capability of an individual system is viewed as a counterbalance to the number of systems needed. The pitfall is that the reduction in numbers can only be done to a certain critical number; any further reduction will lead to a collapse of the entire enterprise, since it will fall below critical mass. Technological advances that increase per unit cost of a system may not always deliver the sought after solution for small air forces.

Geo-strategic Issues

Although contemporary conflicts have developed some peculiar characteristics, a strategic analysis of the conduct of irregular warfare demonstrates that the fundamental nature of war has not changed. However, the perceivable changes have led to changes at the tactical level of war. This situation has affected air forces since they tend to be strategic arms of the nations because of their basic characteristics. The strategic nature of air forces makes them more stable in terms of their doctrine and higher level operational concepts and therefore more easily adaptable to the national security imperatives. This is true irrespective of the status of the air force—niche, small or large.

Contemporary air power has become extremely resource-intensive to maintain and operate and even baseline capabilities have become far too expensive for some nations to acquire. Therefore, it becomes critical to identify and ameliorate the challenges in order to ensure the efficacy of air forces, particularly small air forces. In a very broad manner there are three areas that must be understood and managed effectively to ensure that small air forces continue to be relevant in national security calculations. The three areas are: understanding the current status of air power, the interconnected nature of national grand strategy and air power strategy and political imperatives that impinge of air power capabilities.

Since all operations in the contemporary scenario will be joint in nature, with the three domain-centric forces being supported and supporting dependent on the context of the campaign. Since air power envelopes the entire operating theatre of operations, irrespective of terrain and geography, it becomes a binding agent that permits the advantageous application of joint force. The status of air power within the military power hierarchy will be determined by how well an air force accomplishes its tasks—both independent and within the ambit of joint operations. The complexity of the geo-strategic environment demands that a nation have an articulated national grand strategy that underpins national security. Only from such a base can a functional national security strategy and a well-conceived military strategy be developed. Air power strategy must be developed within this well-constructed process and must have direct connections to both the military strategy, and through it, to the national security strategy.

Political factors, which stem from both domestic and external issues, impinge on all aspects of an air force. Small air forces, mostly dependent on outside sources for the development of their capabilities, are particularly prone to feel the negative effects of political factors. In fact, a small air force's holistic capability is a direct indication of the political standing of the nation within the international comity of nations and the robustness of its alliances. The irrefutable fact is that political concerns and compulsions will be critically influential factors in deciding the calibre, status and influence of the air force in matters of national security.

The major challenges that normally face small air forces have been elaborated, although some nuanced challenges have not been analysed in this paper. A more detailed analysis of the challenges that small air forces must overcome in order to become an effective element of national power is available in my book, *At the Critical Juncture: The Predicament of Small Air Forces*, (2nd Edition, Air Power Development Centre, Canberra, 2019).

Conclusion

There are many characteristics—some easily discernible and others that are obtuse and nuanced—that distinguish a successful small air force from others that struggle to establish their place in the sun and at times even their independence. Small air forces achieve success only by dedicated and continuous effort, which could at times consume the entire capacity of the force. Even though spare capacity may not be available, small air forces must always strive to improve and upgrade their resident capabilities, for it is very easy to fall into an unrecoverable downward spiral and become a diminished force when functioning at critical mass. This is the bane of being a small air force.

There are six primary factors that have the maximum influence on the capability, status and success of a small air force—doctrine and its development; professional master; training; personnel management; logistics; and the quality of air power it is capable of producing. These are the major factors, within which a number of minor traits could be identified. Carefully crafting these factors to support each other mutually and blending them to form a holistic, single entity will lead a small air force to success, the indication of which will be its ability to create strategic effects in the national security arena.

AIR OPTIONS FOR A SMALL AIR FORCE

Gp Capt Zahir Uddin

INTRODUCTION

The hot-air balloon, a concept of flying object began since June 4, 1783 when Montgolfiers (two brothers, Joseph-Michel and Jacques-Étienne Montgolfiers) demonstrated their invention in Annonay, France. This historical event gave the Austrians an air option in 1849 to launch 200 pilotless, bomb-carrying hot-air balloons against forces defending Venice. In 19th century, the military used balloons for three purposes. One was for aerial bombing of military targets. The second was for aerial reconnaissance by captive balloons. The third was for fast communication by transporting personnel, mail, and equipment. Subsequently, the concept of an air machine developed further and on December 17, 1903, Wright brothers (Wilbur and Orville Wright) made successful flights at Kitty Hawk with their first powered aircraft. In 1909, the Wrights designed an airplane to meet the military requirements and made the world's first airplane for military use. Five years later, many visionaries realized an option to use airplane in military applications for achieving their national objectives and with that a major air war had begun.

Throughout history victory has been decided from the events taking place on the surface of the earth. In 19th Century, Britain came to dominate the earth by controlling oceans. But the First World War onward warfare took the skies and now controlling the air is a key part of military strategy. At first airplanes were reconnaissance vehicles utilizing third dimension to observe behind enemy lines and report back. Gradually, airplanes started taking an active role on the battlefield by dropping Flechettes spikes or bombs to hit enemy troops. Thereby, airplanes became an important weapon of war which is further developed under the pressure of improvement on technology.

To utilize airpower with appropriate strategy, air forces all around the world revolutionized and developed simultaneously with the technology and became an important strategic element for a nation's instrument of power. By the word 'strategic' it demands air force to be assigned to achieve strategic effect quickly and precisely which needs comprehensive planning at all levels of warfare. Since the advent of manned aircraft, the employment of airpower developed from traditional forms of supporting surface forces to independent air operation for strategic effect. As the time elapsed and the world experienced two great wars, the generic term 'Airpower' adopted widely as the air force projection capability which solely depends on a nation's security strategy. Thus, it is apparent that large air force will possess higher projection capability than a small air force.

Since Gulf War 1991, military strategists comprehended airpower to be very expensive war elements which need to be employed in a coordinated manner, timely and precisely. Most importantly, all air practitioners realized that airpower can also have object oriented approach to ensure the national security strategy apart from the traditional employment of airpower. Technological innovation gave them further options

to achieve national objectives with precision. Gradually, employment strategy of airpower became more mature to balance between employment and outcome.

While doing so, around the world air forces are contending with the increasing cost of acquiring and maintaining a certain level of airpower capability. This is particularly true for small air forces. The pace of change in the operational environment, nature of threat, and operational concept along with international geo-political and security environment has complicated this process. However, considering the fundamental capabilities of airpower, small air forces also need to be prepared in order to be relevant while pursuing national security objectives. Therefore, the following questions arose while dealing with the topic:

1. What air options are available for a small air force?
2. What are the challenges for implementing an air option?
3. How those challenges can be mitigated?

SCOPE

Scope of the paper is 'Air options for a small air force for achieving a nation's security objectives'.

AIM

Aim of the paper is to analyze the issue in light of a small air force and find out the answers of the above mentioned questions by

1. Discussing various air options for a small air force to achieve national security objectives.
2. Identifying the challenges for air options to implement.
3. Concluding with the mitigating measures to address those challenges.

WHAT IS A SMALL AIR FORCE

Before indulging into the subject, it is important to define a small air force. According to Sanu Kainikara, an airpower strategist at the Airpower Development Centre, Canberra, the true measure of air forces (fig-1) is their airpower capability rather than purely their numerical size. Air forces that have the entire spread of airpower capabilities in sufficient quantity and with adequate redundancy to conduct major, long-drawn campaigns independently without having to avail themselves of assistance from allies are defined as large air force. Moreover, nations with larger air forces obviously have indigenous industry and support infrastructure to be self-sufficient to a very high degree.

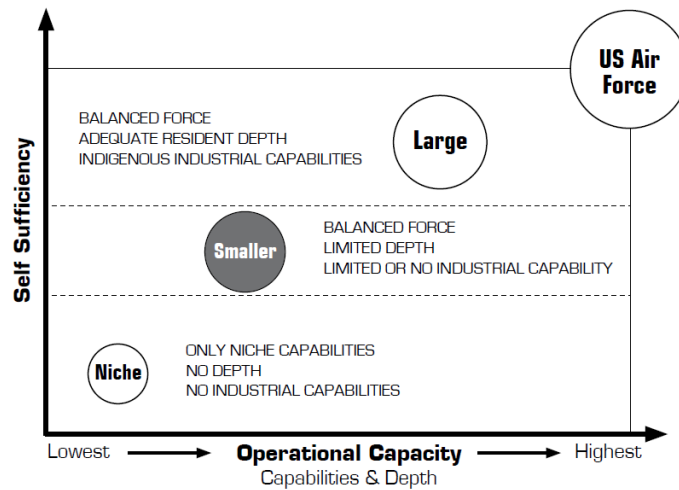


Figure 1. Measure of Air Forces

On the other hand, a small air force is one that has the systems, processes and the inherent capability to deliver all airpower functions, roles and missions as balanced force. However, sustainability of such capabilities will be limited - in terms of the quantum that can be produced at any one time, the length of time the air force can operate at the required level, and the national indigenous technological, industrial and infrastructural support available. A small air force can also be defined as the one that for some reason, such as economic, geographic, political or social, has chosen not to conduct some element or part of the complete air power spectrum. Such air force makes very capable allies and coalition partners and can bring significant capabilities to bear under the umbrella of a large air force led coalition.

AIR STRATEGY

The traditional forms of air strategy encompass counter air operation, anti-surface force operation, and strategic air operation besides combat support air operation. Since Gulf War 1991, air strategy developed through Effect Base Operation (EBO), Information Centric Operation (ICO), Time Sensitive Target (TST) and so on to ensure the employment of valuable and precious airpower are conducted with accuracy and timely fashion to achieve national objective. Thus, to ensure national security the air strategy can be transformed from traditional role oriented to object oriented. In modern days, to keep the essential elements an air strategy is developed based on objectives naming 5Ds which are denial, destruction, deterrence, decapitation, and diplomacy.

Denial

Denial strategy is to attack opponents' military strategy and eliminating military capabilities. It relates to theory of Robert Pape, a famous political scientist of USA, who believes that airpower is best used against fielded forces to either mass them for air attack or disperse them from achieving their objective. Airpower and land power should be integrated and used together to achieve strategic objective. Gulf War 1991 is such

example where the joint force concept integrated all services into one coordinated plan and ensured the maximum use of available capabilities. It degraded overall Iraqi command and control capability by 90 per cent, smashed their ability to move, destroyed literally hundreds of vehicles and inflicted 40 per cent casualties on the enemy's ground forces, making a significant contribution to the Coalition victory.

Destruction

Destruction strategy for punishment seeks to raise the costs of resistance to intolerable levels by inflicting pain on the civilian population. General Giulio Douhet, an Italian general and airpower theorist was a key proponent of strategic bombing in aerial warfare. He justified civilian punishment through destruction because he predicted that if the aerial attacks were sudden, intense, and continuous enough, wars could be won in a significantly shorter amount of time. For example, Operation ALLIED FORCE and its air campaign over Serbia and Kosovo in 1999. All possible avenues of peaceful solution having been exhausted, NATO launched an air campaign against the Milosevic regime on 24 March 1999. Ultimately, the gradual increase in air attacks on targets in Serbia increased the pressure on Serbian leadership to accept the establishment of a political agreement for Kosovo in conformity with international law and the Charter of the United Nations.

Decapitation

Decapitation strategy is an air strategy that attempts to destroy or isolate opponent's leadership. This is to include the theories of John Warden and his supporters, who advocated attacks against leadership related targets which are the principal weakness of a state and represents the quickest and easier method of defeating an opponent. Leadership decapitation increases the chances of a rapid end to insurgencies; enhances the probability of a government victory; reduces the intensity of violent conflict; and decreases the number of insurgent attacks.

Deterrence

Deterrence strategy to ensure national security is the major elements that most nations examine while formulating their security strategy. Thomas Schelling's classic work on deterrence puts forth a general concept of deterrence theory which is not about war but is the art of coercion and intimidation. It is about credibly signaling the power to hurt and inflict pain on a potential adversary as a way to avoid ever having to fire a bullet. In real sense it merits the force projection capability of a nation.

Diplomacy

Diplomacy is an effective strategy of defending vital national interests, building necessary partnerships, preventing conflict, and expanding national influence. Adam B. Lowther, a research professor and director of the Center for Academic and Professional

Journals at the Air Force Research Institute (AFRI) endorsed that while all forms of diplomacy are designed to further state interests, air diplomacy is distinguished by the means employed to promote those interests. Simple response to a natural disaster of a country by aerial delivery serves not only to relieve the immediate crisis situation, but also to provide a visible symbol of care, concern, and consideration.

AIR OPTION FOR SMALL AIR FORCE

An air option for small air force is greatly dependent on a nation's security strategy. It determines the air force role and tasks. By nature, a nation employ its air force to defend its own airspace by implementing continuous monitoring system which includes air defense radars, interceptor aircrafts, ground based air defense systems and some other supporting elements to augment such robust monitoring system. Besides, it needs to have certain capability to make credible deterrence at all time. Moreover, an air force always remains available to meet any challenges particularly natural disasters inside own country as well as outside country if a nation is committed to response. In the present global environment many air forces work in a harmony to ensure UN mandate missions like peace support missions, peace keeping missions, peace building missions.

Therefore, selection of an air option both for role oriented and object oriented is dynamic strategy for any air force, be it large or small. Definitely a large air force enjoys more flexibility than of a small air force. As mentioned earlier, the selection process heavily depends on a nation's security strategy. Formulation of a nation's security strategy again connected with its present security environment, economic growth along with international geo-political situation. Moreover, nature of threat has transferred from conventional to unconventional, confined geography to a wide spread areas, and clear targeting to blur images. Accordingly, operation environment has taken different shapes which further made a nation difficult to formulate employment strategy of its own instrument of power. Globalization, where the whole world is incorporated into a single world society, made a great concern for every nation to shoulder responsibility of world peace and stability. Air forces need to be adaptable and flexible enough to keep up with the pace of change, and be innovative in transforming their capabilities harnessing the inherent characteristics of airpower. This is especially true for small air forces in achieving security objectives of a nation. Therefore, for a small air force, the best air option can be to adapt a flexible air option, of course not compromising its primary role and tasks.

THE CHALLENGES FOR IMPLEMENTING AN AIR OPTION

A nation always wishes to have a strong air force whether it is small or large to ensure its national security. For all small air forces it will be hard enough to improve own capabilities up to a nation's desire until they are supported by all concerns particularly politicians through economical support to develop and sustain. Besides, there are many other challenges can be considered for a small air force to implement a flexible air option.

Right Strategy for Airpower

Sanu Kainikara stated in his working paper on '*The Future Relevance of Smaller Air Forces*' that it is a prime requirement for all sovereign states to have an articulated national grand strategy, especially in a volatile politico-strategic environment. Based on that grand strategy, a functional national security strategy and a well aligned military strategy will be developed. This process is critical to define the status and position of the military forces within the national security process - failure to do so invariably producing lopsided national security strategies and obviously unsuitable military strategies. Airpower strategy, developed within the ambit of this involved process, will have to take into account not only the resident capabilities of the nation's air forces but also the broader strengths and vulnerabilities of the nation. With airpower being an inherently offensive force projection capability, the development of its strategy is particularly susceptible to this factor. More than any other power projection capability, airpower is prone to derisive attacks in the media when unforeseen and unfortunate instances of collateral damage occur in its application. Any collateral impact of air power is readily visible and the political sensitivity to such damage. The media reporting often imposes additional constraints on the offensive use of airpower and negatively impacts the free development of right strategy for airpower.

Operational Environment

In 2016, Joint Air & Space Power Conference was conducted on a theme 'Preparing NATO for Joint Air Operation in a Degraded Environment' where the operational environment for air force was amply discussed. It was revealed that modern air power is a high tech business and it is completely dependent on the ability to gain unrestricted and assured access to the entire electromagnetic spectrum, space, and, gradually to cyberspace. Environmental degradations imposed by an adversary have a massively devastating effect on the ability to successfully project air power across all its roles. Thus, the operational environment has swiftly transformed from benign into a non-permissive and contested environment with major challenges and problems. The old strategy for war to secure own domain of a country has completely changed where adversaries develops strategies aiming at neutralizing the superior war fighting capabilities of conventional military forces by the use of asymmetry and guerilla-type strategy. They are no more confined to a defined geography rather they spread their activities across the border and behave agile to evade the identification. This has direct implications particularly for small air forces to define an operational environment and develop the right strategy for air operation.

Targeting Philosophy

Introduction of the 3rd dimension impressed air power exponents like Douhet, Trenchard and Mitchell, who persuasively advocated the future of air power. They predicted that air power would largely influence the outcome of any future wars at all level. They also believed that airpower is inherently strategic as it operates in the 3rd dimension enabling it to bypass the tactical surface battle and operate directly against the centers of gravity (COG) of an enemy. Following their theories, targeting philosophy like targeting civilians, city and industrial base by mass bombing evolved causing much controversy. Over the time because of the technological development, nature of warfare including targeting philosophy has changed which is evident from recent history. The physiological, Ideological, economical and ethical factor called for a new and acceptable targeting philosophy. Present day, another famous air power exponent, Col John Warden came up with the widely excepted five ring targeting theory which was effectively used during 1991 Gulf war and a significant revolution of modern military occurred by the transition from the serial warfare of World War II to the parallel warfare. Much of these present day targeting theories and models are for the large air forces and coalitions with numerous assets. It is not practically possible for small air forces to follow these theories and models primarily due to recourse constraints, and then due to rapid technological development in the field of airpower.

Jointness

Jointness is an easy platform for a small air force to implement a flexible air option. But integration all services into one coordinated plan is a crucial task for all military leaders. Air force primarily is assigned to gain and maintain control of the air. No other operation can be efficiently conducted unless control of the air is assured. The fact is that the military forces of the advanced world have been able to easily win control of the air in all operations since the 1960s. The last fully contested battle for control of the air was during the Korean War. Since then control of the air became the critical need for a dedicated air campaign. It is often believed that an air campaign is meant to be assigned against opponent's airpower. It's not always true while a strategic target deep into the enemy territory needs to be destroyed with precision. In such context, having real time information using 3rd dimension become a critical element for conducting a joint operation. Proactively, army, navy and air force want to take a lead to exploit 3rd dimension and bring success to their own table. At this point, integrating all services involved in a joint operation need careful planning and design so that a small air force can assign its airpower judiciously with a flexible air option to achieve goals of joint operation and in turn national security objective.

Command and Control (C2)

According to 'JP-102', C2 is defined as the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Personnel, hierarchy of forces, process of

communication, and technology are the key factors to materialize an effective C2 system. Information and Communication Technology (ICT) enables C2 systems to fully utilize the primary strengths of airpower speed, reach and height. These strengths of air power can only be utilized to the fullest if the decision making and dissemination process is fast. Air force becomes a distinct force to utilize C2 system which encompasses the whole spectrum of information gathering, assessing, decision making, and engagement. Advanced C2 systems are technologically and financially very high demanding and costly affair where many developing nations around the world are having difficulties to acquire. For a small air force, it is further difficult to attain a certain degree of C2 system which could be a barrier for having a flexible air option.

PROPOSED MITIGATION OF THE CHALLENGES

National Security Strategy

'National Security Strategy-2018' of USA lays out a strategic vision for protecting the territory, sovereignty and the 'American way of life', promoting prosperity, preserving peace through strength, and advancing US influence in the world. This beautiful vision further connects to the 'National Defense Strategy-2018'. The Department of Defense's enduring mission is to provide combat-credible military forces needed to deter war and protect the security of our nation. Should deterrence fail, the Joint Force is prepared to win. Reinforcing America's traditional tools of diplomacy, the Department provides military options to ensure the President and our diplomats negotiate from a position of strength. Such strategic vision and mission allow military forces to develop their own strategy to achieve the national objectives. Again the national security strategy must not have any big change as the process to ensure the appropriateness of air power strategy is complex and requires constant refinement to ensure its broader alignment with national security strategy. Above all, the example of US surely demands to have a clearly spelled out National Security Strategy particularly for the leaders of small air force to structure his force appropriately and develop a sound doctrine for the implementation of a flexible air option.

Collaboration & Cooperation

Resource constraint is a common issue which limits small air forces to develop at its full strength. With the growing operational need there is a possibility of force overstretch and gradual degradation of overall capability. It further degrades maintenance, operational readiness and morale of a small air force. Collaboration and cooperation with allies' nation is an option to maximize the operational capability of a small air force. This can only be achieved through mutual understanding, military engagement for training exercises, sharing knowledge, and exchanging experiences. Therefore, it is possible to avoid force overstretch which is critical to ensure the performance of a small air force. Importantly, it allows a small air force to make a realistic campaign plan for evaluation and ascertain actual operational competency, ensure operational readiness at an acceptable level, and finally remain flexible to act

effectively for achieving a national objective. It is to be remembered that such cooperation collaboration must take place among all national defense forces for joint campaign so that a clearly defined C2 is achieved in peacetime.

Training

Having a right strategy for airpower and mutual collaboration and cooperation are not enough if a small air force lacks in training. Challenges like degraded operation environment and targeting philosophy remain if all personnel of a small air force are not educated about the consequences of such challenges. As such, a small air force needs to recruit, train and retain well-educated personnel to be effective particularly in 21st century. Leadership models of 19th century will not work for 21st century recruits. There is a phrase, 'Educating the leaders to lead the educated'. It applies to all air forces but particularly to a small air force it attempts to advance their capabilities. In present context, to keep pace with advancement of technology and exploration of different medium to employ airpower a small air force needs well trained educated personnel. This will open up many fronts to rethink and redesign its employment strategy of airpower for achieving national objectives.

CONCLUSION

Following the modern global concepts, many nations are committing each other to make alliance for facing the future challenges. Nations are getting engaged to shoulder responsibility beyond its border with the whole of government approach. Being an element of national instrument of power, air force with its airpower capability is capable of playing a vital role to support national security strategy. The key functions of airpower is to gain and maintain control of the air for specific time and space, obtain situational awareness, shape the environment to influence adversary, respond to defeat enemy and remain align with political objectives. Besides, air forces have the ability to contribute to ensure a stable and secure environment provided they have the necessary capabilities. Operational environment is changing, and target has been transformed from fixed to mobile and agile. Accordingly, air planners do not plan conventional air campaign which is role oriented, rather they also plan for object oriented 5D air campaign which is cost effective with maximum outcome to achieve national security objective. While doing so a small air force may chose for a flexible air option which will allow air planners to suite the national requirement. However, it needs to have certain capability of credible deterrence.

Challenges like not having right strategy for airpower, degraded operational environment, inappropriate targeting philosophy, and joint campaign with hazy C2 system need to be considered which makes air planners difficult to choose a flexible air option. However, these challenges can be mitigated by a clearly spell out national Security Strategy, Collaboration and Cooperation at all levels, and finally having a robust training to prepare all personnel in a small air force.

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Algorithms of Airpower: Four Future Scenarios for Small Air Forces in 2035

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In one of the most important works to be written about airpower theory in the last twenty years, world-renowned strategist and thinker Colin Gray expounds on the necessity of writing doctrine in the context of a “longue durée” approach.¹ Yet, far too often, technology-centric Air Forces let the lure of technology lead them to produce unsound doctrine. Elsewhere in his 2012 work, Gray insists that we have all the historical examples we need to think about airpower soundly now and into the future.

But recent developments in artificial intelligence force us to wrestle with Gray’s assumptions. How much will artificial intelligence change airpower? Will AI transform the very nature of war, as former U.S. Secretary of Defense James Mattis and others have wondered? It is impossible to answer this question definitively, and thus sound preparation for future warfare requires active yet skeptical engagement with AI.

Small air forces must begin by developing a sound long-term strategy for investing in and incorporating AI into one’s air force focused on their nation’s most likely and most devastating threats. Regardless of what strategy is chosen, in the meantime, Air Forces offer a natural focal point to lead AI development. As such, they must lead the way for making investments in human capital, which will benefit the Air Force no matter how AI unfolds in the future.

The Sri Lankan Air Force has a strong history of using its aircraft for both military and civilian purposes. Just as it has used airplanes for dual purposes, so, too, its investment in human

¹ Colin Gray, *Airpower for Strategic Effect* (Maxwell Air Force Base, Alabama: Air University Press, 2012), 58.

capital to establish the foundation for future AI developments that will benefit not only the Air Force but the military and, indeed, the entire nation.

Still, to say there is a tremendous amount of hype surrounding the future of AI is an understatement. Vast differences of opinion surround debates about what the future holds. On one end, there are those who doubt that AI will have a substantial impact on future warfare. Sean McFate—an American professor at the National Defense University, whose students include many future generals—insists that AI is a one-trick pony that can “barely accomplish basic cognitive tasks” (15). In a related but more sophisticated approach, Thomas Rid argues more compellingly that the “rise of the machines” has ceased, namely because defensive cyber solutions cannot provide adequate defense to the same computers without which AI cannot function. Some have suggested that AI can solve defensive vulnerabilities, providing a kind of turbo-charged defense.² The problem, however, is that AI will also enable equally sophisticated cyber offense. In a more middle-of-the-road approach, by contrast, Jonathan Clifford argues that the impact of AI on warfare will be very evolutionary and not result in fundamental changes to war’s nature. AI will affect almost every facet of warfighting, but not in such a way as to be fundamentally unrecognizable from today.³

By contrast, the prophets of doom and gloom emphasize the speed of future conflict and the devastating and destabilizing consequences of that speed on what they have called “hyperwar.” Amir Husain, for example, insists that the ability for humans to react quickly enough to participate significantly in the decision-making process will be compromised, with John Boyd’s famous OODA

² See, for example, Amir Husain, *The Sentient Machine: The Coming Age of Artificial Intelligence* (New York: Scribner, 2017).

³ Jonathan Clifford, “AI Will Change War, But Not in the Way You Think,” 2 Sept 2019, <https://warontherocks.com/2019/09/ai-will-change-war-but-not-in-the-way-you-think/>.

loop cycle becoming more like an OODA point.⁴ In providing a vignette of a ship under attack, for example, he posits that the ship's AI will make a hypothesis, research it, and confirm it in "less than a second."⁵ By contrast, a human's brain simply cannot process so much information so quickly; as a result, in this scenario, a human makes only one decision: whether or not to fire.⁶ Such arguments, however, tend to suffer from technological determinism, or the assumption that the side with the best technology wins. If two sides have AI, the logical thinking goes, then the one with superior AI should win. Meanwhile, they tend to ignore or deemphasize how algorithms always reflect the human limitations and biases of their programmers.⁷

In addition to AI's potential effect on kinetic or physical destruction, futurists of the doom and gloom school also emphasize AI's increasingly powerful non-kinetic effects that can disrupt how populations think. Very soon, for example, "deep fakes"—or videos made by computers that appear to resemble popular figures—will flood the Internet.⁸ A well-respected figure spewing racist or hateful rhetoric, for example, might quickly sow confusion while eliciting a slew of strong emotions that has the possibility of quickly and strongly impacting public opinion.

⁴ Husain, *Sentient Machine*, 90.

⁵ Husain, *Sentient Machine*, 98.

⁶ Husain, *Sentient Machine*, 90 and 96.

⁷ See, for example, Karen Hao, "This is how AI bias really happens—and why it's so hard to fix," *MIT Technology Review*, 4 Feb 2019, <https://www.technologyreview.com/s/612876/this-is-how-ai-bias-really-happensand-why-its-so-hard-to-fix/>.

⁸ See James Giordano and L.R. Bremseth, "Emerging Technologies as Threats in Non-Kinetic Engagements," *U.S. Army Mad Scientist Blog*, 13 December 2018, <https://madsciblog.tradoc.army.mil/tag/kinetic-and-non-kinetic-domains-of-warfare/>; James Vincent, "AI Deepfakes are Now as Simple as Typing Whatever You Want Your Subject to Say," 10 June 2019, <https://www.theverge.com/2019/6/10/18659432/deepfake-ai-fakes-tech-edit-video-by-typing-new-words>.

These developments will occur in the near future on the back of recent advances in deep learning in the realm of artificial narrow intelligence (ANI), which can only function in specific contexts. ANI, for example, has recently beaten humans at poker. But have this algorithm face off against humans tomorrow in the game of checkers and it will do no better than a toddler. By contrast, artificial general intelligence (AGI) holds the possibility of adapting to a variety of situations; some experts also believe it will quickly outpace human thinking in ways that may even pose an existential crisis.

While some doubt that AGI will even be possible, the reality is that ANI is here, and it has already begun to influence how humans think. As a result, the power of social media—which increasingly shapes not only our daily habits but our reference points for truth—will increasingly shape our most deeply-held beliefs thanks to the power of algorithms. As the authors of *LikeWar* describe, AI “can spin a personalized narrative for every resident in a country. The network never sleeps, and it’s always learning. In the midst of a crisis, it will invariably be the first to respond, commanding disproportionate attention and guiding the social media narrative.”⁹ These trends already affected the US presidential election of 2016, when the Donald Trump campaign and Cambridge Analytica demonstrated its ability to target individuals with personalized ads that played to the individual viewer’s emotions. As these capabilities increase exponentially, they potentially result in the possibility of a world that—even without AGI—is difficult for humans to control:

No longer will humans be reliably in charge of the machines. Instead, as machine steer our ideas and culture in an automated, evolutionary process that we no longer understand, they will start “programming us.” . . . The information conflicts that shape politics and war alike are fought today by clever humans using viral engineering. The LikeWars of tomorrow will be fought by highly intelligent, inscrutable algorithms that will speak convincingly of things that never happened, producing “proof” that doesn’t exist.¹⁰

⁹ P.W. Singer and Emerson T. Brooking, *Like War: The Weaponization of Social Media* (New York: Eamon/Houghton Mifflin, 2018), 255.

¹⁰ Singer and Brooking, *Like War*, 256.

The problem will not be that humans and machines think differently, but that machines will begin to control how we think in subtle yet powerful ways. This does not require AGI, just an enormous amount of data. As a result, any consideration of ANI that is already here or will shortly be here must think carefully about the cognitive domain.¹¹

Application of AI to Small Air Forces: A Case Study of Sri Lanka

As has just been shown, there is a tremendous difference of opinion regarding how AI will shape warfare. Thus the rest of this paper will provide four different scenarios, some of doom and gloom and others that are more measured and conservative. Running throughout each of them, though, is the importance of human capital, which in many ways is a far less costly investment than buying expensive state-of-the-art technology that will pay far greater dividends.

The current state of the Sri Lankan Air Force (SLAF) as well as its historical usage is instructive. Beginning with internal self-defense in 1971, the SLAF has been used in a variety of roles that have established a pattern for pursuing a balanced set of missions focused on external and internal defense, mobility, and ISR. It also has blended commercial and military missions in a way that provides added flexibility. Currently, the nation's fleet consists of one Israeli fighter and three Chinese interceptors, two maritime patrol airplanes, seventeen transport aircraft, 47 helicopters, and

¹¹ Kai Fu Lee, for example, argues that recent and significant developments in deep learning have set the stage now for enough "tinkering," or what he views as enough for entrepreneurs to set in play enormous transformations in society (92, 94, 13). These kinds of developments will be the work not of elite AI researchers but average AI engineers (14). Kai Fu Lee, *AI Superpowers: China, Silicon Valley, and the New World Order* (New York: Houghton Mifflin, 2018).

12 trainers. In making future acquisitions, Sri Lanka actively seeks to improve its fighter aircraft, leading to serious discussions with Pakistan to spend \$400 million acquiring twelve JF-17 fighters.¹²

One must also consider the particular context of the nation itself: Sri Lanka is in a relatively advantageous geographical position in South Asia while occupying a strategic position just to the south of India. Its most pressing current problem may be that of national debt.¹³ And developments in AI may not prove enormously disruptive to its economy. Continuing to grow as a tourist destination, for example, helps insulate the nation, as service jobs are relatively safe.

In shifting toward AI, it is useful to consider the nations of Israel and Singapore as somewhat analogous to Sri Lanka's situation in important ways. While significant differences exist between the individual situations of all three nations, each has the potential to invest in human capital which, when following a sound AI strategy, can act as an important force multiplier to increase national security dramatically. Indeed, AI offers the best alternative for Sri Lanka to continue to improve its economic standing while financing the airpower of 2035.

Future Scenarios for Small Air Forces in an Age of Airpower

An effective Sri Lankan air force must consider a range of key factors including: 1) cost 2) external security needs 3) internal security needs. To consider these factors, four scenarios have been developed along two axes. First, the vertical axis stresses the range of options regarding how much Sri Lanka chooses to invest in human capital. This decision is of the utmost importance because it highlights a choice the nation can make regarding how artificial intelligence affects it. If it does not invest heavily in human capital, the nation will struggle to respond kinetically as well as non-

¹² Pierre Delrieu, "New Fighters for Sri Lanka," 10 July 2017, *Asian Military Review*, <https://asianmilitaryreview.com/2017/07/new-fighters-for-sri-lanka/>.

¹³ Umesh Moramudali, "Is Sri Lanka Really a Victim of China's 'Debt Trap,'" *The Diplomat*, 14 May 2019, <https://thediplomat.com/2019/05/is-sri-lanka-really-a-victim-of-chinas-debt-trap/>.

kinetically to both external and internal threats. As compared to its counterparts in South Asia, Sri Lanka benefits greatly from a high literacy rate. Yet it is important to note that it currently is not investing as much in education. It spent 2.1 percent of its GDP on education in 2015, for example, in contrast to India and Pakistan, who spent 3.84 and 2.5 percent, respectively.¹⁴ In 2016, by contrast, it made a notable increase, which the SLAF should prepare to capitalize on.¹⁵

The horizontal axis, by contrast, explores how dramatically AI might affect airpower, with the left side featuring advances in artificial narrow intelligence (ANI) to the more drastic unleashing of artificial general intelligence (AGI) on the right. This axis, it should be noted, is largely out of Sri Lanka's hands, as one can expect these breakthroughs to occur in either China or the US and then spread.¹⁶ Still, it can take steps to prepare to accommodate it and benefit from it as much as possible.

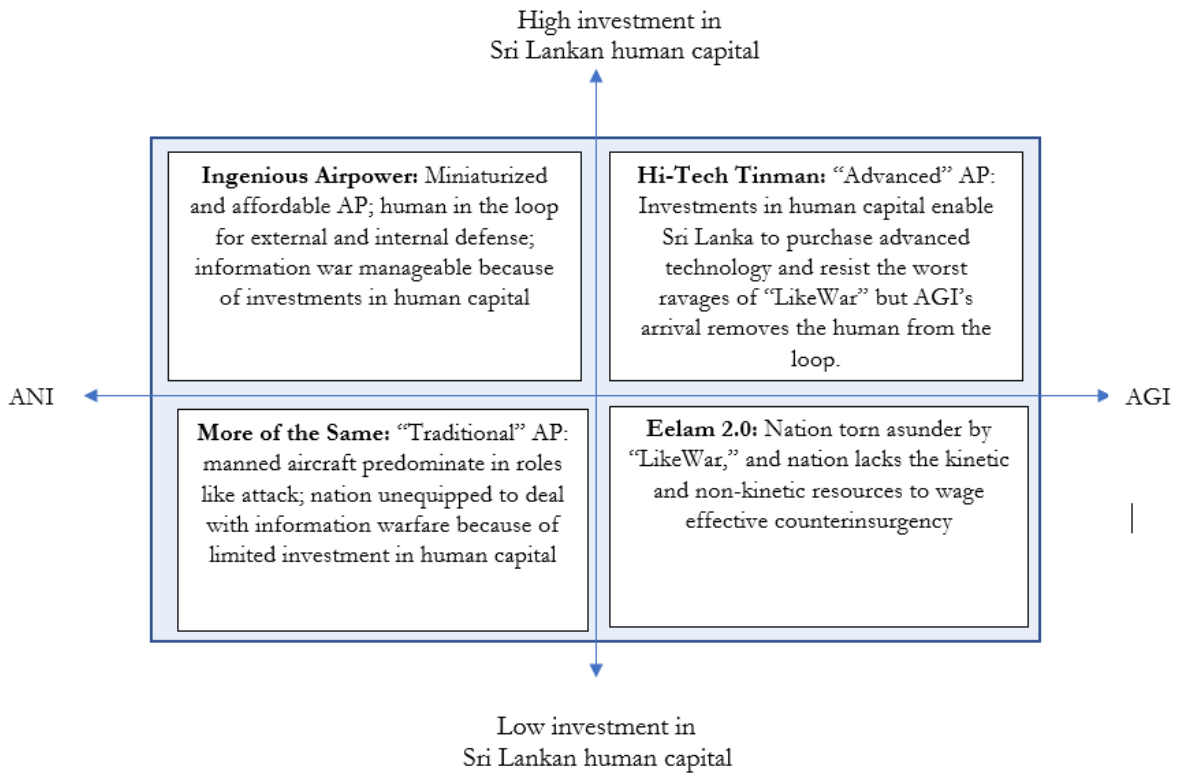
These two axes produce four different airpower paths for SLAF. The best case scenario is "Ingenious Airpower," which enables affordable yet modern kinetic and non-kinetic effects, drawing on the SLAF's tradition of balanced airpower. By contrast, in "More of the Same," Sri Lanka does not invest in human capital, thus limiting the effect of its expensive investment in new fighter aircraft. The worst-case scenarios showcase the potential effects of AGI. In Eelam 2.0—characterized by a SLAF with limited resources to wage traditional counterinsurgency while struggling with the worst ravages of so-called "LikeWar:—the institution departs from its ethical codes upholding the use of precision airpower. In this scenario, it struggles to use kinetic and non-kinetic effect to subdue the raging emotion of unemployed and underemployed workers. Even

¹⁴ Justine D'Souza and Thomas D. Moore, "Education in Sri Lanka," 16 August 2017, <https://wenr.wes.org/2017/08/education-in-sri-lanka>.

¹⁵ "Sri Lanka LK: Government Expenditure on Education: Total: % of GDP" <https://www.ceicdata.com/en/sri-lanka/education-statistics/lk-government-expenditure-on-education-total-of-gdp>.

¹⁶ Kai Lu Fee, *AI Superpowers*.

worse, “Hi-Tech Tinman” features the worst fears of AGI, a world in which Sri Lanka’s investment in human capital backfires to some extent, as it loses control of the AI that previously allowed itself to become far more efficient and thus fund more modern airpower platforms.



Scenario One: More of the Same

Sri Lanka makes some investments in artificial intelligence, but nothing commensurate with its economic power as a nation ranked #61 for its GDP. Still, contracts with businesses based around the world result in improvements in personnel management, scheduling, acquisition, and logistics that all save significant amounts of money.¹⁷

¹⁷ For logistics, see, for example, *Artificial Intelligence and the Future of Defense: Strategic Implications for Small- and Medium-Sized Force Providers* (The Hague Centre for Strategic Studies, 2017), 35 and 73.

The SRAF also continues to pursue manned airplanes, including costly new fighters. In this manner, it replicates the US Air Force, which has been slow to use unmanned aircraft to perform strike missions.¹⁸ The long-term staying power of the US’s “big-ticket military items”—including a new stealth bomber that has now become operational in this scenario—are , but largely irrelevant.¹⁹ F-35s continue to roll out as well, but the Air Force has converted them into unmanned aircraft after artificial intelligence-piloted planes kept defeating manned ones at Red Flag, the institution’s premier training event.²⁰

Sri Lanka continues to maintain its internal and external security because artificial intelligence has not made many developments since its recent successes in deep learning, thus massive societal displacement has yet to occur in the sphere of employment.²¹ Moreover, “LikeWar” is a distant worry. While there are more mobile accounts than citizens, only twenty percent of Sri Lankans use social media consistently, thus insulating the nation from the worst excesses of information warfare.²²

Scenario Two: Ingenious Airpower

A past vision statement of the Sri Lankan Air Force describes how it seeks to be a “well accomplished, resolute and an *ingenious* air power capable of fulfilling the aspirations of the nation

¹⁸ Paul Scharre, *Army of None: Autonomous Weapons and the Future of War* (New York: W.W. Norton, 2018), 60-61.

¹⁹ *Future of Defense*, 51.

²⁰ *Future of Defense*, 89.

²¹ Kai Fung Lee, *AI Superpowers*.

²² “Sri Lanka: The Land of the ‘Mobile,’” 6 March 2018, <http://www.enfection.com/sri-lanka-land-mobile-2/>.

and preserving the sovereignty and territorial integrity of the island.”²³ The basis for this scenario thus draws on extrapolating how Sri Lanka can put ingenuity to work amidst massive changes unleashed by AI developments. It also avoids the dominant tendency when thinking about AI to seek “incremental” changes that correspond to industrial-age militaries rather than envision a new paradigm better befitting information-age air forces.²⁴ In this period of vast military transformation due to the democratization of military technologies, smaller air forces can benefit the most by thinking unconventionally.²⁵

Thus, as China, Russia, and the U.S. continue to pour money into expensive fifth-generation technology, smaller nations might benefit from a different approach that challenges many current assumptions about national security.²⁶ This process begins by setting aside our “current mindset, structures, capabilities, partnership choices, etc.” and instead considering the “broader defense and security objectives we want to sustainably achieve.”²⁷ This can be challenging for all air forces. At a lecture given at U.S. Air Command and Staff College, one prominent airpower theorist speculated on what the U.S. Air Force of 2050 would look like. He did not start with platforms or make any estimates about, for example, how many bombers or fighters that Air Force might need. Rather, he began and ended with the kind of necessary objectives to meet national security objectives. But air forces naturally think of platforms first rather than last.

²³ Sri Lankan Air Force, Facebook page, https://x.facebook.com/SriLankaAirForceGuardiansoftheSkies/about/?ref=page_internal&mt_nav=0; accessed 8 August 2019.

²⁴ *Future of Defense*, 12.

²⁵ *Future of Defense*, 23.

²⁶ *Future of Defense*, 14.

²⁷ *Future of Defense*, 17.

Smaller air forces also can benefit greatly from the tendency of many AI corporations to provide access to their algorithms, leading to the further democratization of military capabilities.²⁸ The changes that AI unleashes have the potential to upset what we think of as typical militaries, i.e. “hierarchically organized mobile formations of uniformed soldiers equipped with a wide range of industrial-age physical technologies based (mostly) on steel, engines and firepower.”²⁹ As two European defense analysts argue, “social technologies” can be just as transformative as “physical technologies.” In other words, in regard to the Industrial Revolution, for example, we tend to focus on the material consequences of that revolution, such as the steam technology. Meanwhile we ignore how ideas similarly enabled such a revolution, such as by envisioning “division[s] of labor.”

The challenge of change, then, is not only in innovating a material product but in creatively anticipating how AI will greatly reshape these “social technologies.”³⁰ This is essential because “[s]heer cognitive [and social] intelligence has proved to be far more evolutionarily powerful than brute human . . . physical force.”³¹ This point receives credence from the west’s application of a tremendous amount of physical force over the last twenty years only to have limited effect, suggesting that the best future weapons may be those of *LikeWar*. Google’s Jigsaw, for example, uses search algorithms to anticipate who might join radical Islamic groups like ISIS. It then targets these individuals with information that challenges ISIS’ carefully-crafted narrative.³² Education is also needed to deal with a more negative and ominous future of warfare in which warfare centers not on kinetic effects but on data. This new form of precision warfare has collateral damage on

²⁸ *Future of Defense*, 56.

²⁹ *Future of Defense*, 61.

³⁰ *Future of Defense*, 62-65.

³¹ *Future of Defense*, 67.

³² *Future of Defense*, 96.

individuals' lives—especially prominent government officials and military officers—through manipulation or blackmail. In this scenario, SLAF helped to prevent such developments by proactively educating potential targets regarding how to protect themselves, again benefiting from investments in human capital.

Given the dual-use AI that SLAF has created for itself and the nation as a whole, it now has more money to modernize and make investments, which it uses not only in pursuing new aircraft platforms but also in personnel. It has begun to benefit from the scholarships it has provided to students just falling short of the fortunate six percentage of applicants who receive admittance into Sri Lankan schools. It has offered free technical training in exchange for a service commitment; as a result, diligent graduates have developed apps and algorithms that have resulted in significant savings.³³ This program has also helped to challenge the narrative that migration abroad offers the best way to obtain personal prosperity.³⁴ Likewise, SLAF has recruited Sri Lankan students with STEM training who have followed that experience with up to two years of work experience in the United States.³⁵ Their experience is sufficient to develop useful algorithms, and they appreciate the opportunity to pioneer and lead teams in their own nation.

Still, SLAF must spend wisely for internal and external defense. As a result, it seeks out continued affordability and reliance in mobility aircraft. It has tested cheap drones made of plywood

³³ For the highly competitive nature of Sri Lankan universities, see http://www.fulbrightsrilanka.com/?page_id=609.

³⁴ The World Bank, “Sri Lanka to Improve Its Higher Education with World Bank Support,” 12 May 2017, <https://www.worldbank.org/en/news/press-release/2017/05/12/sri-lanka-improve-higher-education-with-world-bank-support>.

³⁵ The World Bank, “Sri Lanka to Improve Its Higher Education with World Bank Support,” 12 May 2017, <https://www.worldbank.org/en/news/press-release/2017/05/12/sri-lanka-improve-higher-education-with-world-bank-support>.

that provide precise support to troops in need of resupply.³⁶ It also seeks to balance investments in cyber and space power. Taken together, these investments provide enhanced reconnaissance of the nation and its neighboring seas. This intelligence, surveillance, and reconnaissance is undertaken by networked and low-cost drones, which help to add to the national data set as “data” is the twenty-first century equivalent of oil.

Investments in human capital—including its 2017 receipt of \$100 million in World Bank funding for education and subsequent support—also pay off in increasing internal security.³⁷

Drawing off of Sri Lanka’s advantage as the most literate South Asian nation, students have been inoculated against fake news, having been trained to be “fact checkers.”³⁸ As a result, Sri Lankan nationalism remains strong in the face of external pressure while preventing significant cracks in public opinion, despite the nation’s ethnic divisions. Proactive national policies prevent internal tension from emerging because the nation actively has prepared its citizens for jobs immune to being taken over by AI.

Scenario Three: Hi-Tech Tinman

This horrifying scenario takes us closer to the realm of artificial general intelligence with humans removed from the loop in the application of airpower. “Tinman” refers to the character in

³⁶ Kyle Mizokami, “The Marines’ Plywood Supply Drone Is Undergoing Flight Tests,” *Popular Mechanics*, 20 March 2019, <https://www.popularmechanics.com/military/aviation/a26885819/marines-plywood-supply-drone/>.

³⁷ The World Bank, “Sri Lanka to Improve Its Higher Education with World Bank Support,” 12 May 2017, <https://www.worldbank.org/en/news/press-release/2017/05/12/sri-lanka-improve-higher-education-with-world-bank-support>.

³⁸ LikeWars; Justine D’Souza and Thomas D. Moore, “Education in Sri Lanka,” 16 Aug 2017, <https://wenr.wes.org/2017/08/education-in-sri-lanka>.

the popular movie *Wizard of Oz*, who struggles with the fact that he lacks a heart. The heart relates to the human traits that AGI, for all of its “intelligence,” cannot comprehend. The name also reiterates those AI proponents who downplay how much AI continues to reflect the human limitations of its programmers.

In this scenario, Sri Lanka’s investment in human capital has enabled it to purchase a high-tech air force equipped to defend itself against stand-off threats like hypersonic weapons with high-powered microwave technology and air defense provided by deep learning.³⁹ Unmanned drones enable persistent coverage of surrounding waterways as well as interior areas, allowing the government to maintain near-time situational awareness of potential threats.⁴⁰ In response to ecological crises, for example, SLAF efficiently delivers needed supplies to communities where roads have flooded. It also detects instances of illegal deforestation.⁴¹

Meanwhile, the Sri Lankan government defaults on a loan to China, and the Chinese government agrees to forgive the loan in exchange for requiring every Sri Lankan citizen to install WeChat, a pervasive application that combines online banking, Facebook, and other daily services all in one.⁴² Such a requirement seems like a win-win for Sri Lanka; but, with unprecedented amounts of data, it is easy for China to wage a “LikeWar” against Sri Lanka, quickly winning over its citizens to its views. An invasion is over in a matter of minutes, as new fighters bought for self defense are

³⁹ Heather Venable and Clarence Abercrombie, “Muting the Hype over Hypersonics: The Offense-Defense Balance in Historical Perspective,” 28 May 2019, <https://warontherocks.com/2019/05/muting-the-hype-over-hypersonics-the-offense-defense-balance-in-historical-perspective/>; *Future Defense*, 85.

⁴⁰ *Future Defense*, 83.

⁴¹ Coordinator, “Environmental Protection and Sustainable Development in Sri Lanka,” *Biodiversity Sri Lanka*, 1 Feb 2017, <https://biodiversitysrilanka.org/2017/02/01/environmental-protection-and-sustainable-development-in-sri-lanka/>.

⁴² Arjun Kharpal, “Everything You Need to Know about WeChat—China’s Billion-User Messaging App,” 3 February 2019, www.cnbc.com/2019/02/04/what-is-wechat-china-biggest-messaging-app.html.

hit on airfields before an attack can be detected. This worse-case scenario represents the arrival of hyperwar in which time to respond has shrunk to almost nothing, greatly favoring offensive first-strikes.

Scenario Four: Eelam 2.0

This scenario focuses on an externally secure Sri Lanka in which internal tensions break out because of massive societal dislocation resulting from artificial intelligence. Politically and militarily, Sri Lanka has been slow to move to adopt and invest in artificial intelligence, resulting in a data disaster. It simply does not have the data it needs to figure out how to respond internally to control its restless population through the kinetic and non-kinetic targeting of insurgents as well as innocent civilians, which increasingly fall prey to powerful narratives that promise to make the Eelma Wars that devastated Sri Lanka for decades look minor in comparison. A few well-trained engineers have been using the Internet to enflame remnants of tension from the Civil War.⁴³

Kinetically, the democratization of military technology and the rise of powerful criminal organizations within Sri Lanka have resulted in the proliferation of drones, anti-aircraft weapons, and other technology that provide a significant challenge to the SLAF.⁴⁴ On one devastating day, rebels hack SLAF drones, which then swarm into position, only to launch a coordinated attack against Hambantota Port. AI in a Chinese command and control center located at Hambantota Port responds in less than six seconds, sending a returning salvo at the Port of Colombo.

Recommendations

⁴³ Sahar Khan, “Fresh Violence Threatens Sri Lanka’s Reconciliation Process,” 7 March 2018, <https://www.cato.org/publications/commentary/fresh-violence-threatens-sri-lankas-reconciliation-process>.

⁴⁴ Aaron Stein “Low-Tech, High-Reward: The Houthi Drone Attack, 11 Jan 2019, *Foreign Policy Research Institute*, <https://www.fpri.org/article/2019/01/low-tech-high-reward-the-houthi-drone-attack/>

A nation's national security rests not only on its military but also on its economic prosperity. As even ANI looms on the verge of disrupting societies, small air forces can best prepare by advocating for an increased investment in human capital for a number of reasons: it insulates societies against the worst excesses of information warfare while enabling more efficient, affordable airpower. This human-centric approach also reaffirms the wise strategy the nation has taken in seeking reconciliation rather than punishment in healing from its civil war.

An ingenious air force continues to leverage the tradition of using airpower for military and civilian purposes, meanwhile making smart investments in affordable airpower that befits the shift toward the reality that non-state actors, including insurgents, increasingly benefit from the democratization of military technology, thus making legacy systems like fighter aircraft an increasingly risky and costly proposition. The Sri Lankan Air Force of 2035 looks nothing like that of 2019, but it is highly effective at responding to a variety of missions even as its civilian population is inoculated against the destabilizing tendencies of the ever-increasing war of ideas raging on a civilian population increasingly conducting as much of their lives online as offline, all at the mercy of increasingly powerful algorithms.

The Evolution of Small Air Power Development of the SDF from Inception to Today

0. Introduction

I would like to present the process by which Japan Self-Defense Forces (JSDF) air power developed. The JSDF has gone from having very little air power to its current capabilities. By presenting how we transitioned, I would like to show the significance of the role it played in each phase of the developmental process and further discuss current issues and ways the JSDF is approaching them.

I am pleased to be able to share some ideas with you.

1. Development of the JSDF from Inception to Today

I would like to introduce the process by which JSDF air power developed in three phases. The first phase is the period that JSDF received support from the U.S. and gradually take over roles and capabilities of air power and try to improve it (1954~1960s). The second phase is the period that JSDF tried to enlarge air power in an effort to reinforce Self-Defense Force and strengthen the relations between U.S. and Japan (1970s~the end of the Cold War). Third phase is the period that JSDF expanded the role of air power into international activities in addition to the missions JSDF already had (The end of the Cold War~). I will show the significance of the roles it played in each phase of development and the way how it developed air power despite significant challenges in the national security environment, budgetary situation, and domestic restrictions.

1.1. From Inception to be the JSDF air power of its own

In 1954 JSDF was established with very little air power. Shortly after its establishment, the core of JSDF air power was only about 150 aircraft of Japan Air Self Defense Force (JASDF) and about 60 aircraft of Japan Maritime Self-Defense Force (JMSDF). And the personnel of JASDF was only 6738.

During postwar, Japan had the policy as follows, prioritizing the economic revival of Japan, reducing defense expenditure, depending on the U.S. for defense. Based on the policy, the Basics of Defense Policy was established in 1957. The “1957 Policy for National Defense” clarified the centrality of Japan-U.S. Security Arrangements in countering aggression and build-up of defense capability step by step.

Shortly after its establishment, the JSDF received training, cargo, and fighter aircraft from the U.S. military under the terms of the Mutual Support Agreement (MSA) as part

of multi-faceted U.S. support that also included maintenance equipment, facilities, training and so forth.

The role of JASDF air power was air defense and operation of warning radars. Since 1952 Soviet often conducted violation of the territorial air. In that time U.S. military was in charge. But in the late 1950s, JASDF was required to take over primary air defense role, and the operation of warning radars was gradually shifted over to Japan. In 1958 the JASDF executed the first scramble of an on-alert aircraft of air power. In 1960 the transition of the air defense role and operation of warning radars was almost completed. After that, JASDF started the mission on its own.

Shortly after its establishment, the JMSDF only has helicopters and aircraft for training, and received patrol aircraft from the U.S. military under the terms of MSA as part of multi-faceted U.S. support.

JASDF, which was still in development, got the opportunity to proceed to the next step. In 1962 JSDF decided to introduce the Budget system, in order to respond to the increasing speed of air operations. In 1965 U.S. military stopped the operation of warning radars. As a result, only JSDF did the mission on its own. In 1969 Japan ended the MSA which supported Japan monetarily. Since then Japan has facilitated independent development and domestic production. In 1972 Okinawa prefecture was returned to Japan, since then JASDF took over the role of air defense around Okinawa prefecture from the U.S.

The air power capabilities of attacking ships and tanks were quite limited under the Japan defense policy which states that defensive force is to be used only in the event of an attack, and that the extent of the use of defensive force must be kept to the minimum necessary for self-defense. In addition, the U.S. insisted that JSDF should focus on air defense. Therefore, JSDF air power focused on air defense.

As mentioned above, JSDF air power improved very speedily by the U.S. military's support shortly after the establishment. JSDF air power was formulated by U.S. policy as well as Japan policy.

1.2. JSDF air power in the middle of reinforcing Self-Defense-Force and strengthen between U.S. and Japan (1970s~the end of the Cold War)

In the late 1960s, the security environment changed tremendously. Japan defense policy had been made under the security environment of the U.S. withdrawal from Viet Nam War, Detent, and settlement between the U.S. and China.

The U.S. declared "Nixon doctrine" in 1970, and changed the policy toward Asia. As a result, Japan had to respond to the change; that means it became difficult to rely on

the U.S as before. Japan had to contribute to democratic nations as an important member. In 1970 Yasuhiro Nakasone took office as Director General of the Defense Agency. He started to explore the self-defense of Japan. However, it didn't proceed because it concluded it would take tremendous amount of money, and some countries would be worried about Japan being militaristic and its worsening relationship with the U.S.

In that time The National Defense Program Outlines (NDPO) was established in 1976, which has served to provide basic guidelines for how Japan's defense should be tailored to achieve its end. More specifically, NDPO has covered such themes as overarching principles of national security and the roles of defense force, and, based on the foregoing, organization and force structure of the SDF as well as target force level for major equipment.

The 1976 NDPO was formulated against the backdrop of the détente in the 1970s, and adopted the 'Basic Defense Force Concept' based on the assumption that the underlying trends of international relations would not change significantly for some years to come. Rather than aiming at countering security threats head-on, this concept called upon Japan to possess the minimum necessary defense capability as an independent country so that Japan would not become a power vacuum that would be destabilizing for regional security. This concept can be characterized as having heavier emphasis on deterrent effect for preventing aggression against Japan rather than actual response in the event of aggression.

In the late 1970s, the concern about Soviet Union had been rising especially after the invasion into Afghanistan by Soviet Union. The build-up of JASDF was one of the theme and the concern how to cooperate to tackle the problem had heightened.

In 1978 the Japan-US guidelines were established. It led to defense cooperation being expanded to operations, and as a result it led to an important change to air power. Japan-US guidelines clarified the division of roles and complementary relationship that Japan mainly do the defensive operation around Japan and the U.S. mainly offensive operation. Japan air power was to play a strategic role broadly in the context of containment of the Soviet Union. Since the 1980s the relationship between Japan and the U.S has deepened through joint exercises such as participating in Rim Pac.

Since the 1980s Japan has been required to modernize and improve capabilities of the air defense and anti-submarine by U.S. During the cold war era, JSDF was required to have the abilities to support U.S. in the midst of anti-Soviet Union strategy. Specifically, Japan was required to have the abilities to cope quickly with the submarines and Tu-22M bombers in air defense and sea lane defense.

The core of Japan air power was F-15, E-2C in JASDF and P-3C in JMSDF. F-15, E-2C in JASDF contributed to restrain the Tu-22M bomber going through the Pacific Ocean as well as coping with the threat from the air. JASDF air power was obstruction factor at least around Japan territory.

On the other hand, JMSDF contributed sea lane defense. P-3C has the mission of searching submarines of the Soviet Union. It could monitor tens of thousands of kilometers

As mentioned above, from the 1970s to the 1980s, Japan air power had been developed in the middle of deepening the relationship with U.S. and meeting with U.S. demands, on the other hand, Japan tried to explore the self-defense force in the end realized the limit under the cold war era.

1.3. Enlargement of the air power role

The end of cold war changed the security environment drastically. The significance of Japan-U.S. alliance was reviewed. The trend of disarmament happened in Europe, and it influenced Japan defense policy. On the other hand, Japan considered the pros and cons of whether JSDF should be dispatched abroad as a result of occurrence of the Gulf War. In this way scaled down forces and expansion of missions to include International cooperation were considered seriously.

After the end of cold war, the security environment was severe, and Japan had to face a lot of challenges, such as responding to new threats, the expansion of international cooperation, gray zone situations, new domains, which are space, cyberspace and the electromagnetic spectrum. On the other hand resources are very limited because of the declining birthrate and aging population.

After the end of cold war, National Defense Program Guidelines (NDPG) was revised 5 times (1995, 2004, 2010, 2013, 2018). From these NDPGs I would like to explain Japan's Security and Defense Policy. After that I would like to introduce the development of JASDF air power.

1.3.1. the 1995 NDPG

The 1995 NDPG was formulated in consideration of the changes in the international situation such as the end of the Cold War, and increasing public expectations for the SDF in the wake of the U.N. Peacekeeping Operations and response to the Great Hanshin-Awaji Earthquake. The 1995 NDPG pointed out that previous Defense Programs of Japan were based on the Basic Defense Force Concept that aimed to possess a minimum-necessary defense force as an independent nation in order to prevent the country itself from becoming a power vacuum . That becomes a factor of instability for the neighboring

region, rather than directly coping with a military threat to Japan, and basically followed the same approach.

At the same time, in terms of the content of Japan's defense capabilities, the Guidelines were characterized by their emphasis on the further utilization of JSDF capabilities not only in the defense of Japan, but also in response to large-scale disasters and various other situations, and in contributions to a more stable security environment, as well as reviewing the scale and function of the defense force.

1.3.2. the 2004 NDPG

Amid the emergence of new threats and the challenges of diverse situations such as the progress in the proliferation of weapons of mass destruction and ballistic missiles, and the activities of international terrorist activities, the 2004 NDPG was formulated on the decision that new guidelines for the approach to Japan's national security and defense capabilities were necessary. The 2004 NDPG established two security goals: (1) preventing direct threats from reaching Japan and, in the event that one does, repel it and minimize any damage, and (2) improving the international security environment, so as to reduce the chances that any threat will reach Japan in the first place. To this end, the Guidelines set an integrated combination of three approaches, (1) Japan's own effort, (2) Japan-U.S. Arrangements, and (3) Cooperation with the international community. Accordingly, in terms of the concept of defense capabilities, the Guidelines stipulated that a "multifunctional, - flexible, effective defense force" was necessary to address new threats and diverse situations, with emphasis on response capabilities, while maintaining effective aspects of the Basic Defense Force Concept.

1.3.3. the 2010 NDPG

The 2010 NDPG was formulated in light of the recognition that (1) large-scale military capacity, including nuclear capabilities, still exists in the surrounding region, with many countries modernizing their military forces and intensifying various activities; (2) dramatic progress in such fields as military science and technology has shortened the time between the first signs of a contingency and its development making a seamless response necessary; and (3) many security issues extend across national borders, making partnership and cooperation between countries important for times of peace, so the role of military forces is diversifying and it is becoming common to continuously operate military forces from peacetime. Accordingly, the 2010 NDPG focused on SDF operations, rather than the Basic Defense Force Concept, which emphasized the existence of the defense force; as such, the Guidelines stipulate that it is necessary to ensure that future defense capabilities be dynamic and proactively conduct the various activities required to be fulfilled. Therefore, the 2010 NDPG prescribed the development of a "Dynamic

Defense Force” that demonstrates readiness, mobility, flexibility, sustainability, and versatility, underpinned by advanced technical capabilities and intelligence skills, in light of trends in the level of military technology.

1.3.4. the 2013 NDPG

The 2013 NDPG is the first of its kind to be developed in light of the National Security Strategy (NSS), and it calls for the building of a *Dynamic Joint Defense Force* as the cornerstone for the protection of Japan’s peace and security. Amid the increasingly severe security environment surrounding Japan, the number and the duration of situations, including so-called “gray-zone” situations, that is, neither pure peacetime nor contingencies over sovereignty of the territory or vested interests, which require the JSDF’s commitment, are both increasing. Therefore, it is essential to regularly conduct persistent intelligence, surveillance, and reconnaissance (ISR) activities and swiftly build a response posture in accordance with the development of the situation to prevent further escalation. In dealing with such situations, it is also essential to minimize the damage by effective response through achieving necessary maritime supremacy and air superiority. Among these situations, the qualitative and quantitative capabilities of the defense force underpinning the SDF activities were not necessarily sufficient. The NDPG, being fully mindful of these needs, calls for the enhancement of deterrence and response capability by pursuing further joint operations, improving the mission-capable rate of equipment and its employment to conduct activities, as well as developing defense capabilities adequate both in quality and quantity that underpin various activities.

1.3.5. the 2018 NDPG

The security environment surrounding Japan is changing at extremely high speeds. Changes in the balance of power in the international arena are accelerating and becoming more complex, and uncertainty over the existing order is increasing. In addition, rapid expansion in the use of new domains, which are space, cyberspace and the electromagnetic spectrum is poised to fundamentally change the existing paradigm of national security, which has prioritized responses in the land, sea and air domains. Based on this situation, Japan launched the “Dynamic Joint Defense Force”

I explained each NDPG. After the cold war, Japanese tried to cope with a lot of challenges under harsh conditions.

As you can see from how the defense guidelines have evolved after the Cold War, the threat facing Japan has not entirely disappeared as a result of the collapse of Soviet Union. Rather, the roles we in the military have to play increased due to the emergence of new kind of threats posed by terrorism, as well as increasingly frequent natural disasters. Also, as nations are becoming increasingly reliant on each other, the confusion

and security problems of one nation can have a ripple effect that will have a global influence, making it difficult for one nation to deal with the situation on its own. Japan is now faced with an ever expanding functional, geographical challenges, such as military modernization of some of its neighboring countries and prolonged gray zone situations. The Japanese air power has taken on a bigger role in dealing with the increasingly harsh security environment.

JASDF introduced air refueling/transport aircraft to its arsenal in 2002, and began operating the ballistic missile defense system based on Aegis-equipped destroyers and Patriot of PAC-3 in 2003. In 2004, we launched the operation of satellites for intelligence, which meant that the reach of air power has extended into outer space.

After the cold war, the JSDF was faced with an increasing demand to actually deploy its forces, which made us realize the importance of solid operation capabilities. For example, JSDF's air power has played a significant role in situations short of Defense Operation. In particular, P-3C played an important role in coping with suspicious vessels. The amendment of the Self-Defense Forces Law allowed JSDF aircraft to transport Japanese residents living overseas, and since then JSDF has accelerated its effort to enhance the ability to rescue them. Moreover, JSDF is now able to engage in international relief activities and transport, creating the environment where air power, mainly by transport aircraft, can play a global role.

JSDF also conduct joint training not only with the U.S, but also with other nations through bilateral or multilateral defense exchange programs. Recently, transport and rescue aircraft have participated in such unconventional fields as humanitarian assistance/disaster relief efforts, and capability building support, demonstrating air power's utility.

I have so far talked about how Japan's air power has developed. We have built air power from scratch with the help of the US and gradually improved our capabilities and expand our roles. However, it was a very difficult process because of our limited resources and other constrains. Therefore, we have relied on Japan-US security alliance as a backbone and endeavored to improve our capabilities with a focus on air defense and patrol and searching submarines. After the Cold War, many nations in the world have become more interdependent. New threats such as terrorism is a problem that no single nation can handle alone. And expectations for Japan to play a more international role have increased, and air power has taken on a bigger role in international cooperation, rescue operations of Japanese nationals living overseas, and defense exchanges.

2. JSDF air power today

JSDF utilizes air power in various areas. In order to respond seamlessly to a variety of contingencies, from armed attack to natural disasters, JSDF persistently engages in warning and surveillance activities in the waters and airspace surrounding Japan during peace time. Air power plays significant roles in these activities. JASDF uses radar sites and early warning and control aircraft to carry out warning and surveillance activities over Japanese and airspace. JMSDF patrols Japan's territorial water using P-3C patrol air craft. If JASDF detects any suspicious aircraft heading to Japan's territorial airspace, fighters scramble and approach it based on information from radar sites.

The Ballistic Missile Defense (BMD) system is also one of the most important elements of air power in Japan. The JASDF's patriot System and other BMD sensors are linked with the JMSDF's Aegis system and are operated under the unified command of the Joint Task Force (JTF)-BMD Commander. In the near future, a land based Aegis-System (Aegis Ashore) will be added to this architecture and will be operated by the Japan Ground Self Defense Force (JGSDF). Together those three systems make the BMD system more seamless and effective. It is often said that a new form of military power will be networked and integrated with air power forming the core of the force. The BMD system is a good example this principle.

In addition to these missions, rescue and transport aircraft also have important roles to play in Japan, which has often suffered from natural disasters.

Let me talk about JSDF's air power use abroad. JMSDF has engaged in counter-piracy operations off the coast of Somalia and in the Gulf of Aden since 2009. JMSDF's P-3C unit conducted about 70-80% of the warning and surveillance operations. carried out in the Gulf of Aden by the international community. In addition, JSDF has gained experience using cargo aircraft in HA/DR operations and peace cooperation activities abroad, making the most of its air power's mobility.

3. JSDF's efforts for future air power

Now I would like to talk about some of JSDF's plans for future air power. The foundation of air power is advanced technology, which is progressing rapidly. It is said that military operations will be "multi-domain," to include space and cyberspace in addition to land, maritime and air domains. Military operations are going to become "cross-domain operations," which are fought across different domains. Ensuring stable use of space and cyberspace is going to be essential to achieve our missions in this new type of operation. Recognizing this, JSDF is putting effort into areas such as Space Situational Awareness (SSA) and Cyber Security to keep up with the new security trend.

Also, a very important basis of air power that we cannot ignore is human resources. Cutting-edge technology such as Artificial Intelligence (AI) supplements human abilities. On the other hand, it needs humans who use it appropriately. As our mission is going to be more international and diverse, it is vital to keep highly qualified personnel for the long term. However, Japan is facing a declining birthrate and aging population. It is a matter of urgent importance to secure enough workforce both for the government and for the private sector. The Japanese government has launched an initiative in order to realize a gender-equal society. While this effort is fundamentally for the realization of the equal status between men and women, it also provides us with a solution for the coming shortage of human resources. After JASDF opened its doors to female fighter pilots. In August of last year, we welcomed the first female fighter pilot in JASDF history.

4. Conclusion

I have so far talked about process by which JSDF air power developed from small beginnings to today.

JSDF air power improved speedily by the U.S. support shortly after the establishment. The main missions were air defense and the operation of warning radar, patrolling. After the cold war, the roles and functions of air power expanded sharply, such as HA/DR operations and peace cooperation activities. The roles of air power would be expanding in the future. Considering that JSDF would not have adequate resources enough to correspond to all roles only by JSDF's air power, it is necessary to cooperate with other countries to stabilize international security environment and make up for its vulnerabilities and advance each country's capabilities.

Staying Relevant - Fiscal, Technological, and Operational Challenges facing Smaller Air Forces

by Malinda Meegoda

Abstract

Air forces all over the world are struggling with the increasing cost of acquiring and maintaining a basic airpower capability threshold. To become a relevant branch of a nation's armed services, air forces need to transform themselves into innovative learning organisations that can keep up with the changing security environment and the rapid technological shifts shaping the nature of warfare. This is particularly more applicable for smaller air forces such as the Sri Lanka Air Force, which does not enjoy the levels of resources available at its disposal compared to other air forces. This paper will aim to explore some of the modern strategic and operational dilemmas facing smaller air forces. Within these limitations, this paper will attempt to localise some of these challenges and recommend actions and policies that the Sri Lankan Air Force could consider to retain its relevancy as an important cog in Sri Lanka's armed forces structure. The paper proposes that the Sri Lanka Air Force increase their capabilities and place more of an emphasis on working with the Sri Lanka Navy to meet security challenges in the maritime domain increasing 'jointness' between the two service branches. Tackling the multiple challenges of maintaining a credible air force however, requires a combination of short-term and long-term policy planning to achieve the transformations desired.

1.Introduction

The approach to studying the effectiveness of airpower throughout the twentieth and twenty-first century has been arguably marred by two problems; either airpower strategists fail to forecast the increasing lethal capabilities of aerial warfare, or they have overestimated airpower capabilities as a lethal force to meet a nation's strategic and security objectives. Out of these two scenarios, the latter approach has gained more traction in recent times as the sophistication of airframes, propulsion technologies, and weapons platforms have increased exponentially.¹ This is a strategy trap that particularly smaller air forces such as the Sri Lanka Air Force (SLAF) should look to avoid. For the remainder of this paper the term 'Smaller Air Forces' will be used in reference to an air force that for a variety of economic, social and strategic reasons have chosen not to employ the complete air power spectrum. The paper will aim to

explore some of the modern strategic and operational dilemmas facing smaller air forces. Within these limitations, the paper will attempt to localise some of these challenges and recommend actions and policies that the Sri Lankan Air Force could consider to retain its relevancy as an important cog in Sri Lanka's armed forces structure.

2. The Evolution of Air Power

Since the Wright brothers took to the sky for the first time in the early part of the twentieth century, airpower has undergone monumental shifts in its reach, and capabilities. In comparison to Sea Power, which has a much longer operational history and which has been studied at great length, the field of air power studies has a comparatively short history.² In addition, there is very little that has been written about smaller air forces, with much of the discussions overwhelmingly studied through the lens of large practitioners of full-spectrum air power such as the US and Russia. Additionally, when looking at air power there is an immediate tendency to look at it largely as offensive weapons designed to break enemy targets and infrastructure. Meanwhile, other functions such as air power's ability to provide services when there are interruptions to existing infrastructure are sometimes critically overlooked.³

One of the first theoreticians of airpower, an Italian artillery officer named General Giulio Douhet, who in his book *The Command of the Air*, postulated that the most optimum use of aerial warfare would be against cities, and civilian targets.⁴ The reasoning behind his thinking was that this line of warfare would have the greatest impact in demoralising the enemy populations' will to fight. The evolution of airpower has proved some of his conclusions wrong. Nevertheless, General Douhet was not wrong at the time, as aerial warfare was deemed to be fairly imprecise and the only available option due to the inaccuracy of munitions available at the time was to use it for countervalue targeting.⁵ It was only during the Second World War that the necessity of air campaigns started to materialise in destabilising enemy targets, maintaining air cover for ground troops, and defending a state's territorial integrity.⁶ From then on, US experience in Vietnam in the 1960s bore mixed results as some of the limitations of aerial warfare started to appear when fighting asymmetrical battles with nimble guerrilla forces.⁷ The ability of enemy forces to shoot down aircrafts with fairly unsophisticated anti-aircraft weapons forced large air powers such as the US to re-think its approach to aerial warfare. However, in the 1990s, Operation Desert Storm in Iraq, and NATO's air campaigns in the former Yugoslavia enthused airpower theorists and strategists into thinking that air superiority can have an overwhelming effect on outcomes in modern warfare.⁸ The idea that

an air force could cause large structural damage without endangering a large number of soldiers on the ground was deemed not only military efficient but politically expedient as well.⁹ However, recent re-examinations, particularly of the missions in Yugoslavia, merit a re-evaluation whether the role of airpower in the success of these missions was in fact overstated.¹⁰ Regardless, of what the final assessment may be, it would be fair to surmise that most air forces in the world cannot come even close to the multi role capabilities of the US and its partner NATO air forces. Therefore, it is relevant to ask if smaller air forces can mount any unilateral threat that can be sustained over a significant period of time. These limitations, however not only apply to smaller air forces such as the Sri Lanka Air Force but includes other medium-sized air powers such as India, Pakistan and Turkey as well.

3.Sri Lanka Air Force Modernisation Dilemmas

The Sri Lanka Air Force (SLAF) has and continues to play a critical role in military and political tasks with support at times by and of Sri Lanka's naval, special, and ground forces. Since the culmination of hostilities between Sri Lanka and the LTTE, the role of the Sri Lanka air force's role in combat operations has been negligible. Sri Lanka Air Force currently has very limited offensive air capabilities, and currently possess a handful of ageing fixed-wing combat aircrafts, with no Airborne Early Warning Control (AEW&C) systems, or any surface to air weapons platforms to serve any air defence needs. However, Sri Lanka currently does not face any direct existential threats either from its neighbouring states, or other global powers. Therefore, whether Sri Lanka should continue to maintain fixed-wing combat air crafts is a question that needs to be addressed. Planners looking at a long-term transformation plan for the SLAF need to consider whether the cost of purchasing new jet-powered combat aircrafts to maintain a symbolic value in Sri Lanka's overall defence doctrine is a price worth paying.

Moreover, planners need to consider whether Sri Lanka's security interests could be met through alternate means such as political and military diplomacy, and security alliance building. The fiscal space available for increments in defence spending remains tenuous at best. The financial debt burden Sri Lanka is saddled with is substantial, as evidenced by the Central Bank of Sri Lanka's reporting of Sri Lanka's debt service payments figures in 2018, which amounted to 82.9% of Gross Domestic Product (GDP).¹¹ As shown in Table 1 Sri Lanka's defence expenditure is fairly modest compared to some of the regional players. However, the Sri Lankan government does spend a sizable figure (10.1 %) on defence as part of its overall government spending relative to some of the much richer ASEAN countries such as Malaysia

(4.3 %), Thailand (6.3 %) and Indonesia (4.3 %).¹² Therefore, it stands to reason, that future transformation plans for Sri Lanka's armed forces are carried out in a cohesive manner that incorporates greater input from economists, government policymakers, academics, and relevant think tanks to optimise the benefits.

The experience of other smaller countries such as New Zealand also suggests that alternate directions in airpower could be considered. New Zealand, a country with a much higher GDP than Sri Lanka, in the early 2000s abandoned phased out combat aircrafts from their air force structure.¹³ However, it must be said that New Zealand has never had to face multiple domestic insurgencies and threats from organised terrorist outfits. In addition, New Zealand also enjoys the security benefits from its robust security partnership with neighbouring Australia (ANZUS Treaty) and by extension with the United States.¹⁴ Sri Lanka, on the other hand, has not entered into such agreements of similar scope for a variety of socio-political reasons.

Table 1: Combat capable aviation fleet sizes and defence expenditure of significant military forces operating in the Indian Ocean Region

Country	Number of Combat Capable Aircrafts Marine Aviation*	Number of Combat Capable Aircrafts Air Force*	Defence Expenditure 2018 (USD billions current figure)	Defence Share of GDP % (2018)	Share of Government Spending % (2018)
Australia	-	163	26.7	1.9	5.1
China	374	2397	250.0	1.9	5.5
India	69	849	66.5	2.4	8.7
Indonesia	-	102	7.4	0.7	4.3
Iran	3	334	13.2	2.7	15.8
Kenya	-	38	1.1	1.2	4.8
Malaysia	-	66	3.5	1.0	4.3
Pakistan	7	425	11.4	4.0	18.5
Singapore	-	134	10.8	3.1	17.1
South Africa	-	50	3.6	1.0	2.9
Sri Lanka	-	30	1.7	1.9	10.1
Thailand	3	149	6.8	1.3	6.3
United States	1042**	1478	648.8	3.2	9.0

Source: International Institute for Strategic Studies (IISS). Military Balance 2018, and Stockholm International Peace Research Institute (SIPRI) Military Expenditure Database

*Combat Aircraft figures are for 2017 that appeared in Military Balance 2018.

**includes US Navy and US Marine Corps

4. Maritime Safety and Security and Air-Sea Integration

In the current operating environment, many of both external and internal security risks facing Sri Lanka largely emanate from non-state actors, with a majority of them operating in the maritime domain. As an island nation, Sri Lanka is also situated in one of the most strategic geolocations in the world with a number of active shipping lanes passing through its Exclusive Economic Zone (EEZ). The total area of Sri Lanka's EEZ is more than seven times its actual land area, which presents a number of maritime security challenges.¹⁵ Some of the most pressing non-traditional security threats include; Illegal, Unauthorised and Unregulated (IUU) fishing, drug trafficking, human smuggling, maritime piracy, Humanitarian Assistance Disaster Relief (HADR), and Search and Rescue (SAR) operations.

Unlike other medium to large maritime powers operating in the Indian Ocean, Sri Lanka does not have extensive air support in the maritime domain. While the Sri Lanka Navy (SLN) has received a number of vessels to its fleet in the recent past -notably two frigates that were gifted from the US Coast Guard, and the People's Republic of China Navy (PLAN), SLAF has not been a beneficiary of aircrafts or other significant military hardware.¹⁶ To increase the Sri Lanka Navy's capacity to combat some of the issues mentioned earlier, it is vital that it receives adequate air support from SLAF. The SLAF in recognition of this need has conducted joint maritime-air operations with the Sri Lanka Navy, particularly to increase Sri Lanka's maritime domain awareness in the region. Currently, there is a significant gap in Sri Lanka's capacity to monitor the maritime domain from the air due to the lack of adequate maritime patrol aircraft, and search and rescue helicopters. As some of the core non-traditional maritime security threats affect multiple countries in the region, other more resource endowed nations could step up to aid the capacity deficit of the SLAF either through grants, or concessionary loans to acquire the needed hardware. It must be noted, however, that any acquisition process whether it be through a grant or a concessionary loan, SLAF and the Ministry of Defence must carefully evaluate the short, medium, and long-term implications of integrating new aircrafts and equipment into its inventory. There is a long list of hidden costs associated when acquiring a new aircraft, some of them that may not be apparent to civilian policymakers and strategists right away. In many instances, the base price of an aircraft could change from the announcement to the date of delivery. In addition, currency fluctuations, delays and rising costs of spare parts all could add to the cost of maintaining the aircrafts.¹⁷

To meet some of the security challenges in the maritime domain, a separate joint Air-Naval command could also be established including a joint operational command to re-orient some of SLAF's focus to maritime issues. 'Jointness', in military affairs does however come with its own set of challenges, especially when one branch of the three defence services appear to be more significant than others. If improperly done, jointness can lead to unwarranted interservice rivalry, information gaps, and unclear chains of command. While the primary goals of air-sea integration should be about increasing Sri Lanka's maritime reach, and ability to cooperate with its international partners, an underlying objective of such an endeavour should also be about resource optimisation.

Jointness, however, is not something that can be operationalised overnight. It would also not be advisable to import joint operational models from other countries. The way joint operations need to be approached should be on a need's basis, tailor-made to the security and resource capabilities of a particular country. A US model or a Chinese model that aims for greater power projection would be ill-suited to Sri Lanka. As a precursor to institutionalising jointness between the SLAF and the SLN, a rigorous analysis needs to be undertaken to understand the limitations and capabilities of each of the service branches. This is a process that will evolve with time and cannot simply be mapped out as a policy document alone, but would need practical action such as joint training. Joint training, and educating each other's service legacy and history could help map out the nature of the tasks that require action in a joint operational setting. The eventual goal should be to develop a commonality of vision and purpose to synergise the strengths of each other's capabilities to forge a unified fighting force. There are practical reasons for advocating jointness between the Sri Lanka Navy and Air Force. The two branches of the service are naturally the services that will venture into territorial defence outside Sri Lanka's immediate land boundaries. In addition, jointness could also allow the two services to develop concurrently with the evolving technological shifts, and help avoid one particular branch of the armed forces from falling behind the other. With some of these technologies and practices such as cyber, electronic warfare, and Intelligence Surveillance and Reconnaissance (ISR), the line between the civilian and military spheres continue to blur.¹⁸ Therefore, it makes sense to reduce the compartmentalisation of the armed services especially when it comes to these emerging technologies.

5. Asymmetric warfare, UAVs, and Counter Insurgency operations

We are living in an age where the old maxim of ‘control the air and win the war’ is gradually becoming obsolete. The arrival of Unmanned Aerial Vehicles (UAV) has in some respects democratised the global aeronautical industry.¹⁹ With traditional airpower, either be it rotary or fixed-wing, there are only a handful of companies based in a select number of countries that have been successful in sustaining continuous production and export of such items. Additionally, the lead time involved in introducing a new aircraft and associated weapons platforms is especially high in comparison to other military hardware. It is also extremely difficult to reach the economies of scale in production needed for manufacturers as one could find with other consumer goods. Even a fairly large country such as India has had numerous problems in sustaining its indigenous defence industry partially due to this constraint.²⁰ Despite possessing illustrious aeronautical defence companies such as Hindustan Aircraft Limited (HAL), India still relies heavily on foreign imports for much of its defence needs. In fact, India despite the size of its economy and population has become the world’s second-largest importer of military hardware only behind Saudi Arabia.²¹ With UAVs, however, many of the smaller units especially could be considered as dual-use in nature, and with a burgeoning consumer market for smaller drones, the entry costs for new manufacturers continue to decline.²² Experts have even pointed out that the civilian sector of drone manufacturing has in some aspects begun to outpace the technological developments in the military sector. Even in the purely military sphere of armed UAVs, an ever-increasing number of countries have started to manufacture and include armed UAVs in their inventory.²³ While there have been some efforts made to curb the proliferation of drone technology by some states, it is still unclear whether other competing states will follow similar guidelines.²⁴

All these changes come with a new set of security concerns. Non-state actors, in particular, are increasingly looking to acquire modern UAVs to retrofit them with smaller weaponised payloads capable of creating surprise attacks on civilian and military installations.²⁵ In documents uncovered in 2017, it became evident that Daesh (ISIS) had a systematic UAV program, with many units built from off the shelf components.²⁶ The drones were used for a multitude of purposes including surveillance in the battlefield, distributing propaganda, and dropping explosives on civilians and military units.²⁷ Even in the aftermath of the Easter Sunday attacks in Sri Lanka, subsequent raids by security forces uncovered UAVs in the possession of the preparators.²⁸ A continued over-emphasis on traditional radar and ballistic missile defence systems could catch future governments off guard, as many of these small

drones cannot be monitored by traditional radar systems. The US government with its anti-drone warfare program known as 'Black Dart' which has been operational for the past few years is looking at ways to counter such threats.²⁹ However, this is an arena that smaller air forces can also play a crucial role in developing countermeasures, as the required solutions may not always be of a high-cost variety. Instead, it may require a greater ability to problem solve against such patterns of attack. Some of the solutions may just as well come from a smaller air force such as the SLAF, as with other larger air forces. The Sri Lanka Air Force could especially look to conduct research and development on what is commonly referred to as 'non-kinetic capabilities', which mainly translates into electronic and offensive cyber-attacks to disrupt hostile and unauthorised UAVs.

As a tool, for any air force, the most overwhelming advantage of UAVs is its ability to gather intelligence and integrate collected data with the decisions to use force. The ability of drones to be airborne for an extended period of time and collect real-time intelligence can help provide a more complete picture when combined with other forms of intelligence. For a country like Sri Lanka that is no longer engaged in continuous military campaigns with enemy combatants, the principle use of UAVs could serve two important non-lethal functions. The first would be to monitor the maritime domain, especially against unwanted incursions by illegal fishing vessels, drug traffickers, and other non-state actors engaging in illicit activities in the Indian Ocean. The second function drones could serve the SLAF's needs is in Search and Rescue missions on both land and sea. In addition, Humanitarian and Disaster Relief missions could also benefit from drones to survey the extent of areas affected in the aftermath or during an ongoing natural disaster event.³⁰ Developing SLAF's overall UAV capacity will have the additional benefit that it truly can be transformed into a multirole platform. Even in the absence of constant conflict, a need may arise in the future that an area under suspicion of operating terror operations would warrant some form of aerial surveillance and intelligence gathering.

6. Way Forward

Those who advocate for the continuing necessity of an airborne fighting force must be able to convince policy planners and decision-makers, especially at the political level the real utility of maintaining and improving a country's airpower capabilities. While air forces by nature remain organisations that are well equipped to exploit cutting edge technology, airpower proponents need to refrain from relying entirely on technology to market the need for increased budgets etc. Smaller air forces such as the SLAF do not have the means to rapidly increase the

size and shape of their capabilities. However, as with any smaller organizational unit competing with other bigger operators, smaller air forces need to find avenues that they are able to master and provide innovative solutions. This could help create substantial professional depth within their forces, despite not being able to enjoy the size of other larger air forces.

The SLAF's recent initiatives such as cloud seeding and aerial seeding bombing campaigns are good examples of demonstrating to the public, and policymakers, the potential, the value, and relevance of maintaining a dynamic air force.³¹ If the SLAF intends to develop its non-kinetic capabilities, the SLAF will have to increase its engagements with the private sector, and some of the other leading post-secondary educational institutions.

The SLAF as with other smaller air forces needs to make continuous and concerted efforts to transform itself into a highly innovative, adaptive and learning organisation. The SLAF and other branches of the military also need to re-think their force numbers and look to rightsizing the forces as a means to allocate and prioritise more funding into training, research and development, and other procurement initiatives.

7. Conclusion

It is by now axiomatic that the prevailing security environment, particularly in the Indian Ocean, has become noteworthy for the complexity and variety of challenges facing countries seeking a rules-based order. All countries seeking a common desire to increase integration, peace and prosperity require continuous and concerted engagement and cooperation at all levels of the political and military spectrum. To this end, air forces can play a vital role in helping shape this environment. Evidence also suggests that if states are not willing to take on this responsibility, other non-state actors are ready to exploit any vacuums of ungoverned spaces for their own benefit which can have large scale negative regional and global impacts. Therefore, it is in the interest of everyone that larger air forces consider building up the capacity of smaller well-intentioned partners to realise shared security interests. However, to demonstrate the utility of their services, air forces as a demonstrable fact must look to evolve and become centres of excellence epitomising attributes of innovation, nimbleness, and deep professionalism.

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PASSAGE PLAN TO EXPLOIT INTERNAL STRENGTHS

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Introduction

1. Indian Ocean region (IOR) is a flash point in global geopolitics in the 21st century. Factors that were traditional in nature such as hegemonic role of strong nations are predominating in the region ever than before. In parallel, non-traditional factors such as transnational crimes are also increasing in the IOR jeopardising the good order among the stake holders. In the future, the stake holders of the IOR, particularly the countries that are having a shore-line would be tasked to conduct policing and initiate preventive action against increasing transnational crimes in the region.

2. Sri Lank being an island nation located in the middle of the Indian Ocean (IO) that divide the ocean in to two parts as the Arabian Sea and the Bay of Bengal has become a strategically important place in the maritime domain. Both legal trades and illegal smugglings are transiting through the country as it is the best option available for the interest actors to continue their economic activities. Crimes such as drug trafficking, gunrunning, IUU fishing, and human smuggling are also increasing dramatically. As a result, the role and task of the security sector of the country are increased by many-fold.

3. In contrary to transnational crimes, natural disasters such as landslides, floods and sea-borne disasters are more likely to increase in the region in years to come. On the other hand, East-West Sea Lanes of Communication (SLOC) is located close to the Sothern Coast of the country. These SLOCs are the arteries of the regional and extra regional economies transporting in and out flow of the required resources and products. As a result, more surveillance assets are required in order to ensure the security and safety of the region.

4. Even though, the Sri Lanka Navy (SLN) has been protecting its vast sea area, the available platforms and capabilities are observed to be insufficient compared to the role it is expected to perform. The Maritime Domain Awareness (MDA) in the region with other navies is essential to find possible ways and means to root out the threats. Moreover, the Continental Margin being claimed by the country is a huge sea area.

5. In this endeavour, SLN should develop its maritime surveillance capabilities. This includes the introduction of new sensors, equipment and establishing of the Fleet Air Arm. However, in this juncture due to the financial austerity, it is unlikely that SLN can establish a Naval Air Wing single handed. Therefore, the essay will argues that the most appropriate and workable approach is to conduct combined operations by SLN and Sri Lanka Air Force (SLAF). This effort will create an avenue to expand SLN surveillance

capabilities. Similarly, the SLAF will be able to use its capabilities to meet the maritime requirement of the nation.

6. In this study, the authors are focusing on safe guarding of maritime assets, uplifting of SLN's capabilities to achieve sustained reach, MDA with swift gathering of information, possibility to develop naval aviation with SLAF and redefining of the future role of the Sri Lanka military.

What is Sri Lanka's Role and Task in the IOR Domain?

7. The position of Sri Lanka in the Indian Ocean plays a vital role in the maritime route of East and West. The distance to Strait of Bab-el-Mandep towards the west and Strait of Malacca towards the east is approximately 2000 miles and the location of the country is situated almost in the center of the SLOC. Historians consider 'Sri Lanka as the oceanic cockpit of Asia' (Mendis 1992) which can act as strong gate-ways to the region and control the historical maritime involvements in the Indian Ocean Region. Further, throughout the history it has facilitated the outsiders as "an entry-point, a mid-point meeting place, a harbour an emporium for international merchandise and a landfall". This emphasizes that the strategic importance of Sri Lanka in history is much bigger compared to its small size.

8. Admiral Harry Harris, Commander, U.S. Pacific Command in his speech at 'Galle Dialogue'-Sri Lanka in 2016, mentioned that, "there are three things that one must take into consideration when evaluating strategic significance: location, location, and location" (Harry 2016). This statement has brought out two important aspects; one is the strategically importance of Sri Lanka and the other one is the geopolitical importance of location for the global powers. It is true that the ships that sail from Middle East to China or Suez to Malacca cannot move without passing the south of Sri Lanka. This sea route is in fact the life line of global economy. In order to influence the regional security and hegemony, it is necessary to build partnerships with Sri Lanka because it has easy access from the centre of the IOR. Therefore, International trade partners and the global powers need to develop strategic partnerships with Sri Lanka in order to protect their interests.

9. Sri Lanka is vested with a 200 Nautical Miles of Exclusive Economic Zone which is eight times the land area (Sri Lanka Navy's Maritime Strategy 2025, 2015). This ocean space is a huge asset and navy carries out maritime surveillance in the area with its limited naval assets. As the Navy is committed to safeguard the maritime frontline of an island nation, a well mapped strategy is an important prerequisite. The inability to yield the full potential in terms of the natural resources in the ocean mass as well as the inability to counter maritime security threats (traditional as well as non-traditional) could cause irreversible damage to the Nation as a whole.

10. The Indian Ocean has become an ungoverned space where traditional and non-traditional maritime security threats are growing. Fueled by naval arms race, the Indian

Ocean is at risk of strategic competition between the big powers (like the USA, China and India) similar to the South China Sea (Brewster, 2019). A skirmish at sea between few naval vessels could spiral into a major battle which can disrupt regional trade including that of the Sri Lanka. Not surprisingly, issues relating to maritime safety and security in the Indian Ocean have become an important area for regional dialogue among the navies of Indian Ocean economies and extra regional economies. The Indian Ocean Naval Symposium hosted by India and the Galle Dialogue hosted by SLN (Khurana, 2018) are classic examples to this tendency.

11. Among non-traditional security threats, maritime crimes, people smuggling, drug trafficking and piracy are on the rise. For example, 46.6% of total global piracy incidents in 2017 took place in the Indian Ocean region. Moreover, about 7000 Kgs of narcotics were seized in Sri Lanka alone in 2018 (National Dangerous drug Control Board, Sri Lanka, 2017 and 2018; International Maritime Bureau, 2018). In addition to this, Sri Lanka, as a nation has another burning issue. There are worries about large fishing trawlers from neighbouring countries that engage in poaching in Sri Lankan waters which could affect marine ecosystems and fishermen's livelihoods.

12. Another responsibility that lies with Sri Lanka are the Search and Rescue (SAR) region that is 27 times of the land mass (Sri Lanka Navy's Maritime Strategy 2025, 2015). The SAR region borders with India, Indonesia, Australia and Maldives. In case of any maritime emergency or disaster that takes place within the above demarcated area, the SLN has to respond in accordance with the international obligations.

13. Sri Lanka forwarded her claims for Outer Continental Margin in April 2009. The expected sea area after the demarcation will be closer to 75,000 square kilo meters. On establishing this claim, it would give the country a sea area 24 times as large as the country's land area (Sri Lanka Navy's Maritime Strategy 2025, 2015). This would further enable the country to gain economic benefits as the sea bed and the sub-soil of this domain is rich in oil and other mineral resources due to Bengal Fan.

14. The vast sea area given under the provisions of UNCLOS to the Government of Sri Lanka contains vital resources that the foreign nations are eager to exploit. Therefore, safeguarding of the area is of paramount importance. The requirement of well equipped, self-sustained and far reaching naval force for the protection of the sea area is self-explanatory. Sustained reach can be achieved either by expansion of fleet or force multiplication by adding sensors, equipment and MDA through naval aviation.

Why does Sri Lanka need Fleet Air Arm?

15. The naval aviation is dating back to 1903. However, first ever taking off from and landing aboard ships at sea demonstrated by the United State Navy pilot, Eugene

Ely who took off from the cruiser USS Birmingham anchored off the Virginia coast in November 1910 (Sitz 1930). Since then it has been evolving to be a mighty floating force equipped with Aircraft carriers, fighter squadron, airborne early warning aircraft and ship borne UAVs and components.

16. Small maritime nations such as Maldives, Seychelles, Mauritius and the friendly navies such as Bangladesh and Malaysia have already acquired the maritime air surveillance capabilities. The role that SLN has to perform compare to the above nations is more or less equal. Also, threat perception that prevails in our sea area is more demanding. Inadequacy of proper surveillance system in our region not only create encouraging push factor for smugglers but also SLN deprive its credibility among other maritime nations as SLN is responsible to policing its EEZ.

17. The huge number of seaborne commercial traffic in south of Sri Lanka requires safe transit passage at our waters. With the economic development and the energy demand, the East-West Sea Line of Communication (SLOC) that passes across the Indian Ocean Region (IOR) has become busy and strategically important. "The Indian Ocean accounts for one half of all the world's container traffic...[and] 70 percent of the traffic of petroleum products for the entire world' (Robert 2010) . In order to facilitate the requirement, SLN needs to maintain effective and efficient MDA in the region. In present day context, real time information gathering is vital to react swiftly and promptly. The absence of sharing of information instantly can deprive the opportunity to mitigate the threat.

18. In this back drop, the introduction of a naval aviation wing is timely necessity. Moreover, present scenario requires timely and speedy information gathering and real time information sharing. If SLN can acquire the naval aviation assets, it will be a big force multiplication that can be utilized in safeguarding the seas.

How SLAF can contribute to enhance SLN role

19. The establishment of exclusive Naval Air Wing by SLN alone is unlikely with the existing economic situation of the country. Further, it requires few years to implement a fully operational Naval Air Wing as it has to start from the ground level training, acquiring of infrastructure and purchasing of equipment. At the movement, SLN requirement is to enhance its maritime surveillance capabilities within a short period of time in order to conduct successful operations at sea.

20. The role of Sri Lanka Air Force is to safeguard national air space and involve in the event within territorial waters of the country. The area of operation of Sri Lanka Air Force is confined by the Air Force act and existing capabilities. After the eradication of terrorism in 2009, the conventional military role of air taxonomy of SLAF has been

diminishing. On the other hand since then, the available aircraft are underutilized. Also SLAF has faced difficulties when dealing with the modern requirements.

21. SLAF capabilities to conduct maritime surveillance, protecting maritime interests and SAR at sea are comparatively less due to its conventional role and land based capabilities. Countries which are sharing physical borders with adjacent countries always likely to strength capabilities of individual Air Force's to protect their national air space. In contrary, island nations across the world are more concern to protect maritime interests by strengthening naval aviation capabilities. Therefore, the role of SLAF should be re-emphasized to meet the future aspirations.

22. New platforms should be included to SLAF inventory that can enable it to conduct both maritime surveillance as well as its conventional role. In present day context in aviation, multirole/swing-role air craft and helicopters are more appropriate than conventional role based air assets. Further, these air craft have a high demand due to the capabilities in different operating domains. Since SLAF comprises of highly skillful technical staff and battle- experienced pilots, the conversion to new platforms will not require huge investment. SLAF can appreciate 'modes operandi' of the Royal Australian Air Force and Royal New Zealand Air force in order to understand their contribution to maritime surveillance in their respective domains (ed Keith 2005). Further, this effort will be a viable option for both SLN and SLAF to acquire their far-reaching maritime surveillance capabilities under the shrinking defence budget and economic austerity of the country.

23. The Radar base air surveillance mission that is conducted by SLAF could be developed to higher grade in order to achieve range advantage of surveillance capabilities. South of Sri Lanka comprises of vast sea area extending to East up to the Australian continent and Westward up to the African continent accounting of thousands of sea miles. The efficient air surveillance in this region could prevent unauthorized entry by a third party. The SLAF experience and the geographical location of the country could be used to exploit the opportunity. SLAF can use HF surface wave radar to monitor large number of merchant vessels and fishing communities at south of Sri Lanka as Royal Australian Air Force use in Torres Strait between Australia and Indonesia (ed Keith 2005).

Conclusion

24. Ensuring the maritime security is very important to Sri Lanka. The natural calamities inland, and at seas and protection of fishing communities in SL waters will be more prone in future. The security tasks of SLN would be multifaceted and challengeable due to different threat perception from various actors and natural

catastrophes. Moreover, the swift response with timely information will be key tenants for the successful SLN's maritime operations in the future.

25. Development of dedicated air wing for maritime surveillance is deemed necessity in this context. The effort requires more financial aspects and it is time consuming. Since the requirement is very essential more than ever before, the country has to act immediately. In absence of SLAF involvement, the establishment of Naval Air Wing will delay for a few years.

26. It is necessary to understand and redefine the role of the Air Force while retaining its original norms as a conventional Air Force. The requirements arise out at sea cannot be undertaken effectively only by naval fleet units. It requires force multiplication by adding long reach capabilities to share MDA. In present day contest in aviation, multirole /swing-role air craft and helicopters are more affordable than conventional role based air assets for a country like Sri Lanka. Since the country's defence budget is shrinking this joint venture of SLN and SLAF would be the best option available to the country at present.

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Developing Small Air Forces Through Professional Mastery to Meet the Future Challenges

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Abstract: There is no exemption to all air forces in the world for challenges created by contemporary geo-political and economic milieu irrespective their size and capabilities. Thus, they are trying to optimise their capabilities and operations to meet the national security concerns while enduring to field of new capabilities. Small air forces, who are consisted with balance capabilities, but are limited in the depth (size and capacity) are the most affected force due to the recession in resource availability. Supplementary, the challenges for security have obliged nation-states to readjust their policies in national security that sequentially make it relevance to air forces to also reappraise their strategies. Therefore, this paper has discussed an approach for small air forces to cope up said challenges through the professional mastery to continue as a valid and essential component within the broader national security imperatives.

Key words: Small air force, national security, professional mastery

Introduction

Air Power is predominantly been a resource exhaustive competence and therefore, expensive to acquire, preserve and operate at the looked-for level of competency. Further, maintaining cost of effective air forces have amplified due to the improvements made to the air power capability through cutting edge technological innovations. In chorus, widely spread political coercions among democratic nation-states across the globe always mandate a more impartial dispersal of national wealth where defence is only one of countless rival primacies that all look as if equally importance and urgent, particularly in times of comparative peace. Accordingly, air forces have the obligatory task of acquiring adequate capabilities within a sphere of finite allocation of national resources.

Over the past few decades, air power has often become the first choice for governments to ensure the national security due to its ability to generate precise, proportional and discriminatory effects through inherent characteristics of air power. Even though air power

aficionados are exultant over this position of pre-eminence, the reality of acquiring of contemporary air power capabilities and upholding them to the anticipated level to competence is extensively resource intensive endeavour where beyond and reach of many air forces in the world. The air forces in the world today are contending with the cumulative cost of retrieving even a baseline level of air power capability. Since the required capabilities have to be fastened with the higher level, the necessity of resources is amplified by an order of magnitude. In view of the foregoing, there is an apparent trend can be observed among less sophisticated nations to view this vital facet as being excessively resource intensive in contrast to the capability being made available. Thus, this has increasingly become the first step for air forces on the road to irrelevancy. With the purpose of remain in force with in the national security imperatives, air forces must be balanced by acquiring and preserving required capabilities within a limited resource allocation.

Need for being sufficiently adaptable with the ever changing international geo-political environment is another solemn factor where air forces need to pay their much attention. The intensity of this factor is driven to further height with the evolution of air power capabilities. Moreover, air forces need to be more innovative in transforming existing capabilities to guarantee that they are capable to harness the intrinsic and occasionally inimitable physiognomies of air power. This is ultimately an arduous task by any standard, made particularly tough with respect to smaller air forces.

Thus, professional mastery will be one of worthwhile option available to develop the capability of small air forces to stay focus to challenges with the limited resource allocation. With that backdrop, this paper is aimed to propose an approach for small air force to cope up said challenges through the professional mastery to continue as a valid and essential component within the broader national security imperatives.

Small Air Forces

It is necessary to explicate the term “small or smaller air force” before embarking to the status of air power. The accurate measure of the air power of air forces are not laid with their numerical size as has been traditionally done. It is truly measured based on the capability-spread. It is true that only handful of air forces in the world is capable enough to apply their air power doctrine shorn of compromise, and engage with a war conferring to the way they

know and should. Further, most of the air forces have an obligation to strike a balance between what they know, they should do and what they can do. Therefore, precise description of a term frequently leads to further argument that the term itself. Endeavouring to outline a small air force also is fallen into the foregoing condition. Thus, to serve the purpose of this paper, a small air force is defined as “*an air force which will have chosen to conduct some element or part of the complete air power spectrum due to some fundamental reason such as economic, geographic, social or political*” (Mackenzie, 1994).

Only handful of nations have the capacity to maintain a large, effective air force due to predominant geo-political and economic setting. Therefore, it is unbearable for nations who do not have large air force to building one up with the existing international setting. Nevertheless, nation-states with smaller air forces that already possessed with appropriate capability will discover that preserving this competence is not only convenient, but also expedient in the interior of national security apparatus. Further, benefits of preserving and frequently upgrading an extant capability will far overshadow the resource insinuations in maintaining already extant capabilities at mandatory level.

Air power capabilities are not something that can be flippantly tuned and keep aside to unfold when strategic national security issues were ascended. Thus, nation-states are desire to acquire sufficiency in this fraction; sufficiency in this scenario will be purely based on the perception and necessities of individual nation. However, a small air force will accomplish unduly great effects if efficiently managed and there is a possibility to survive than large air forces in extreme cases. The foremost reason to foregoing fact is the critical requirement for very high resources expenditure in continuous basis. Even during a peace time, there is a requirement to ensure adequacy of capability levels in an air force. Small air forces mitigate this resource expenditure up to a certain extend by preserving capabilities at just right quantum, thereby effectively plummeting the resource outlay while continuing to field balanced air power capabilities.

Satisfying Demands of Modern Combat

Modern combat is multifaceted and steered with the use of state-of-the-art- technology as well as sophisticated notions of operation. Therefore, it demands primarily four core aptitudes from combat practitioners. Each of these practitioners have their own sub-spectrum. First and

foremost, the tempo and intensity of modern combat fluctuates with the absence of any early warning and this demands intellectual suppleness of a very high order to comprehend and function proficiently within the total setting of the conflict. Secondly, the risks, challenges and threats that are ascended in the modern conflict setups are much broader than they have ever been in the past. As such, these situations stress a widespread comprehension of said factors from military personnel not only with regard to the battlefield but to the national security equation at the strategic level (Kainikara, 2012).

Thirdly, there must be a vibrant and grave understanding of the motivation of the adversary and his immediate enduring objectives. This facet shoulders superior importance in modern conflicts where more often than not, the conflicting force is non-conventional in nature. Information concerning the conceivable actions at the tactical and operational levels will offer an intuition into the functioning of the adversary's system. Nevertheless, knowledge concerning the motivation, which in turn offered intensification to the conflict itself, is essential and critical to initiating the precise actions to arrive at a long-term solution to the matters that have created the conflict. Appropriate strategic effects can only be created with a thorough understanding of the several façades that stimulate the adversary to fight. This factor stresses the need for adequate consciousness across all levels of the force (Kainikara, 2012).

Fourthly, decision-makers of all levels of command need to have the knowledge of relative capabilities of the adversary and own forces. Only a correct assessment of this relativity will provide the background which is necessary to leverage one's own strengths, establish centre of gravity of adversary, and ensure the optimised employment of available military resources (Kainikara, 2012).

Satisfying these four core demands compels military personnel to be multi-faceted. Only a balanced combination of technical and operational expertise and an adequate level of strategic awareness will provide the required input into making superior decisions. Therefore, creating a 'balanced' air force requires the spread of systems to generate air power and the depth of expertise resident in its personnel. Technical and operational expertise is built predominantly through training that is oriented towards facing 'known' situations and slight variations to them. In terms of air power, it deals with the lower levels of application of air

power, the actual physical act of employing a system in the most effective manner (Simons, 2005).

On the other hand, strategic awareness can be considered to be only ten per cent training and is almost entirely built on education. Strategic awareness is dependent on the ability of a person to critically examine the current and emerging situation. Correctly identifying the emerging situation in turn is underpinned by the ability to understand the 'unknown', which then provides the person with a greater ability to make calculated judgements. Normally there exists a visible gap between technical expertise and strategic awareness, especially in the middle-level command positions. However, a competent military force will create a system by which this gap can be bridged through building professional mastery across all levels of command (Simons, 2005).

Small Air Forces: Need to Be Stayed Relevant

There is an obligation for air forces to be evolved and cognisant of changing national security imperatives in order to be stayed relevant. However, this evolution needs to be prudently balanced in contrast to capability requirements, especially in the case of air forces operating under resource constraints. Even though they fundamentally restricted in capability, will have to offer acceptable air power as required for the future security of the nation-state, while enduring appropriate to both conditions and means. Air power will persist as a key instrument of national power into the new millennium. If air power is to be a substantial and potent façade of national security stance, air forces will have to be capable enough for operations across the widest spectrum of warfighting, irrespective of their stature. Further, they must continue to be endured realistic capabilities while safeguarding that acceptable flexibility is upheld to tailor these to meet lesser requirements. However, large or high-end air forces will remain to play a significant in not only shaping the security environment in the nation-state's region of interest, but also for conducting offensive operations (Kainikara, 2011).

At the same time, small air forces also have the tough task of having to ensure balanced capabilities while dealing with the realities of the extant and preparing to cope up with the extreme uncertainty of the future. Further, small air forces have to prepare themselves to function proficiently in a rapidly fluctuating world where intimidations to national security will ensure from unforeseen sources and where national interests are overextended far beyond

one country's own geographic boundaries. Therefore, development of small air force, based on sound professional mastery is one of the principal methods to meet said challenges effectively (Mackenzie, 1994).

A detailed comprehension of existing capabilities of the force and the process by which these capabilities can be adapted to focus on the emerging and disparate threats is of vital importance to the development of appropriate future approaches to air power employment. Further, it is also need to be based on an analysis of future scenarios, as far ahead as can comprehensively be done, that will challenge the nation-state's security stance and air power options. Therefore, effective employment of small air forces would depend a great deal on how they are able to enhance their basic attributes by being agile, flexible and adaptive to emerging scenarios (Kainikara, 2011).

The induction of air power to the warfare did not change the vital nature of war, but it did change the way in which war is conducted. Forefathers of air power realised that strict adherence to existing surface warfare would limit the inherent advantages of the new medium. The study of how best to utilise the air power has betrothed the minds of professional airmen since its first successful flights. Modern combat demands professional mastery of the appropriate depth from all practitioners of the art; soldiers, sailors and airmen, as well as cyber and space specialists alike. Military commanders must have the ability to identify the core issues from the mass of information that is provided to them in a conflict situation. At critical junctures, with too many unknowns in the equation, professional mastery fills the gap and is the key to success (Mallick, 2017). Therefore, air forces must groom their memberships to the highest order of professional mastery to warrant they can produce the obligatory effort at all levels of conflict. Moreover, professional mastery must permeate the individual and the organisation at all levels if an air force is to create its trustworthiness as a force of strategic relevance. Thus, professional mastery would be one of prolific approaches available for small air forces to be stayed relevant with ever changing national security imperatives.

Professional Mastery

Wars are essentially moral conflicts where victory is the corollary of the collapse of the enemy's will. *Fighting power* is the term used to describe the military forces capacity to fight and win. Military forces generate fighting power through the combination of three

components. The intellectual component provides the knowledge to fight; the moral component provides the will to fight; and the physical component provides the means to fight. These three components are interdependent.

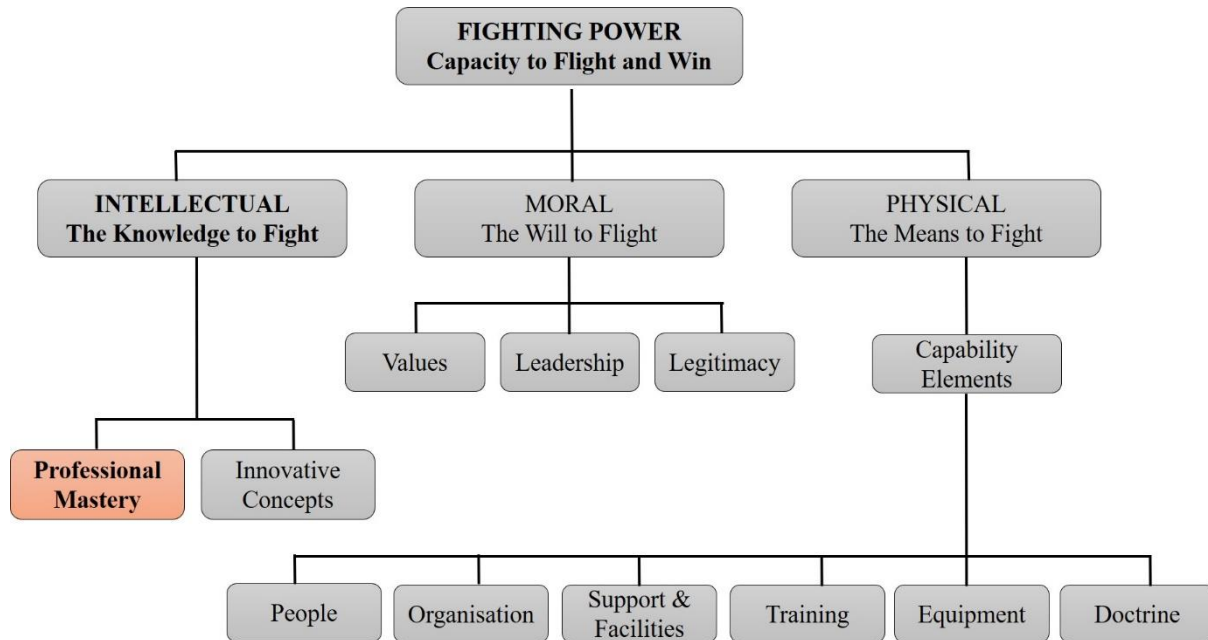


Figure 1 Concept of fighting power (JDP 0-30)

The development of this concept concentrates on the human dimension of warfighting capability. In professional mastery, leadership is the key environmental prerequisite. The moral component (values, leadership and legitimacy) embodies those individual and organisational characteristics that are fundamental to success. Together, the intellectual and moral components of fighting power are the human dimension of warfighting capability, which involves the knowledge and the will to fight and win. It also involves people. It is about how people, individually and collectively, utilise their non-physical resources to contribute to winning in warfighting. Investing in the human dimension of warfighting should provide military with a concept-led approach to fighting power, where innovative concepts guide the development and application of military capabilities to seize and retain the initiative in every undertaking. Professional mastery is the focus for developing and delivering the intellectual component of capability, which underpins the application and management of the physical component of capability.

While it is not possible to predict where or when the next war will occur, or what form it will take, there are some things for which military can prepare. Obviously, Air Force can prepare

the physical condition and training of officers and airmen. Equally important, the air force must prepare the minds of the next generation of leaders to handle the challenges of the future battlefield. The mental challenge will be more important than all the technological sophistication that the air force can bring to bear. Most important in that intellectual preparation must be a recognition of what will not change: the fundamental nature of war—the fact that fog, friction, ambiguity and uncertainty will dominate the battlefields of the future just as they have those of the past. Warfighting is a contest of human wills. As Clausewitz points out, “*war is not waged against an abstract enemy, but against a real one*” (Howard & Paret, 1976).

Professional Mastery is not a new concept. The most critical ingredient for success is the human element and how well personnel adapt to challenges and their environment. Professional mastery is a system’s view of any military force that offers an integrated understanding of how the individual and the organisation interact to deliver the human dimension of warfighting. It recognises the impact of human competence in the achievement of success. As such, the term professional mastery of this paper is defined as “*the ability to perform given competencies, the awareness of why they are being performed, the flexibility to perform them in a range of circumstances, and the self-confidence to apply them in conditions of risk and ambiguity*” (Somer & Schmidtchen, 1999). Further, this paper postulates that professional mastery is a state that changes as a result of personnel responding to their environment. As such, professional mastery should be developed through the challenge of confronting novel problems or contexts, such as the changing nature of conflict.

Professional Mastery: A Stairway to Small Air Forces to Be Stayed Relevant

Air forces, irrespective of their size are fundamentally fighting forces charged with maintaining the ability to apply lethal force from the air in the pursuit of national security imperatives and to promote national interests when directed by the government. This is an onerous responsibility and entails a myriad of activities that must be cohesively and logically brought together to ensure effectiveness. Thus, professional mastery is the binding force and the thread of continuity that transforms disparate groups and units into an air force capable of projecting force and providing the government with viable options to ensure national security. Military forces are hierarchical organisations and are perhaps more rigid in their make-up than most commercial groups. Along with an accepted hierarchy it is the

professional mastery of each individual that makes up the collective proficiency of the force. In other words, a personal understanding of air power which is the responsibility of every member of an air force is the starting point from which the discipline of professional mastery, individual and collective, is built. Further, through this process each individual must aspire to maximise Air Force's contribution to the ability to fight and win at all times (Brower, 2018). The collective professional mastery of an air force will determine its proficiency, efficiency and effectiveness. In a very generic manner, the level of professional mastery resident in an air force can be superimposed on the broader military and national security campaigns. This will provide a visible scale that indicates the status of evolution of an air force in terms of its progression to full maturity. Further it will also illustrate the relationship of professional mastery to the development of an air force to one of strategic influence in the national stage (Holder & Murray, 1998).

There is general consensus and acceptance that the 'profession of arms' is a profession like any other that meets the definitional requirements. People from any of the three environmental Services; army, navy and air force, whose primary occupation in life is military service form the core of this profession. In order to qualify as professionals, they have an obligation to be experts in their chosen field. Therefore airmen, who specialise in generating and delivering air power for the security of the nation, have a duty to be professional experts of air power (Brower, 2018).

An air force's primary function is to generate, apply and sustain air power to meet the political objectives laid out by the government of the day. The focus should always be the employment of air power in the context of national security (Mackenzie, 1994). Professional mastery of air power, therefore, should be the ability to employ air power optimally so that its effectiveness in meeting grand strategic and military strategic objectives is enhanced (Mallick, 2017).

Even a few decades ago military forces were primarily focused on defeating an adversary through the use of armed force. This entailed destruction of infrastructure and resources to make the adversary capitulate. However, the requirement today is for military forces to be able fight and win against irregular forces whose modus operandi is almost always unclear and unpredictable. The need in these cases is more to avoid destruction and, at the same time, facilitate security and build up stability. These are diametrically opposed end-states in

conflict. The first step in professional development is therefore to understand the characteristics and conduct of war, with special reference to the one in which the force is involved. It is necessary to view the conflict as it is in actuality without the perception being coloured by preconceived ideas. This means that the characteristics of the war being fought, and those of the conflicts that are likely to be fought into the near future, should have a direct influence on military education to ensure professional mastery (Simons, 2005).

Appropriate education is the cornerstone on which professional mastery of air power is built. Lack of education and knowledge in the necessary areas, will inhibit an individual from progressing beyond a certain level of technical mastery in the application of air power. When this permeates an entire air force, it becomes very clear that without adequate emphasis being laid on education the force will remain at the fringes of technical and professional mastery (Johnson-Freese, 2012). The implications of such a state of affairs are dire both in terms of national security and the well-being of the air force itself.

Professional Mastery: Force Multiplier for Small Air Forces

In an air force the term 'force multiplier' is used to describe a capability that allows a given input to produce a relatively greater output of effective combat power; in other words, any system improvement which increases the efficiency or effectiveness of a military force. In an important sense, professional mastery is a force multiplier because it improves the corporate understanding of the application of air power; that is, both the benefits and the disadvantages.

The professional airman is an integral part of the air power he manipulates. Prolonged exposure to an air environment has conditioned the airman to think in terms of the technology he utilises, and the medium through which it is projected. The professional soldier tends to be a leader of men, and developer of group skills, whereas the airman utilises technology with the support of technicians. This is perhaps best illustrated in the different manner in which the three services engage in combat. In stark contrast to the surface forces, an air force sends only a very small number of highly trained officers into combat (Mackenzie, 1994).

Prolonged association with the air environment has resulted in environmentally related characteristics becoming imbued in the human fabric of air power. Most noticeable amongst these are the time and space perspective, flexibility and high levels of individual skill. Further, the goal of every airman is to achieve 'professional mastery' of the air environment.

Historical analysis indicates that those airmen who best utilised the capabilities and flexibility of air power in war, were those seeking, or from, an independent air force. As such, Professional Military Education is the tool to increase the proper understanding and awareness of airmen with regard to the ever-changing future battle space due to many factors as discussed. Professional Military Education will keep them ready with the imperatives for the correct use of this formidable weapon (Mallick, 2017).

When applied across all ranks, a professional education program will increase the level of awareness throughout the air force. Experience in air forces has shown that meticulously designed professional development system results in a number of positive benefits. These include a clearer perception at all levels of the fundamental purpose of an air force. It also enables personnel in all branches to discuss the operation of their air force in common terms. Since it promotes the sense of common purpose essential in an effective military organisation, professional mastery is a worthwhile investment in that air force's success in the future and will increase the effectiveness and efficiency in greater terms as a force multiplier (Johnson-Freese, 2012).

Loosing Wars by Big Nations

Though it is a common phenomenon that strong nations (forces) always dictate the victory in conflicts over weaker states, many examples could be cited from the history where weak actor has made the power of strong actor irrelevant. If the power infers victory in war/conflict, then weak actors should almost never win against strong opponents, especially when the gap in relative powers is very high (Brongers, 2017). Hitherto, history advocates otherwise. Weak actors could win sometimes. Precisely, the Vietnam and Algerian wars have amply demonstrated that the overwhelming military and technological superiority of major powers will not provide any guarantee for their victory against small nations. In air power perspective, the Six-day war is the great example which can be cited in support of foregoing notion. This was fought in 1967 between weak actor Israel and an Arab coalition of which the main contributors were Egypt, Jordan and Syria as strong actors. This was mainly fought in terms of air power and Israeli Air Force was greatly outnumbered against the strong Arabic coalition (Arreguín-Toft, 2001). Foregoing examples and explanations clearly demonstrated that the power is not the only factor which decides the victory. In that sense, a small air force will accomplish unduly great effects if efficiently managed and there is a possibility to survive than large air forces in extreme cases.

It is apparent that small air forces are more attentive on operational and tactical outcomes in general. Nevertheless, they will have to evolve from being operationally concerned with into a force which overlays a strategic concentration based on its operational competence. There is no exemption that the combat power will be continued as the keystone of small air forces' ability to create necessary effects, by force and with authority. But, the relevance of air power in national/strategic security equation can only be accomplished by developing professional mastery. In aggregation with other essential skills and features, professional mastery within the whole force is a foundational prerequisite for the progression of smaller air forces into air forces of strategic influence (Johnson-Freese, 2012).

Conclusion

The security dimension of the world is ever-changing due to the stride of developments varying with the stimulus of a numerous new rudiments and contemplations made by the rivalries and the modus operandi of the combatants. Thus, this phenomenon stresses even that competent small air forces to undergo an unceasing but well-controlled transformation in order to preserve their relevance in the national security equation. It is ostensible within the modern battle space that the outcome of any battle, either covert or overt, is determine not purely by physical or virtual military victory, but by winning in the cognitive domain, the behaviour and belief system of the antagonists. Thus, this notion will demand to dealing progressively in the decision domain of the adversary. The force that precisely deals with the factors that stimulus the decision-making aptitude of the antagonists and effect the essential actions to target them will make the adversary change their mind set and always succeed.

The profession of arms has to contend with the uncertainties and lethality of war. Further, the price of failure can be disastrous to the security of the nation. The ambiguous nature of future challenges demands serious intellectual preparation for warfighting. As Sir Michael Howard has suggested on a number of occasions, war is not only the most physically demanding of professions, but the most intellectually demanding of professions. Thousands of years of history confirm that ambiguity, miscalculation, incompetence and, above all, chance will continue to dominate the conduct of war. Therefore, achieving professional mastery of air power is a more complex process than achieving mastery in some other profession.

Acquiring professional mastery is not easy, nor is it a one-time effort. It remains a continuous process of education, learning, introspection and practical application of knowledge in equal measure. The shape and characteristics of future conflicts is difficult, if not impossible, to predict with any assurance. However, that does not in any way diminish the responsibility of the air force to contribute directly to national security. The primary asset that any air force has to ensure its agility to counter any threat to the nation will be the intellect and knowledge of its personnel, individually and collectively. Through the professional mastery, small air forces will certainly be able to gain this impetus and stay remain within the national security equation.

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**EVOLVING DYNAMICS OF THE AIR SUPPORT NEEDED BY THE LAND AND
NAVAL FORCES TO DELIVER NATIONAL MILITARY OBJECTIVES OF
SRI LANKA**

“If a battle can be won without suffering loss, surely this is the most economical, if not the most traditional, way of gaining the strategical object”.
—J F C Fuller

INTRODUCTION

1. The use of airpower to further a nation’s strategic aims and objectives has come a long way since the pounding of Nazi Germany’s ball bearing factories by Allied bombers and the obliteration of Hiroshima and Nagasaki, both of which events had a significant effect on the outcome of World War II. Subsequent aircraft such as the B52 in the 1950s and the Russian Tu126 bomber in the 1960s could deliver nuclear missiles and warheads. This capability added a new dimension to strategic airpower—that of deterrence.¹ Barring the odd failure, the application of airpower to attain strategic objectives and engage in coercive diplomacy has seen tremendous success over the last 50 years.² Conversely, poor target selection during Operation Rolling Thunder from 1965 to 1968 led to the total failure of that operation. The strategy of targeting the Ho Chi Minh Trail and centers of population in North Vietnam proved to be blunders rectified in Linebacker II, which targeted only military and infrastructure elements of national power.³

2. Next came the redefinition of platforms to prosecute the strategic air campaign and the consequent understanding that the campaign became better focused when one looked at the effect of destruction on a nation’s ability or will to wage war rather than concentrating on the target and platform itself.⁴ The final fillip to the case for strategic

¹ Air Chief Marshal Sir Michael Knight, *Strategic Offensive Air Operations* (Washington, DC: Brassey’s, 1989), 48–60.

² Duncan Bell, “*The Seductive Promise of Air Power: Strategic Coercion in Vietnam (and Beyond?)*” *Royal Air Force Air Power Review* 3, no. 2 (Summer 2000): 38–53.

³ Ibid.

⁴ Mark J. Conversino, “*The Changed Nature of Strategic Air Attack*,” *Parameters* 27, no. 4 (Winter 1997–98): 28–41, <http://www.carlisle.army.mil/usawc/Parameters/97winter/conversi.htm>.

airpower is, without doubt, the emergence of highly accurate PGMs, coupled with real time intelligence and just in time targeting, which enable a nation to exert its will on another without committing ground forces, thus paving the way for negotiated settlement of conflicts without unnecessary collateral damage and loss of life. Enough has been written over the years about the spectacular success of the coalition air forces in Desert Storm, wherein an effect based strategic air campaign, conceived by Col John Warden and executed by Gen Charles Horner, helped achieve Pres. George H. W. Bush's strategic objective of driving Iraq out of Kuwait with minimum attrition.⁵

3. Sri Lanka Armed Forces are in a drive to right size force structure while maintaining essential capabilities to deliver national military objectives as part of the national effort to ensure security of post conflict Sri Lanka. National economic development demands greater attention in terms of meager financial resources and hence allocating necessary funds for development in the arena of national security will continue to be a challenge faced by the government. Yet recent incidents highlight that the country's geography, demography and current regional and global strategic environment demand considerable emphasis on national security related developments. Tri services have a joint role to play and the Sri Lanka Army and Sri Lanka Navy will need the versatile support of the Sri Lanka Air Force to deliver their responsibilities in the joint effort towards achieving national military objectives in order to ensure national security of the country. Planners of rightsizing Sri Lanka Air Force have to be cognizant of these challenges.

4. This paper takes a broad view of the use of airpower and presents an Army perspective on the strategic, operational and tactical support needed by the Land and Naval forces from the Sri Lanka Air Force in the joint effort of tri services towards achieving national military objectives in order to ensure national security of Sri Lanka.

⁵Col Richard T. Reynolds, *Heart of the Storm: The Genesis of the Air Campaign against Iraq* (Maxwell AFB, AL: Air University Press, January 1995).

5. The objectives of the paper are to:
 - a. Shed some light on application of air power towards achieving military objectives.
 - b. Identify Sri Lanka's national military objectives in light of the evolving security environment.
 - c. Consider key capabilities that the Sri Lanka Air Force has to possess in order to support Land and Naval forces to deliver national military objectives.

AIR POWER APPLICATION UNDER EVOLVING SECURITY ENVIRONMENT

6. It is widely held belief that the next few generations may not see a world war and the force structures of developing countries like Sri Lanka needs only to focus on waging local wars under hi-tech conditions, low intensity conflicts, and counter insurgencies. Others argue that the former could not be farther from the truth because the coming years will see a struggle for strategic resources, strategic points, and strategic markets, most of which are spread across the globe, hundreds of miles from a country's geographical boundaries.⁶ A threat to these assets would warrant speedy intervention, something that only airpower in tandem with space based reconnaissance, surveillance, targeting, and acquisition capability can achieve. Obviously, all of these capabilities would have to be networked and secured. One cannot overemphasize the case for developing the SLAF's strategic air capability in the coming years in light of Sri Lanka's emergence as a potential economic hub in Asia with global commercial interests and markets. Only synergistic joint operations can provide swift, precise, and decisive involvement in potential hot spots spread across the theaters of operations, with airpower used as a spring board or launch pad for further involvement by land and naval forces.⁷

7. In conventional conflicts since WorldWar II air forces have set the conditions for joint operations, establishing advantages and opportunities for all components. As

⁶Air Commodore ArjunSubramaniam, *The strategic Role of Air Power*, Air & Space Power Journal , p.3, September 2008.

⁷Ibid.

Admiral William F. Halsey told Congress after World War II “the lesson from the last war that stands out clearly above all the others is that if you want to go anywhere in modern war, in the air, on the sea, on the land, you must have command of the air”.⁸ This is true today, although space supremacy and informational dominance have become necessary accompaniments to air supremacy--a capability only few developed countries can aspire to have. First and foremost, an air force exists to develop and maintain special capacities to promote and defend national interests (as the other services do, each in a distinct way). The Nation must have an air force capable of helping its Army and the Navy to protect people and forces from hostile attacks. “The big picture mission of the Air Force, to control and exploit air has two dimensions. In the foreground, controlling includes everything needed to control in the air. In the background, exploiting includes tasks that are best done in air and those that confer special advantages when conducted by air forces. Planners continue to devise means to exploit air and tasks that are best performed by air forces”.⁹

8. The three main objectives of any military campaign—coercion or intimidation, incapacitation or dismemberment, and annihilation or destruction—have always focused on achieving a nation’s geopolitical goals in any dispute or conflict. Warfare in the twenty first century is slowly moving towards using annihilation or destruction as a last resort in legitimate war fighting scenarios. That said, two airpower theorists from the USAF—Col John Boyd and Colonel Warden—propounded path breaking theories of paralyzing the enemy by strategic application of airpower.¹⁰

9. While Boyd talked about paralyzing the enemy psychologically and weakening his will to fight, Warden emphasized the need to paralyze the adversary physically by attacking leadership, infrastructure, communication links, and field forces as part of his

⁸Jones HA, *The War in the Air*, p. 10. Published by Leonaur Ltd (2019)

⁹Air Commodore Arjun Subramaniam, *The strategic Role of Air Power*, Air & Space Power Journal , p.3, September 2008

¹⁰Maj David S. Fadok, *John Boyd and John Warden: Air Power’s Quest for Strategic Paralysis* (Maxwell AFB, AL: Air University Press, February 1995).

now famous “Five Ring Theory,” based on Clausewitz’s centers of gravity, which formed the heart of the air campaign in Desert Storm. The cornerstone of this process is the high probability of pounding an enemy into submission without inflicting too many casualties and reducing the intensity of battle by driving his leadership underground, blinding him, rendering his senses (eyes and ears) ineffective, and destroying his reserves as well as follow on forces by carrying out deep precision strikes.

10. Although the strategic air campaign that aims at paralysis is based on the overwhelming asymmetrical technology advantage that many strong air forces will likely enjoy in any conflict scenario, the strategic planners in Sri Lanka must understand the tremendous advantages of creating an asymmetry vis-à-vis potential adversary by building up a potent strategic air capability built around technology and force multipliers. That does not mean that airpower alone can win wars, but by applying the principles of asymmetry and paralysis, we can hasten the capitulation of an enemy by incapacitating him and reducing his military potential, as mentioned earlier, rather than destroying him. Airpower can do all this and simultaneously support the surface campaign by conducting parallel warfare at the tactical, operational, and strategic levels.¹¹ Building such an ability calls for a change in mindset and significant alterations in asset allocation.

11. Hence, in the Sri Lankan context, while discussing on creation of a lean air force we have to ensure that it remains capable enough to show a meaner posture to potential adversaries. Sri Lanka Air Force needs sufficient numbers of aircraft and other platforms to conduct parallel operations on manifold aspects. This obviously calls for a strong case to progressively beef up the number of combat, reconnaissance and transport squadrons in the SLAF for future requirements.

¹¹Rebecca Grant, “The Redefinition of Strategic Air Power,” Air Force Magazine 86, no. 10 (October 2003): 33–38, <http://www.afa.org/magazine/oct2003/1003strategic.pdf>.

12. The emergence of invisible enemies, such as terrorists, and unconventional targets involving material and human resources will increase the difficulty of classifying the roles performed by strategic air assets over the next few decades. Perhaps the most critical characteristics of air power that might occupy centre stage for the SLAF in years to come would include flexibility, reach, precision fire power, and interoperability, with other characteristics such as surprise and shock effect serving as age old, time tested corollary benefits. What aspects of these four characteristics make them the focus of a study to define the SLAF's strategic air power roles for the twenty first century? The ability of a platform to switch effortlessly from a tactical to a strategic role is an inescapable imperative, as is its reach in performing interventionist roles with appropriate combat support elements, hundreds of kilometers away from its launch base. Having reached its target, the platform must be able to neutralize it with precision attacks and minimum collateral damage. They also need to be well integrated with elements of the land or naval forces involved in operations so as to synergistically apply the principles of asymmetry in conflict resolution. In view of the above facts the SLAF would need to answer few major questions before deciding on right sizing or restructuring:

- a. What are the types of campaigns the SLAF will likely be involved in?
- b. Does SLAF have the resources to prosecute such campaigns?
- c. Is Sri Lanka willing to prosecute war in a foreign land?
- d. Does Sri Lanka likely to face a war from a foreign land?
- e. Are there other immediate threats to Sri Lanka to counter for an extended period?

13. Answers to these questions have to be found through a holistic deliberation and in addition to that the SLAF need to consider another fundamental question pertaining to its role. Until now, people have viewed the SLAF as a predominantly tactical air force with limited deterrent capability. Will that be enough for future? This paper does not attempt to answer these questions. However, in this context to further examine the air

support requirement, it is essential to have an appropriate impression on national military objectives of Sri Lanka.

NATIONAL MILITARY OBJECTIVES OF SRI LANKA

14. National Security Objectives are achieved through the application of elements of national power such as political and diplomatic, information and techno scientific, military and law enforcement, economic, socio-cultural, geostrategic location and environment, population, etc. Accordingly the application of military power is only one of the elements of national power. National Military Objectives are derived from the National Security Objectives in line with available and enhanced capabilities and military role in a democracy. Military Objectives may be discussed as follows:

- a. Prime responsibility of the Sri Lanka Armed Forces is to protect the state, its people and territory from any form of aggression.
- b. Sri Lanka's defence apparatus should identify, access and address maritime issues through instruments of national power and need to overcome maritime security challenges in terms of conventional, non-conventional threats in the global and regional maritime security environment.
- c. Create a secure and peaceful environment free of terrorism and extremism while generating an inhospitable environment for violent extremism to deny breeding grounds, external or internal support and sanctuaries for terrorists and extremists groups in Sri Lanka.
- d. Assist the Government in time of crisis including natural and manmade disasters, epidemic and breakdown of essential services.

e. Contribute towards international peace and security by sharing information on common threats, joint military exercises and training, disaster response in regional countries and participating UN peacekeeping missions.

f. Contribute towards the Government efforts of sustainable development in upholding a secure and peaceful environment for the development activities of the state.

g. Enhance intelligence and surveillance capabilities and network as combined effort to assist national security in order to counter emerging threats and to provide vital information for strategic decision making.

POSSIBLE FUTURE ROLES OF SRI LANKA AIR FORCE

15. In considering the above, it is apparent that, contemporary environment has created a condition to “think big” and “think far” along the present day context of the national, regional and global volatile situations. Hence, we must replace conventional roles with those that cater to the following scenarios:

a. **Limited Air Superiority Over Power Projection:** Power projection (or force projection) is a term used in military and political science to refer to the capacity of a state to deploy and sustain forces outside its territory. This ability is a crucial element of a state's power in international relations.¹² In Sri Lankan context it is hard to believe that SLAF needs power projection capability, however, it may become necessary to maintain Air Superiority for a limited period of time to safeguard Sri Lanka’s air space from an imminent threat if and when such a need arises.

b. **Strategic Intervention Over Limited Distances and Duration:** As a transforming air force, SLAF should be able to conduct air operations in line with the evolving and changing characters of air power which are based on fundamental roles of air power along with intelligence and situational

¹²Free dictionary online, <https://www.thefreedictionary.com/power+projection>, (31 Aug 2019).

awareness, air mobility, attack, and control of the air. These capabilities will halt the outside intimidation before it influences the land forces while hindering and diminishing the magnitude of the external hazard in the outer perimeters of the country's territory. On the other hand as a professional and conventional air force, it is vital to uphold its aptitude to gain control of the air over a limited distances and duration in the future strategic scenarios.

c. **Humanitarian Intervention:** Humanitarian intervention is the use of military force to address extraordinary suffering of people. They are interventions to protect, defend, or rescue other people from extreme situations. Sri Lanka and the Indian Ocean Region are prone to situations that demand humanitarian intervention of Armed Forces. The SLAF should be equipped for such eventualities within the country or outside the country when such requests are received. These capabilities may become useful when operating under the UN flag too.

d. **Peacekeeping/Enforcement Missions:** Contributing to UN peacekeeping operations has created a unique opportunity for SLAF to demonstrate its strength, capabilities and experience in the global arena. Air Force operation is always sophisticated, technical and costly affair with various challenges. When SLAF aircraft fly with distressed people, logistic support, evacuation missions, or carrying high officials or delegations displaying the flag of Sri Lanka on her wing, it obviously demonstrates the contribution of our nation in establishing global peace and this is only possible through UN peacekeeping operations. In the future, with the change of geo-political situation, there might be increased need of UN missions and SLAF needs to be always ready to undertake any such missions with the fullest of its competence with an updated air fleet.

e. **Protection of Energy and Economic Resources:** Initial work has been already completed by Sri Lanka's Petroleum Resources Development

Secretariat (PRDS) for exploration and development work in the remaining blocks in Mannar and Cauvery basins after legislating the National Policy on Natural Gas (NPNG) with an aim to drill natural gas before 2025. So far we have discovered around 1.350 trillion cubic feet (TCF) of NG in Dorado and Barracuda discoveries in Mannar Basin up to 5 TCF upside potential and over 10 million barrels of oil. Also the undiscovered hydrocarbon potential in 42,000 square kilometers in the Mannar basin is estimated to exceed 9 TCF natural gas and over 2 billion barrels of oil.¹³ Therefore, it is in the national interest to ensure that these areas are not exploited by external powers and that the treasures that are held within are preserved for the benefit of the nation and its people. Thus, this requires regular vigilance, periodic routine surveillance as well as reconnaissance as called for by specific requirements. In view of that, it is obvious the SLAF should be equipped with modern air assets to meet the challenges in terms of pollution control, search and rescue missions and military actions that are likely to be faced by the nation within the enormous sea boundaries of Sri Lanka.

f. **Disaster Management and Search and Rescue Activities:** Disaster management is a continuous and integrated process involving many stakeholders working together to prevent, mitigate, prepare for, and respond to disaster and reconstruction after disaster. It is confirmed that no single organization can handle a disaster situation of large scale alone. It is the collective responsibility of different groups of stakeholders, like various ministries, departments, private sector, civil society, non-governmental organizations, armed forces, and international institutions etc., and everyone plays different roles in this process. While, some stakeholders have to take a leading role in disaster management, others play a supporting role in this process. Thus, there are different group of stakeholders for disaster management

¹³Daily Mirror newspaper, <http://www.dailymirror.lk/business-news/SL-plans-major-licensing-round-for-oil-and-gas-blocks/273-164705>(31 Aug 2019).

and among them armed forces play a vital role. Amid these organizations, the SLAF has a major role to play along with the Army and the Navy as part of joint effort in the pre-disaster, during the disaster and post-disaster situations. Hence, the SLAF should be equipped with adequate and capable air assets to produce speed, maneuver and agility during all phases of search and rescue missions during any kind of a disaster.

g. **Assist SLN during Blue Water Operations:** An air force can make a major contribution to the employment of naval forces across the spectrum of conflict at sea. The long range, high speed, and lethality of modern aircraft allow them to operate over the major part of the ocean. However, their effectiveness decreases as combat actions take place closer to the enemy or friendly shores. Maritime and air operations should normally be planned to exploit the natural synergies between air and naval forces. Aircraft have longer reach and higher speed than surface ships. They can operate autonomously. In contrast, it is rare for surface forces to operate beyond the effective range of land-based or carrier-borne aircraft.¹⁴ In view of the above facts and the experience gained during humanitarian operations , as well as considering the modern trends, the SLAF should have the capability to assist SLN in the course of blue water operations with a contemporary, updated long range air fleet for future contingencies.

m. **Assist SLA during Land Operations:** In the modern era, there has been few major land operations conducted without some participation of friendly aircraft. Air force can be employed for a variety of missions in support of friendly ground forces in both offense and defense. Among other things, air attacks can compel the enemy to stop his advance and revert to the defensive. They can compel the enemy to channel his advancing forces into areas where they can be more easily contained or destroyed. Air force can cause extensive delays in the planned movements of opposing troops on the battlefield. When

¹⁴Vego N. Milan, *Major joint operations by, JFQ / issue 48, 1st quarter 2008*, ndupress.

ground forces are on the defensive, the air force can, by attacking the enemy forces, buy time to bring in fresh troops, reinforce positions, or launch spoiling attacks. Strikes from the air can greatly complicate withdrawal or retreat. Obtaining air superiority or supremacy can often be more successful if air forces synchronize operations with ground forces. All these possibilities demand that SLAF be prepared with adequately capable and modern air platforms.

n. **Maintain a Strong Air Defence:** Air Defence platform of a country is one of the vital components of its national security. In contemporary armed conflicts, air and air defence forces realize strategic effects through their operations and have decisive influence on the outcome of armed conflicts. In peacetime, these forces are the main factor in diverting and eliminating potential asymmetric threats from the air space. According to the mission statement of SLAF, "Air defence is the SLAFs premier core competency, to detect, identify and destroy any hostile aircraft getting airborne within Sri Lanka or any hostile aircraft that attempts to penetrate Sri Lanka's airspace. It is the role of the SLAF to ensure that the skies above our nation are not used against it by those who wish it ill".¹⁵ In this respect, it is worth to consider whether SLAF is currently capable in control of the Sri Lanka's air space with available air defence system. Therefore, the decision makers cannot ignore the timely adjustments needed to the SLAF AD structure.

o. **Surveillance Activities:** Strategic and tactical aerospace surveillance and reconnaissance operations over country's territory are another key area for any air force of sovereign country. Sri Lanka has a land area of over 65,000 square kilometers as well as a territorial sea of 12 Nautical Miles, a Contiguous Zone of 24 Nautical Miles and Exclusive Economic Zone of 200 Nautical Miles. Then there is extended territorial sea that Sri Lanka has claimed beyond

¹⁵SLAF website, https://www.airforce.lk/pages.php?pages=mission_vision ((31 Aug 2019).

that. It is in the national interest as well as among the national security concerns to ensure that these sea areas are not exploited by external powers. Therefore, SLAF must possess the assets for the systematic observation of airspace and sea surface by electronic, visual or any other means, primarily for the purpose of identifying and determining the hostile movements in the country's air space and to support Naval Forces. In this context, it is of utmost significance to enhance surveillance and reconnaissance capabilities of SLAF with appropriate assets in order to transform its ability in line with changing national security dimensions.

CONCLUSION

16. The SLAF finds itself in the midst of a modernization process likely to take 10-15 or more years, by which time it will possess significant strategic capability in terms of platforms and force multipliers. The upgrading of infrastructure and communications requirements to support such operations have to accompany this modernization. The SLAF's mindset must also shift from that of a tactically oriented and proficient force to one that has the confidence to influence strategy and associated changes. At a time when nations are increasingly reluctant to commit ground forces due to the likelihood of mounting casualties, the ability to engage strategic targets with minimum collateral damage and maximum effect has made airpower a preferred option in swift, conventional conflict resolution.

17. In many of the scenarios discussed in this paper, the Navy and Army would continue to form key components of any joint task force, but the Air Force would have to be involved and support constantly. Although the tsunami relief efforts of 2004 and other emergency situations that occurred such as floods and landslides highlighted the speed and responsiveness of SLAF in terms of assistance to the affected areas, at home as well as in neighboring countries, such as in Nepal after earth quake, they also revealed the need for additional resources such as heavy lift helicopters and transport aircraft for disaster relief operations.

18. From the imprecise aerial attacks of World War II to the precision with which modern aircraft engage targets in Afghanistan, Libya, Syria and Iraq, the strategic air campaign has come a long way. Having realized that the strategic effects of air power application make themselves felt across the spectrum of conflict, ranging from limited and high intensity conventional warfare to sub conventional and irregular warfare, we know it is time for the SLAF to put together a blueprint for building a credible strategic aerial intervention capability in all aspects including operation other than war over the next decade and beyond.

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**AN AIR DIPLOMACY POLICY FOR SRI LANKA:
FORMULATING AND IMPLEMENTING A TWO-TIER STRATEGY**

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ABSTRACT

The intrinsic patterns of history which resulted in the rise and fall of states have seen a significant development throughout the 20th century as air travel intensified and progressed to its current level of operation. The ability to cross regions and continents in shorter periods of time dramatically altered the practice of diplomacy itself. Whilst diplomats played a critical role for centuries as the emissaries of leaders, who rarely or never met, increased and enhanced air travel has enabled an intensification of connectivity at the highest level, resulting in the diplomat needing to evolve and for the practice of diplomacy to become more indepth and specialized.

Amidst these vast strides in diplomacy and transportation, the Air Power of states has grown significantly allowing for its use in times of emergency and need, as well as during conflict. This paper attempts to focus on Air Diplomacy and its usage, and thereby argue its paramount relevance for an island nation, such as Sri Lanka. Given that connectivity and defence are the basic tenants upon which states like Sri Lanka have survived for millennia, this paper examines the rationale for Air Diplomacy to be formulated and implemented through a two tier strategy. It is argued that an Air Diplomacy Policy, once implemented, would generate new opportunities for Sri Lanka in general, while increasing the potential of the Sri Lanka Air Force and boosting the foreign policy of the country in particular.

The adoption of an innovative Air Diplomacy policy needs to be rationalized on two levels, at the bilateral and multilateral levels, with two categories of interaction identified at each level. The identification of critical areas of governance and the incorporation of strategy to achieve overarching objectives in these specified areas ensures the creation of a state which can harness opportunities, develop industry, prosper people and equally importantly, increase its presence and influence on the world stage. All nation states, irrespective of their size, location or resources, look to enhance their potential and power. Formulating and implementing a comprehensive Air Diplomacy Policy is one such sphere of significance. It augurs well for defence, strengthens foreign policy, boosts diplomacy and increases connectivity.

This could be done primarily in the bilateral sphere whereby Sri Lanka utilizes her strong bilateral connections with strategic countries in the region and beyond, and secondly at the multilateral level, whereby Sri Lanka plays a vigorous role in redefining defence cooperation through Air Diplomacy. Both levels provide the country and the

Sri Lanka Air Force with the opportunity of branching out and creating another highly valued platform for cooperation which would augur well for the state in the long run.

Keywords: Air Diplomacy, Sri Lanka Air Force, Foreign Policy,

FULL PAPER

AN AIR DIPLOMACY POLICY FOR SRI LANKA: FORMULATING AND IMPLEMENTATING A TWO-TIER STRATEGY

INTRODUCTION

On the eve of the 20th century the Wright Brothers tested their wing-warping control concept of a flying device which revolutionized travel. Their invention in July 1899 set the pace for advancements in aviation that saw humans not only flying around the world but venturing further, into outer space and even landing on the moon 70 years later in 1969. To date, many other aspects of air travel have intensified with the space race playing a key role. In 2019 the world witnessed the world's biggest airplane, the Stratolaunch jet, flying over California's Mojave Desert, while plans have been revealed to develop a plane that would be able to travel at five times the speed of sound, reducing the journey from New York to London to 90 minutes from the current seven hours.

Developed countries continue to race into the future with the latest innovations and most modern technology. This combination yields immense power and intense influence on the world's stage. The advancements are spread across private and public sectors, with states improving infrastructure, enhancing air capabilities and incorporating this dimension into diplomacy to increase connectivity. Developing countries which rely heavily on diplomatic engagement to remain formidable players on the world's stage, lack sufficient infrastructure and budgetary constraints often hold such countries back from pursuing ambitious policies.

It is thus necessary for such countries, including Sri Lanka to explore areas of cooperation through which the synergy of joint collaboration would yield positive results and boost the standings of developing states. A concerted policy of Air Diplomacy, if implemented keenly, would result in a plethora of opportunities. These would portend well for the betterment of the Sri Lanka Air Force as one of the key implementing agencies and would see a venture into a hitherto untapped area of expertise that would advance the diplomatic engagement of the island and strengthen foreign policy tools at the disposal of the state.

This paper attempts to focus on Air Diplomacy and its usage, and thereby argue its paramount relevance for an island nation, such as Sri Lanka. Given that connectivity and defence are the basic tenants upon which states like Sri Lanka have survived for millennia, this paper examines the rationale for Air Diplomacy to be formulated and implemented through a two tier approach. It is argued that an Air Diplomacy Policy, once implemented, would generate new opportunities for Sri Lanka in general, while increasing the potential of the Sri Lanka Air Force and boosting the foreign policy of the country in particular.

FIRST TIER - BILATERAL ENGAGEMENT

The bilateral level would need to be examined in two categories. Sri Lanka possesses 67 missions across the globe which are accredited to a number of other countries with which Sri Lanka has diplomatic ties. Continuous interaction with these countries form the first platform in the first tier from which the Air Diplomacy policy could be activated at the bilateral level. Reaching out to as many countries as possible conveys a strong message of interest and seriousness while raising awareness towards the national initiative.

A comprehensive briefing would need to be dispatched to the Air Forces of these countries from the Sri Lanka Air Force, through the Ministry of Foreign Affairs, and the Sri Lanka Missions and also through the resident missions in Sri Lanka as well as the respective Honorary Consuls in the country. These briefs would detail that which Sri Lanka hopes to promote through Air Diplomacy, discuss the nature of the thrust into this sphere and the manner in which engagement is sought, while highlighting the need for enhanced cooperation.

Once the objectives of Sri Lanka have been expressed, interest could be expected to vary from region to region and country to country. Those who do respond and express interest would enable the compilation of the next level whereby strategic partners are identified for the implementation of joint efforts. This second level of the bilateral engagement would give Sri Lanka the opportunity of reaching beyond the usual remit of connectivity and improve bilateral relations in the process. Countries that would come onboard, would be those who find that which is proposed to be mutually beneficial, and would want to collaborate in such endeavours.

Of the totality of countries with Sri Lanka engages, many are those from which purchases of ammunition, equipment, aircraft, vessels have been made at varied times. These are countries of immense importance and it is vital to develop closer relations

with them by proposing cooperation in different forms. This could range from structured joint sessions between the militaries, and in particular with the Air Forces of the respective countries. Adopting a similar format as the Joint Sessions between countries at the political level, the Air Force interface would lead to deeper understanding, better cooperation and stronger connectivity, especially at times of need. It could also evolve into and include the conducting of joint drills between the Air Forces, which would result in the sharing of technology and expertise. Many of the countries from which the aforementioned purchases have been made in the past are countries possessing the wherewithal to lead in the aviation sector and are those which have the capacity and capability to extend cooperation in the technology sharing sphere.

RESEARCH AND TRAINING

Research remains a crucial factor when policies are being formulated. That which has already been done and the potential of that which can be done, would only be comprehensible after an indepth exercise of research has been undertaken and the results analysed. Whilst this is true for any form of academic study it extends similarly to the area of cooperation. Efforts have to be made to understand the nature, scope and potential of Air Diplomacy, through collaboration among academia, the Sri Lanka Air Force and the Ministry of Foreign Affairs if the endeavour is to succeed. A thorough study would bring to the surface areas in which strengths exist, weaknesses persist, opportunities abound and threats maybe perceived.

The study of the domestic situation remains a primary objective but it wouldn't be curtailed to that which occurs within the shores of the island. It is important to identify case studies of countries, their Air Forces, the nature of collaboration therein and the means through which policies of Air Diplomacy have been formulated and implemented. All too often countries look to increase Air Power and what appears as sole Air Power strategies would possess critical processes in which Air Diplomacy has been incorporated.

In February 2019, France and Germany revealed the progress made over the sixth-generation fighter programme, known as the Future Combat Air System (FCAS). In addition 'the two governments also awarded €65 million to Dassault and Airbus for the two-year study that will solidify a path forward for FCAS'.¹ The two countries have

¹ Insinna, V., *French Air Force chief: France and Germany working on export controls for future fighter*, 08 February 2019, Retrieved September 2019 -<https://www.defensenews.com/global/europe/2019/02/08/french-air-force-chief-france-and-germany-working-on-export-controls-for-future-fighter/>

seen consistent cooperation in this field and this latest venture highlights the potential of the joint effort, and has also seen the inclusion of Spain as an observer, with others expected to join this endeavour.

In June 2019, the integral air partnership between France and Singapore came in for praise, when Singapore's Senior Minister of State for Defence Heng Chee How was at the Cazaux Air Base in France. Noting that the opportunity to train alongside a very professional Air Force, such as the French Air Force spoke volumes of the practical value of the collaboration between the two countries, he observed that a strong and capable defence must include a strong air force, which has the ability to train its pilots well.² The collaboration was boarding well for both countries as Singapore gained the latest in relation to technique and precision, while France was deepening ties with an Asian ally.

The following month, in July military cooperation was enhanced through joint air patrols as Russia and China negotiated an agreement for deeper cooperation and conducted their first joint patrol mission over the Sea of Japan. The agreement was an extension of one that was agreed in 1993 which 'focused on creating conditions for cooperation in the field of military technology between the two countries.' It also detailed training, learning and information exchanges, mutual assistance in servicing weapons and military equipment and conducting joint research and commemorative military events.³

Engagement of this nature, as detailed in the preceding paragraphs creates a unique platform for countries to grow closer, consolidate bonds of friendship and strategize together. The depth of the partnerships would be felt in situations of tension with other countries as these strategic partners would bolster each other. As witnessed between Singapore and France, seeking opportunities of this nature contributes more significantly to the smaller partner. Sri Lanka would do well to attempt deepening partnerships of this nature into research and training as it would widen the existing opportunities afforded to Sri Lanka by Air Forces around the world. The exposure the officers of the Sri Lanka Air Force would receive overseas would enable them to gain knowledge and insight into the latest innovations and technology whilst also equipping them with deeper understanding of countries and their policies.

² Zhang, L. M., *Training in France allows Singapore pilots to develop cutting-edge skills in the air: Heng Chee How*, Strait Times, 20 June 2019 - Retrieved September 2019 - <https://www.straitstimes.com/singapore/training-in-france-allows-singapore-pilots-to-develop-cutting-edge-in-the-air-heng-chee>

³ Kashin, V., *Joint Russian-Chinese Air Patrol Signifies New Level of Cooperation*, 30 July 2019 - Retrieved September 2019 - <https://carnegie.ru/commentary/79587>

Equal attention would need to be paid to the enhancement of programmes conducted in Sri Lanka, especially the Junior Command and Staff Course, through which more placements could be offered to partnering states. The establishment of the Junior Command and Staff College in 1999 at the Sri Lanka Air Force Academy in China Bay filled a vacuum hitherto experienced in Sri Lanka. The programme could see the induction of more foreign participants, who would understand Sri Lanka better, relate to the geopolitical significance of the island and comprehend the trajectory being followed by the country.

Their presence in increased numbers would in turn allow Sri Lankan officers to grasp nuances and subtleties of foreign forces through the interactions that would occur in Sri Lanka. The participation of foreign officers yields vital results in the long term as officers progress in seniority in their respective forces and retain a unique connection to Sri Lanka. The creation of a senior level programme would also be beneficial as it would yield the aforementioned results and be a supplementary platform for interaction.

Numerous other forms of exchanges would augment the policy of Air Diplomacy, from the sporting arena wherein teams from the Sri Lanka Air Force playing against foreign Air Force teams and also hosting events in Sri Lanka. Friendly aircraft visits could be increased to create more opportunities for officers to interact, gain deeper understanding and observe processes overseas. Bilateral drills or air shows could be arranged at periodic stages through which an interest is generated among the general public while deepening connectivity between the two Forces and countries.

Avenues for engagement remain limitless. Countries around the world look for ways and means through which they would be able to meet regularly, exchange expertise, gain from each other and share with each other. Through a concerted policy of Air Diplomacy which strategizes the means through which wider and deeper engagement is envisaged and realized, Sri Lanka would be able to successfully formulate and implement a sound bilateral approach.

SECOND TIER - MULTILATERAL ENGAGEMENT

Multilateral engagement forms the second tier whereby the bilateral connectivity could, in time, be merged with regional conclaves. Identification of an existing grouping for initiation of such endeavours requires clear understanding on the scope of the grouping and the pace at which such initiatives could be activated among the member states of

the organisation. The merging with regional conclaves could be done through existing regional mechanisms or could be explored through new structures.

In examining existing structures, while it seems too early to explore the potential of South Asian cooperation given the current stalemate in political relations among SAARC countries, Sri Lanka could instead look at playing a catalytic role of bringing Indian Ocean Rim Association (IORA) countries together to implement a policy of Air Diplomacy amongst the 21 member states and 7 dialogue partners. Whilst this could be done within the framework of existing groupings, whereby Sri Lanka proposes the establishment of such fora even in groupings such as BIMSTEC and the Commonwealth, where the use of Air Diplomacy would greatly enhance security cooperation.

Sri Lanka currently chairs the Bay of Bengal Initiative for Multisectoral Technical and Economic Cooperation (BIMSTEC) while also being delegated leadership in the areas of technology as well as counter terrorism and transnational crime. These two categories are out of 14 sector specific areas of cooperation. BIMSTEC would serve as an ideal platform from which military cooperation can be promoted in general and an Air Diplomacy Policy keenly sought in particular. It would be innovative and open new vistas for Sri Lanka while enhancing multilateral engagement and creating new opportunities. It is important to note that 'member states in BIMSTEC are identifying priority areas, comprehending looming challenges, adapting to the presence of new actors, exploring new initiatives and opportunities, and most importantly changing the course of their respective ships of diplomacy to suit global developments.'⁴

Given that Sri Lanka is currently in a position of leadership of BIMSTEC, the possibility exists to reach out to other member states and seek their concurrence to embark on a new initiative. Air connectivity remains pivotal for states and the incorporation of a policy of Air Diplomacy would bode well to strengthen regional ties, and would serve as a platform for increased development of the Air Forces of each member state.

Furthermore, in relation to the Shanghai Cooperation Organisation (SCO), wherein Sri Lanka is a dialogue partner at present, the country could seek deeper engagement, even actively campaigning for full membership, while articulating the contribution, especially in the area of counter terrorism that the country would be able to make, and gain through collaboration with other member states, observers and dialogue partners.

⁴ Cooke, G. I. H, *Sri Lanka's chairing of BIMSTEC: Momentous or Mundane?*, 20 September 2018, retrieved September 2019 - <http://www.ft.lk/opinion/Sri-Lanka-s-chairing-of-BIMSTEC--Momentous-or-mundane-/14-663157>

Having identified the three evils of separatism, terrorism and extremism, the SCO undertakes numerous initiatives which include military drills at the All-SCO level. Awareness of the impact of such exercises is not widely discussed but the presence of the political leadership at the drills denotes the growing significance of the organisation which is relatively young, having started as the Shanghai Five in 1996 with five member states and thereafter renaming itself the Shanghai Cooperation Organisation in 2001 with the inclusion of Uzbekistan. The inclusion of India and Pakistan in 2017 increased the importance of the grouping as its area of coverage reaches across South Asia, while representing nearly half of humanity.

Of the member states, China has constructed and utilizes special warehouses and other infrastructure to carry out simulations for military exercises as part of training. This is done to recreate the environment and provide for varied terrain which is required for complete training purposes. Given the need for specific terrain, Sri Lanka, possessing different forms of natural terrain within the country, as well as the vast territory in which the conflict was waged, and the ideal temperature and topography to simulate tropical environments, would be able to offer a complete option to China and the SCO. These conditions are not curtailed to the land and extend further throughout the diversity found with regard to the sea and especially in relation to the air space over varied forms of land, and the sea.

Sri Lanka would benefit from increasing its participation in the SCO, having been the first dialogue partner to be welcomed into the organization in 2009. While the aspect of terrain would augur well for overall military cooperation, the innovative proposal of Air Diplomacy would create a new platform for collaboration, which currently doesn't exist among SCO member states. Whilst the joint military drills are carried out in member states, the floating of a new initiative of this nature would give dialogue partners the opportunity of being included in such exercises as was seen when invitations were dispatched to Iran, Mongolia, Belarus and Turkmenistan for the exercise in Orenburg in September 2019. The first three of the aforementioned states are SCO observers, and their presence and participation sets a precedent which could be built on by dialogue partners for their inclusion in the future exercises.

Often smaller countries, like Sri Lanka stand to gain much from such groupings and questions are raised over their contribution in return. It is imperative that countries like Sri Lanka 'bring to the table' the decades of experience, especially in the fields of counter terrorism, and are identified as countries that have acted with determination and deserve due recognition for the contribution made in thwarting terror on its soil. The offer of fresh initiatives, expertise and territory – land, sea and air - translate into tangible aspects of cooperation which would be welcomed by the SCO and would bode

well for Sri Lanka, if and when the country decides to seek full membership in the grouping.

AIR DIPLOMACY DIALOGUE

The second category at the multilateral level would see Sri Lanka explore new areas of air connectivity through the creation of a 'Shangri la Dialogue' model, which could be implemented for purposes of Air Diplomacy. This platform would generate immense opportunities for the Air Chiefs of specific countries, multiple stakeholders from the field and technical experts to converge each year in a bid to discuss military aviation issues, multilateral cooperation, enhance regional security as well as improve humanitarian assistance and relief efforts. The conference would also serve as a hub for the sharing of information on suspicious air activity, response to terror threats, and measures that could be adopted to thwart such activity and threats.

This 'Air Diplomacy Dialogue' structured to bring together the government, military and academia would converge vital sectors in securing the best possible opportunities for the countries concerned. With representation from the government hierarchy, military command and academicians, consensus could be sought and reached on regional and international issues in the field of air power. Sri Lanka's hosting of such a venture, although financially intense would give the island an unparalleled niche in this sphere.

This initiative would require a solid entrenchment in the sector prior to venturing into organizing such a forum, and it would be prudent to realize such a Dialogue in the long term rather than attempting to implement it at an early stage. Upon conducting a feasibility study through a process of consultation with strategic partner countries, Sri Lanka's establishment and convening of such an initiative would make the island the centre of Air Diplomacy and the key node in the dialogue on Air Power. The proposed mechanism would be a first of its kind, generating unparalleled attention.

AIR CHIEF'S CONCLAVE

Whether through SAARC, BIMSTEC or the SCO, or through a new initiative as an Air Diplomacy Dialogue, a primary step in promoting cooperation in the sphere of Air Diplomacy is the proposal to establish and host an Air Force Chief's Conference. Given the pivotal role of Air Chiefs, and in particular their role in formulating and

implementing an Air Diplomacy policy, a conclave through which they would meet annually is paramount to set direction and ensure results.

Devising an Air Chief's Conclave could be formulated based on similar arrangements found in other regions and regional groupings. Whether in the Americas, Africa or South East Asia, the apparatus in operation is one which identifies the overwhelming importance of guaranteeing and strengthening Air Power and adopting sound Air Diplomacy policies which augment other foreign policy tools of the respective states in boosting cooperation, providing security and developing a new platform for cooperation. The three case studies identified, from the Americas, Africa and South East Asia possess many commonalities which enable clear study of their *modus operandi*. The potential of these conclaves in bridging gaps that exist in regional security and establishing policy to combat threats while also improving preparedness displays their success and highlights the importance of the platform they have created.

The System of Cooperation among the American Air Forces (SICOFAA) was established to promote and strengthen cooperation among the Air Forces of the American continent and to achieve mutual support to act jointly if and when the need arises. SICOFAA focuses on simulated air operations, human resource enhancement, provision of education and training, engaging in scientific research, conducting search and rescue missions, preparing for disaster relief operations and weather related exercises, improving telecommunication and generating awareness on aerospace medicine. Air Chiefs of the 21 members meet annually in what is identified as the Conference of the American Air Chiefs (CONJEFAMER)⁵

The Association of South East Asian Nations (ASEAN) established an ASEAN Air Chiefs Conference (AACC) in 2004. It functions as the key platform for the 10 Air Forces of ASEAN to deliberate and foster closer ties as well as increase cooperation in the fields of military aviation and multilateral air force collaboration to respond to issues concerning counterterrorism, humanitarian assistance and disaster relief. In 2018, the AACC strengthened the standard operating procedures for the Air Forces of the sub-regional grouping to respond faster to humanitarian assistance and disaster relief operations (HADR). The measures adopted included a uniformed prefix in aircraft call signs for regional HADR operations, to ensure faster diplomatic clearance processes.

⁵ Members of SICOFAA - Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela and United States of America

They also created the ASEAN Air Force Centre Counter-Terrorism Hotline to share information about suspicious air activities and terrorist threats, as well as supported the Guidelines for Air Encounters between Military Aircraft framework as a confidence building measure to increase aviation security in the region.

The African Air Chiefs Symposium (AACS) sees Air Force Chiefs from across the African continent meeting with their American counterparts to discuss continental defence issues. They identify their national capabilities and challenges and look for ways to resolve common issues, while guaranteeing training and force development. The AACS has evolved a Charter which outlines the fundamental areas of focus to be air operations in relation to mobility; intelligence, surveillance and reconnaissance (ISR); close air attack, the provision of humanitarian assistance and disaster relief, responding to transnational threats, improving human resources, education and training, guaranteeing supply, logistics and rapid response as well as prevention of air accidents and ensuring air domain safety.

CONCLUSION

Formulating a two - tier strategy by firstly reaching out to all countries with which Sri Lanka enjoys diplomatic relations and then identifying those which express interest in such collaboration, would result in the consolidation of a network of strategic partners. At this bilateral level the scope of engagement is vast given the potential of working together to boost the aviation sector and earn the dividends of synergizing. From joint sessions at the highest level and technical level, improved research into the field and the sharing of technology, to international exposure through increased overseas training opportunities as well as increased domestic training courses for foreign officers, bilateral air drills and friendly aircraft visits, all of which would consolidate the strategic partnership that Sri Lanka would enjoy with key partners in the international community.

Progressing to the multilateral level, the opportunities being harnessed by the American, Africa and South Asian Air Forces bear testimony to the potential of joint efforts and exercises in maintaining peace and stability within, increasing regional security against outside threats, raising standards across the board and equally importantly fortifying the foreign policy of countries. Proposing an Air Chiefs Conclave in one or several of the identified groupings would see Sri Lanka being identified as the

country with genuine interest in Air Diplomacy and create a new niche for the country on the world's stage, and ensure that image is not only built, but trust and confidence is boosted as well.

The adoption of the two – tier strategy at the bilateral and multilateral levels would enhance connectivity and defence which are the basic tenants upon which states like Sri Lanka have survived for millennia. The rationale for Air Diplomacy to be formulated and implemented through a two tier strategy remains paramount as the implementation of an Air Diplomacy Policy would generate new opportunities for Sri Lanka in general, while increasing the potential of the Sri Lanka Air Force and boosting the foreign policy of the country in particular.

120 years after the Wright Brothers first tested their wing-warping control concept of a flying device which revolutionized travel, humanity stands on the threshold of harnessing the vast strides made in the field of aviation. Whilst developed countries sprint into the future with the adoption of the latest technology and mutually beneficial collaboration, it is time that developing countries in general and Sri Lanka in particular, broadened the scope of diplomatic engagement, enhanced capacity to reach beyond the accepted, built strong and long lasting partnerships, while further strengthening ones that exist, and look to the future to rebrand, revitalize and revolutionize diplomacy.

An Air Diplomacy policy promises to lay the foundation for such an endeavour and needs to be pursued with vigour if the island nation is to take her place amongst her contemporaries in the current age.