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Future Employment of Small Air Forces

by Sanu Kainikara

FOREWORD

Air forces all over the world are grappling with the increasing cost of acquiring and maintaining a baseline level of air power capability. The pace of change in the international geo-political and security environment has further complicated this process. In order to be relevant in the pursuit of national security goals, air forces must take into account their intrinsic capabilities and their ability to support the larger national interest. Air forces need to be sufficiently adaptable to keep up with the pace of change, and be innovative in transforming their capabilities to ensure that they are able to harness the inherent characteristics of air power. This is especially true for small air forces.

This paper examines the significant characteristics of air power vis-à-vis the emerging threat trends and then suggests a possible way for future employment of small air forces. It suggests an employment methodology that is tailored, yet sufficiently adaptable to achieve battle space superiority and allied effects that are necessary in the future threat environment. The paper contends that the changing nature of war and therefore the application of military force necessitates the development of innovative employment concepts for military forces to be effective. This has special significance in the case of small forces. This paper will add to the ongoing debate regarding the best way to employ air power in support of the government's security initiatives.

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AUTHOR'S FOREWORD

National security requirements have become extremely complex in the wake of rapid globalisation of the economy and the proliferation of technology. The world is moving towards a situation wherein the demarcation between domestic, regional and international security issues are becoming increasingly blurred. Socio-economic changes and rapid technological developments challenge the traditional concept of national security as never before.

We are witnessing the passing of an era of military strategy that evolved at the end of World War II and was relevant as long as the bipolar world existed. The current era is completely different, and adversaries are now developing strategies aimed at neutralising the superior warfighting capabilities of conventional military forces by the use of asymmetry and guerilla-type strategy. This has direct implications not only for large forces, but also for small forces that are technologically advanced and proactive in the development of their operational strategies.

While not the only means of assuring national security, military forces form an undeniably critical element within the agencies actively involved in ensuring the safety and security of the nation and its myriad interests. The sharp change in the strategy and conduct of warfare therefore makes it imperative for the military forces to reorient their strategy at the highest level. Warfare has already transcended the brute application of force for a number of reasons and is unlikely to ever revert to a fight between the military forces of the adversarial nations. It is now incumbent on the practitioners of the art of strategy that an effective way be delineated to ensure the usefulness of military forces as an instrument of national security.

Airforces the world over are grappling with the increased demands being placed on them while constraints in resource availability are making the acquisition of adequate capabilities more difficult. In addition, the absolute cost of these capabilities has increased disproportionately, placing greater strain on the air forces. Most of the air forces around the world now do not qualify as balanced forces, if the balance is viewed as possessing all the disparate capabilities, both direct as well as in support, that air power brings to bear when employed as an entity.

The need of the hour is for these small forces to have a clear concept of employment well into the future so that force development, an expensive proposition by itself, can be carried out with the required assurance of it being correct. The utopian dream would be to have a concept of employment that can be tailored to any emerging situation and yet remain within the clear boundaries of the here and now. This is not possible. This paper is an attempt at articulating the possible contribution of air power in the emerging geo-strategic environment by building on contemporary doctrine, principles and awareness of future air power capabilities.

> *"The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty, and we must rise with the occasion. As our case is new, so must we think anew and act anew."*
>
> – US President Abraham Lincoln Address to Congress, 1862

INTRODUCTION

Military forces have been integral to human civilisation since the beginning of history. War and the craving to subjugate divergent views are perhaps the most steadfast and constant factors that stand out in the evolution of mankind. It is therefore not surprising that nations expend a disproportionately large amount of time, energy and resources towards ensuring that military forces are kept well equipped, trained and combat-ready at all times. In fact, the unwritten contract between the government and the governed in democratic countries is the assurance that is given to the population of security within the bounds of the nation and the protection of national interests within the region and globally. It is in this context that the approach to the employment of such military forces comes into focus.

While regular land and maritime forces have existed for a number of centuries, air forces have only been part of the equation for a century. If viewed in terms of the impact of air power on the final outcome of a conflict, this timeframe reduces even further. It is only during the course of World War II that air power actually came into its own. However, its capacity to grow in effectiveness and utilisation has surpassed all other capabilities. In a comparatively short span of time, air power has come to centre stage and continues to evolve.

The down side of such dramatic improvements in capability has been that this rapid growth has not assured air power availability in a general manner and is almost completely reliant on technology. It can be argued that although technology is the prime mover behind the newfound status of air power it is also the reason why high-end air power capabilities are almost prohibitively expensive. Further, the requirement to be able to operate at the high-end of technology makes it almost impossible for the majority of the nations of the world to fully harness and use its intrinsic capabilities. The result has been the gradual evolution of 'small air forces' around the world. Here the term 'small' does not mean in numbers and size alone, but is used primarily to indicate a number of different characteristics—capability, access as well as capability to absorb technology, employment options, resource availability and maturity of doctrine and strategy for its employment.

> *"This is the key point: the effective employment of air and space power has to do not so much with airplanes and missiles and engineering as with thinking and attitude and imagination."*[1]
>
> – General Merril A. McPeak, (Ret)
> Former Chief of Staff, United States Air Force

In order to stay relevant, air forces have to be constantly evolving and cognisant of changing national security requirements. This evolution will have to be carefully balanced against capability requirements, especially in the case of air forces operating under resource constraints. Even though inherently limited in capability, they will have to provide adequate air power as required for the future security of the nation, while remaining relevant to both circumstances and means. Air power will remain a major instrument of national power well into the 21st century.[2] If they are to be a significant and potent instrument of national security posture, airforces—irrespective of their stature—will have to be capable of operations across the broadest spectrum of warfighting. They must continue to maintain realistic capabilities while ensuring that adequate flexibility is maintained to tailor these to meet lesser requirements. High-end air power capabilities will continue to play an important role in not only shaping the security environment in the nation's region of interest, but also for conducting offensive operations.

Small air forces have the tough task of having to ensure balanced capabilities while dealing with the realities of the present and preparing to face the extreme uncertainty of the future. They would have to gear themselves to operate competently in a rapidly changing world where threats to national security will ensue from unexpected sources and where national interests are stretched far beyond one's own geographic borders. Flexible and sustainable force structure development, based on sound doctrine, is one of the primary methods to meet these challenges effectively.

A thorough understanding of extant 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. It is also based on an analysis of future scenarios, as far ahead as can comprehensively be done, that will challenge the nation's security posture and available air power options. 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.

Historically, joint forces have been able to obtain very clear advantages when employed against technologically equal opponents who do not follow a joint approach.[3] A joint force provides multi-dimensional capability and offers a great deal of flexibility if employed correctly. Even though it is not a panacea, it is certain that all future campaigns will be 'joint' in nature. Especially for smaller forces, this has implications beyond the pure understanding of jointness. Even in the current environment, no individual service is capable of delivering the end-state required in a campaign. This trend towards all-arms campaigns will be further enhanced and the military force of a nation will have to move

towards being a seamless entity that, in combining, produces effects that are larger than the sum of the individual contributions.

It is in making the military force a seamless entity that air power is capable of contributing the most. By its ubiquitous nature, enhanced perspective and inherent flexibility, air power easily becomes the binding element bringing disparate capabilities together in a cohesive manner. While only a joint force will be able to prevail in a contest, the contribution made by air power in making that force viable cannot be over emphasised.

Scope

This paper is primarily futuristic and aspirational in nature but is based on the current state of those small air forces that have accessibility to state-of-the-art technology in terms of their equipment, and have a fairly well developed understanding of the approach to employment of air power. The increased lead-time required to operationally field new and technologically sophisticated capabilities indicates that current decisions will have a direct impact on the future. The paper attempts to suggest an optimum approach, at the strategic level, to the possible employment of small air forces in a future campaign in the 2025–2035 timeframe.

The paper is built on some enduring paradigms, principles of war and the timeless commonality in military combat, as well as a number of evolving and completely new ideas. It takes into account lessons from recent operations, technological innovations of consequence, the increasing ambiguity in threat delineation, and the changing nature of war to arrive at a strategic approach to the employment of small air forces that may stand the test of time.

FUTURE WARS: EMERGING PARADIGMS

> *"We live in a world where emergencies are always possible, and our survival may depend on our capacity to meet emergencies. Having said that, it is necessary also to say that emergency measures— however good for the emergency—do not make good permanent policies. Emergency measures are costly, they are superficial, and they imply that the enemy has the initiative."*
>
> – John Foster Dulles

Future Security Environment

The future is always linked to the present, which in turn draws on the past for a clear understanding of unfolding events. In this link from the past to the future lies the continuity and certainties that make comprehending the complexities of the future slightly easier. Understanding the challenges of the emerging security environment will be important to the way in which air forces operate in the future.

The Future Security Environment (FSE) will be heavily influenced by developments in technology that will facilitate the proliferation of cheap but effective weapons. The other factor that will directly influence the future geo-strategic environment is the ongoing economic globalisation. While the developments by themselves may not be that alarming, the situation assumes critical dimensions because of the seeming ease with which these technologies are made available to states and organisations that have a proclivity to destabilise the security environment and are therefore potential adversaries.

Economic globalisation has become a double-edged sword. On the one hand it provides the free world with a modicum of control of states that are economically faltering by exerting economic and diplomatic pressure. On the other hand such pressures by themselves might increase the chances of a near-failing state resorting to the use of force as an end in itself. Globalisation has also brought a number of developing nations to near economic independence but neither the political freedom nor the respect for law, the twin pillars of peaceful coexistence, have necessarily been associated with the economic success.

Development of a global economy also means the globalisation of national security interests for almost all the sovereign states of the world. This makes ensuring national security a complicated issue that transcendspuregeographicaldefenceofnationalboundaries.Inaddition, the destabilisation brought on by a combination of strained economic conditions and uncontrolled demographic growth within one country has

the potential to spill well beyond its immediate neighbourhood and affect regions that may be vital for global prosperity. Under such circumstances, intervention of some sort by the international community—economic, diplomatic or military—would become necessary to ensure continued stability of such volatile regions.

Currently the threats posed by non-state organisations, with disparate ideologies and with ill-defined goals or end-state to their struggle, have taken centre stage. Although such groups are not historical novelties, easy access to extremely sophisticated technology and military hardware, covert sponsorship provided to these groups by some states and their willingness to terrorise the population by extreme methods, make them dangerous and difficult to contain. This situation is likely to become even more complex and threatening in the coming decades.

It is more than likely that the FSE will be dominated by the implications of economically failed or near-failing states that provide the catalyst for the crystallisation of violent eruptions and become safe havens for non-state anarchists with real or perceived grievances that they tend to redress by violent means. Such destabilisation could affect not only the immediate region, but also have both direct and indirect repercussions that will be felt further afield in a global manner. It is certain that it is not possible to develop an accurate model of the future and the future world will remain an uncertain place. However, it will encompass major advances in the development of military capabilities and emerging technologies, which will have major disruptive effects in the implementation of national security imperatives. A major challenge will be the adaptation of human thinking and perceptions in line with the emerging and uncertain FSE.

The prevalent uncertainty is likely to create crises that are unpredictable both in their nature and in the timing of their eruption. In addition, conflicts of the future are likely to be defined not so much by international law as by its proclivity to emerge in areas encompassing issues that have no clearly demarcated legal sanctity.

The preponderant power inherent in the military forces of the developed world almost completely precludes the employment of force projection capabilities in the conventional manner against them. The threat of international intervention in the case of conventional state-on-state war between smaller nations acts as a clear deterrent, making the chances of such conflicts occurring very remote. Both these factors contribute to a visible movement away from a less capable adversary engaging in major combat and conventional attacks, towards reliance on asymmetry to neutralise the overwhelming advantages that larger conventional forces possess. This trend will probably be further emphasised in the future.

Faced with such a power imbalance, the weaker side in a confrontation is more likely to resort to classic guerilla warfare tactics, especially in cases where they are more attuned to being well organised, and to terrorist activities in most other cases. Essentially, resorting to asymmetric warfare will also assist conventionally inferior forces to retain the initiative vis-à-vis the progress of the confrontation. Porous borders, cheap travel and a vibrant black market in arms and ammunition make this strategy easier to employ. Future terrorist threats, although for the most part lacking in high-technology weapons, will be amorphous, constantly evolving, highly adaptive and extremely difficult to eliminate.

Modern military forces are almost completely dependent on the dissemination of large quantities of information at great speed for effective operations and are reliant on information superiority to ensure success. As a corollary, information superiority provides a disproportionately high assurance of success to the force that possesses it. Within the information domain, cyberspace is a comparatively new realm of warfare application that is fast becoming an independent battle dimension like air, land, sea and space in the physical domain. Information operations assets will therefore exist and function in both the physical and informational domains, making their coordination a complex activity. Because of their decisive impact on the outcome of any encounter, information assets—both physical and cognitive—will be targeted as a means to neutralise their overwhelming influence on operations.

Space technology and capabilities will increase at a greater rate than terrestrial ones and by 2025 a large number of countries will either possess dedicated space-based capabilities or will be space users. Space will also play a major part in information operations with the majority of the necessary assets being space-based, making space an integral part of the information domain. These capabilities will be subjected to high levels of direct and indirect

threat from lasers and other directed energy weapons. In order to ensure robust capabilities, future space-based assets would need built-in self-protection, enhanced manoeuvrability and jam-resistant communications.

The threats to national security that are likely to emerge in the 2025 timeframe will span a large spectrum from the disruptive and irregular to conflict with large conventional forces. Any of these threats could produce effects that reach catastrophic proportions. Proliferation of high-technology is to be expected in the 21st century and technology will be slave to anyone who cares to master it. Breakthroughs in sensors, information technology, biotechnology, miniaturisation on the molecular level, cyberoperations, nano-technology and Directed Energy (DE) weapons are already demonstrating spectacular capabilities. These technologies have the capacity to overwhelm even the most sophisticated air defence systems quickly and to keep them neutralised for a sufficient time span, that permits a one-time, paralysing attack. The absence, albeit for a short period, of effective air defences increases the chances of a conventionally delivered catastrophic attack with weapons of mass destruction. The threat arising from the use of disruptive technologies will be one of the most difficult to counter in the future. However, it can be assumed that disruptive capabilities are not likely to mature to the extent that it becomes the primary threat in the near future.

The scenario that emerges is one of the unpredictable threats emanating from both conventional nations in partial failure and non-state groups, with the delineation of the two groups becoming increasingly blurred. Even when nation-states are involved in conflict, overt or covert, the legality of their positions will be tenuous and, therefore, the clear demarcation between war and peace that has existed in the past will no longer be applicable. Future conflicts are not likely to conform to traditional concepts and the battlespace of the future will have no clearly identifiable boundaries in time and space. Although air power will be a coveted capability, the uncertainty associated with the globalised FSE will make it difficult to be definitive regarding its primary use in the pursuit of strategic national security.

Complex Character of Future Wars

> *"Victory smiles upon those who anticipate the changes in the character of war, not on those who wait to adapt themselves after the changes occur."*
>
> – Guilio Douhet

The nature of conflict is continuously changing, and this change permeates to the lowest levels of warfare, reinforcing its unpredictability. As a corollary, it is the same constantly changing nature that provides an enduring continuity to the conduct of war. This continuity is further emphasised by the complexity brought in by the fog and friction of war, as well as the lethality of armed conflict. Even though the human dimension will continue to be central to the successful prosecution of war, the same dimension, along with technology, constitute the fundamental factors that bring about constant changes in the nature of conflict. These have been universal truths and will continue to remain so irrespective of the technological sophistication of the warring parties.

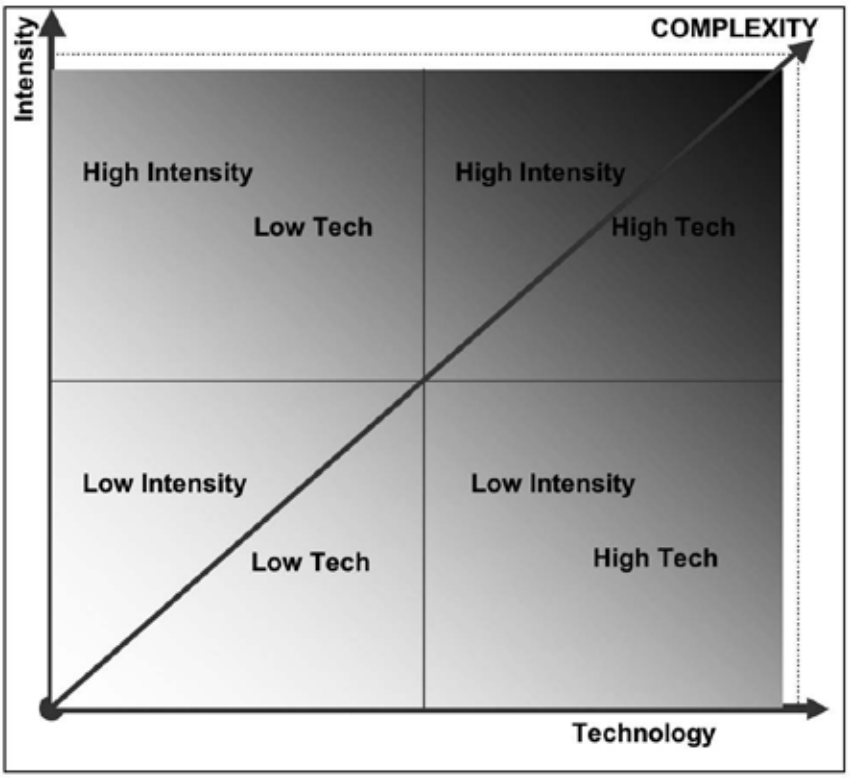
Technology will have a significant impact on the nature and character of war and will be one of the major defining factors in the conduct of war-like activities. Throughout recorded history, technology has been a primary driving factor in the evolution of tactics, strategy and doctrine. This overarching impact of technology on all aspects of warfare is unlikely to lessen. Situational awareness and responsiveness to emerging threats are two major factors that determine the overall capability of a force. Innovative use of technology can create an advantage by providing enhanced situational awareness to fielded forces, thereby improving their chances of success. The rapid evolution of technology makes it difficult for existing doctrine, strategy and tactics to completely absorb the advantages that these advances provide. The transformation in the conduct and nature of war and other military operations necessitates the formulation of extremely flexible and adaptable doctrine and strategy that can maintain the basic aim of military forces sacrosanct—that of providing national security.

In order to prevail over tenacious adversaries, military forces will have to operate at a high level of jointness in the future. The capacity of a force to adopt emerging technologies and the capability to enhance inherent interoperability will play pivotal roles in determining the level of jointness that a force will be able to achieve.

The defining characteristic of warfare in the information age will be the technological capacity to ensure near-instantaneous coordination of numerous weapon systems over great distances thereby ensuring effects that are probably unfathomable today. This will demolish the traditional concept of clearly defined battlefields or battlespaces, further convoluting an already complex activity.

The physical environment in which they are fought will determine the complexity of future conflicts. It has been forecast that by 2025, greater than 60 per cent of the world's eight billion people will be living in cities that have grown into great urban areas. The corollary is that force application will need to embrace concepts and doctrine for operating around mega-cities and urbanised areas that comprehensively address the legal, moral and ethical responsibilities that arise from operations in urban environments. In such an environment, the quantum of force that will be required will depend on the context of its application. Domination of mega-cities, which will become a necessity in the future, will not be achieved by adopting a single concept, but by the development of concepts of operations derived for multiple contexts.

Complexity of future conflicts can be graded in a graph where intensity of conflict and technology are the two major axes. Complexity at its lowest will be low intensity and low technology, with high intensity and high technology at the other end. From an air power perspective, it is more than likely that the majority of future employment will be in conflicts that tend to be at least in the mid-technology level. Air power operations in low technology and low intensity situations are likely to be in the non-combat areas where non-intrusive surveillance and reconnaissance will be needed. Combat operations will involve at least a medium level of complexity. The type of war—inter-state, intra-state, guerilla operations, and terrorism—can be superimposed on this to draw out the level of complexity that can be expected.



Complexity of Conflict

Air power has been the centrepiece of success in most of the recent conflicts. Potential adversaries, without the benefit of adequate air power resources, are likely to adopt strategies and tactics aimed at neutralising air power's technological edge, which is the basis for its effectiveness. They will resort to mobility, dispersion, signature management, deception and exploitation of complex physical and social terrain to neutralise the advantage that is inherent in air power and attempt to achieve parity with other capabilities. They will also attempt to exploit perceived weaknesses of small air forces, like the lack of mass and sustainability.

The unpredictable nature and timing of emerging threats and the constantly evolving FSE in a globally connected world encourages the international integration of security needs and responses. The complexity of such operations will be greatly increased when the threat cannot be clearly defined in terms of personnel, intent and *modus operandi*.

AIR POWER CHARACTERISTICS

The rapid changes that are being brought about in the nature and conduct of war by the harnessing of unprecedented developments in technology and its evolving complex character affect all the elements of military power projection capabilities. Air power characteristics, overwhelmingly reliant on technology for their effectiveness, will have to be evaluated in view of the FSE to determine their relevance in future battlespaces. In doing so, cognisance will have to be taken of changes in the context and environment in which it will be employed since they will have an indelible impact on air power effectiveness. Based on such an analysis, the roles that air power would undertake in the application of military power will have to be tailored and adapted.

Traditionally air power characteristics have been listed and defined as strengths and weaknesses. While air power does have limitations in its absolute application, the characteristics need to be analysed within a given context to be fully understood. Further, in recent times, innovative use of technology has mitigated most of the weaknesses, making air power a more all-round capability. Air power characteristics will continue to evolve in a comprehensive manner by combining two or more traditional characteristics. Since the characteristics would envelope a larger spectrum in the effects that they could create, their applicability will also increase. These complex characteristics will be viewed as an encapsulation of those qualities that make the fundamental contributions of air power so significant in modern warfare.

The fundamental characteristics that will have a significant impact on air power contribution to the future battlespace are concurrent operations, precision, reach, tempo and centralised control. Each of these will encompass a number of traditional characteristics that will accurately define its character and will depend on a host of subordinate, contributory factors to be effective.

Concurrent Operations. Air power has the capacity to have a three dimensional perspective and thereby will be in a better position to anticipate the need for concurrent operations to achieve the stated objectives. In addition, the greater responsiveness as well as the ability to concentrate force at any place and time of its choosing make air power an extremely effective power projection tool. Concurrent operations permit the waging of war in parallel, which in turn can be used to control the tempo of operations to suit one's own requirements while denying the enemy such control.

Precision. Precision in an air power context is the combination of accuracy, reliability and lethality. Precision contributes directly to the achievement of the desired effect with a high probability. Technological improvements in air power weapon systems will provide accuracy to ensure that they can be employed in areas where collateral damage tolerance is low and lethality will ensure their use to neutralise specific targets to create the necessary effect. The limited payload carrying capability of air power assets and their inherent impermanence is partially mitigated by improved precision. Further, precision enables the concentration of force on an as-required basis. The synergistic exploitation of reach, precision and tempo will be required to compress the decision-making cycle to pre-empt enemy action and operate within the adversary's OODA loop to ensure success.

Reach. Reach can be defined as the ability to carry out operations to create the effects that are required unconstrained by physical barriers, from long distances at timings of one's own choice. In combination with the characteristic of penetration, the impact of reach is self evident in the attack of strategic targets deep in the enemy heartland, while it can also be exploited to create surprise, disorientation and dislocation even at the battlefront. Reach will be enhanced by increased range made possible by adequate force multiplier capabilities like air-to-air refuelling, increased survivability because of technology assisted self-protection systems and improved stand-off weapons. These improvements ensure that the reliance on operational bases within the close vicinity of the target will no longer be a constraint in the application of air power. In addition, it also alleviates the detrimental effect of impermanence. Persistence and lethality of payload will be the other major inputs necessary to optimise reach.

Tempo. Tempo is the rate at which military power is applied in an efficient manner across part or the whole theatre of operations. Versatility and flexibility of air power assets permits their high tempo application, which will imply the ability to concentrate force to the desired degree; deliver appropriate firepower across the full range of target types; and the built-in responsiveness to rapidly respond to evolving strategic, operational and tactical situations. Adequacy and security of operating bases, rapid reaction and technological edge are the major factors that will contribute to controlling the tempo of operations.

Centralised Command. Centralised command is a tenet and cannot strictly be listed as a characteristic, but is being discussed along with air power characteristics to have a clearer understanding of the evolving nature of air power. A technically sophisticated force operating in the 21st century should have the potential for information superiority. The centralised command and coordination of ISTAR assets; the standardisation of geospatial data analysis; communication protocols that provide secure redundancy; and accurate, speedy data processing tools will be the inputs that are necessary to ensure sufficiency of information operations. When cohesively moulded into an optimised concept that transcends the traditional demarcation between strategic, operational and tactical aspects of war, centralised command will form the firm foundation for the further development of the concept of network-centric warfare.

These characteristics are fundamental to the effectiveness of air power and their veracity will have to be ensured at all times. By cleverly leveraging these characteristics, small air forces will be able to gain strategic agility that will in turn enhance air power efficacy. Resource constrained air forces will also have to take into account the necessity for conservation of assets to retain adequate availability to maintain the required tempo. Air power will lead a sea change in sensor to shooter information exchange, both in quality and timeliness. In the future, even small air forces will have to develop fully automated, theatre-wide mission planning and tasking systems operating in near real-time to achieve the necessary effect.

Optimal combination of air power characteristics will provide the capability for a force to alter the character, scope and tempo of operations across the entire spectrum of combat.

EMPLOYMENT CONCEPT FOR SMALL AIR FORCES

> *New conditions require, for solution—and new weapons require, for maximum application—new and imaginative methods. Wars are never won in the past.*
>
> General Douglas MacArthur

All sovereign states will have fairly clear national security policy that informs and guides the formulation of its strategic military plans. These documents provide the framework to establish the defence outputs to achieve national security aims and objectives. In a generic manner, currently there is international consensus that the global security environment will continue to be extremely complex, requiring a whole of government approach and the creation of coalitions and alliances to ensure national security. It is certain that a purely military response will not be able to contain emerging threats to stability.

The whole of government approach that most of the nations are currently following builds a National Effects Based Approach to solving security issues. There is consensus that pure attrition will not produce the desired end-state in any conflict and therefore is not the correct approach to lasting solutions to security challenges. Military action is only one part of a larger process and will become a sort of last resort weapon rather than the tool of first choice. However, the deterrent qualities resident in robust military capabilities would provide policy makers a flexible option in the application of a whole of government approach to national security.

Small air forces would have to work within the boundaries of the larger military establishment using the same foundation to move into the 21st century. An employment concept for any military force will have to be a dynamic living process, adapting to ongoing changes in context and circumstances. Preparing for the future will have to be based on analysing the evolving environment to determine capability requirements, prioritising future options and making a few key and informed assumptions. The assumptions on which this employment concept has been developed are:

- that the possibility of overt, conventional state-on-state conflict is remote;
- that overstretched global resources will increase the potential for crises and therefore the possibility of the use of conventional military forces;
- that resource constraints will exert abnormally high pressures on air power capabilities necessitating the formation of small air forces; and
- that the ability to absorb emerging technologies to enhance performance will be vital to the successful employment of small air forces.

Military Missions and the Air Force of the Future

All nations give the highest priority in their security policy to ensuring the defence of the nation and its interests. The differences between nations lie in the interpretation of national interests and the subsequent prioritisation of these secondary security issues. Based on the primary aim and other broad strategic objectives, enduring national security missions are derived for the guidance of the various arms of the government. From a military perspective, it is obvious that defence of the nation will be the prime force determinant for the foreseeable future. The quantum of contribution of the military to ensuring national security would change with circumstances dependent on a number of variable factors. There is also a tangible change in the utilisation of defence forces to ensure national security as they get employed more often in domestic situations.

Smallair forces would have to be geared for operations within a coalition, while retaining the capability to operate without external support in an independent manner if the need arises. This would perhaps be the worst case scenario for a small air force. Within a coalition, regional or global, small air forces would be expected to provide limited but niche capabilities that would contribute to the success of the campaign. The future strategic environment will exert extraordinary pressure on small air forces to be able to defend national interests, if necessary as an independent entity, while continuing to maintain the capability to operate within coalitions outside the geographic borders of the nation.

Under these conditions, it can be clearly derived that for an air force to be an effective tool of national security it will not only have to be capable of defending the homeland, but also carefully geared for expeditionary employment in forward operations to support the larger military mission. Even conventional defence of the nation contingencies will demand the exploitation of the expeditionary construct of the force to overcome the lack of depth in capacity of small air forces to cover large areas. Second will be the capability to provide interoperable forces appropriately tailored to support government commitments and the requirements of the mission. The third requirement of the future force will be the capability of people and systems to be flexible and adaptable to undertake multi-role employment. Network centricity will be crucial to the success of military missions and the Air Force of the future will play a key role in this.[4]

Future Concept of Employment

Employment of modern military forces in the future would always have to be undertaken within the ambit of a National Effects-Based Strategy. This will form the basis for the development of employment concepts and methodology for the future. For military forces, this will translate to Effects-Based Operations (EBO) aimed at achieving the goals within the whole-of government approach to conflict. Based on the laid down strategic objectives, the nation's land, maritime and air forces will prepare the concept of employment of the forces to achieve the necessary effects.

The atmosphere and space envelope the entire surface of the earth and, therefore, air and space power will have an all encompassing role to play. Dependent on the context, the actions could be at the tactical level with the effects percolating upwards in a combined manner until the grand strategic effect has been achieved, or could be strategic in nature, achieving the desired effect almost immediately. Air and space power is capable of producing a very large spectrum of effects, however, their relative importance and, therefore, the priority accorded to the capability development needed to create a particular effect will be determined by the emerging strategic environment. An effects-based approach to the employment of air power will necessitate an essential overlap of different capabilities.

From the requirements above, it can be deduced that even a small air force of the future, in order to remain relevant, should be capable of conducting simultaneous combat operations that span all levels of warlike activities within a single battlespace or in disparate operational areas. *The overarching future employment concept for small air forces will have to be that of Battlespace Superiority.* Battlespace Superiority is that degree of dominance of own forces over the adversary, which permits the unhampered conduct of own operations, delineated in time and space. This effect of dominating the battlespace, within laid down contexts and clearly limited in time and space, will be achieved by two primary strategic operations—**Persistent Forward Presence and Judicious Precision Attack**.

BATTLESPACE SUPERIORITY

> *"The field for air superiority is not a straightforward issue like a naval battle or a land battle; it is not even a series of combats between fighters; it is frequently a highly complex operation which may involve any or all types of aircraft. It is a campaign rather than a battle, and there is no absolute finality to it so long as enemy aircraft are operating."*
>
> – Air Chief Marshal Sir Arthur Tedder

The concept of Battlespace Superiority aims to create the effects necessary to achieve objectives which, when considered within the larger framework, contribute to the overall national strategic objectives. Superiority in the battlespace will enhance air force capabilities to generate effects at all levels of warfare by optimally combining its inherent characteristics while operating within the battlespace as well as from distances well outside the conventional battlespace.

Dominance of the battlespace is necessary to ensure unrestricted freedom of operations and the ideal would be uncontested, complete dominance. However, even with technological innovations that will become available in the future, this may not be an achievable goal even for large and highly capable air forces. Battlespace Superiority that spans the entire spectrum of operations, ie. control limited in time and space, would have to be accepted. The context in which such dominance is being sought would also have to be considered to arrive at the real requirement. Small air forces should therefore aim to provide Battlespace Superiority at all times and places determined to be of critical importance to one's own operations, while denying the adversary the same capability.

Persistent Forward Presence

Although limited in time and space in the case of small air forces, battlespace dominance will need to be persistent within the context of operations. Lack of persistence can be exploited by adversaries and used as a window of opportunity for the employment of their own forces effectively. While 24-hour persistence will be the ideal situation, this is an unrealistic goal even for large air forces. Resource constraints will always be a hindrance in the pursuit of persistence in all air forces. In the case of small air forces, the need to tailor resource availability and the required level of persistence will be a fine balancing act. The effectiveness of the capability to be delivered vis-à-vis its cost factor, as part of the larger military resource allocation will determine the priority allocated to achieving this dominance. It will therefore be necessary to accept graded dominance dependent on emerging situations and requirements. Considering the geo-strategic environment, governmental guidance regarding national strategic objectives and the future structure of the military force, Persistent Forward Presence (PFP) would be the only way to achieve the necessary Battlespace Superiority.

Defending the sovereignty of a nation will require the projection of force in an ever-increasing manner. The characteristic of reach will enhance forward presence and add to persistence in conditions wherein power projection at the strategic level is desired. Forward positioning of combat assets will reduce the time spent in transiting to the battlespace and will, to a certain degree, ameliorate the problem of persistence associated with the prosecution of a long drawn out campaign even if the tempo is not very high. Geographic dispersion of threats and the need for a small air force to be able to contain them with limited resources would make forward presence a matter of necessity, although the political acceptability of such a move would determine its efficacy.

The implementation of the concept of PFP will require the air force to be able to deploy and sustain forces in forward locations—in country, regional and globally if required—for extended periods. This is necessary to ensure that adversaries do not neutralise the inherent reach of air power by moving their centres of gravity outside the range of air force assets, in terms of both surveillance and strike. The strategic assessment and analysis of threat scenarios at the national level will determine how far forward air power assets that have different capabilities should be deployed. The nature of such forward deployments will have a political dimension to it, which will need to be carefully considered at the civil-military strategic level.

Successful implementation of the PFP concept will also require, in a large number of situations, long duration air or space power assets deployed over a particular area in the battlespace. Although persistence is not a characteristic that is readily identified with air power, there are emerging technologies that provide air power with the capability to maintain persistent presence within specified time and space limitations. In combination with forward presence, adequate persistence will increase the deterrent effect of offensive air power. Persistence is a direct function of the adequacy of resources and is adversely affected by the lack of it. At the strategic conceptual level, air power persistence will be influenced by government directives that take into account the role of other agencies in the pursuit of national security goals.

Presence in the air power context encompasses a very large spectrum in terms of capability, starting from benign surveillance on the one end to lethal force application on the other. The response time required to bring the disparate elements that constitute air power to bear in a given situation as well as the time required to transition from the benign end to the lethal end of the spectrum would determine the forward presence capabilities of a small air force. For resource constrained small air forces, the requirement to keep response time to the barest minimum would have to be tempered with the necessity to conserve the available resources in such a way to ensure that they would be able to attain and maintain the required tempo when the need arises. Reduced usage of assets and therefore, less than 100 per cent presence will have to be accepted after careful study of the strategic environment.

A possible way to achieve optimisation in the employment of small air forces in the PFP context would be to carry out intrusive ISR in the battlespace while keeping offensive response capability as a deterrent in close proximity to ensure swiftness of response when necessary. Air operations to ensure adequate PFP will need to be coordinated with surface force operations/manoeuvres in a closely integrated manner as part of joint combined arms teams for assured success. Air forces will have to undertake surveillance, deterrence and air presence tasks as part of the larger force projection capability of the military and the nation.

Analysis of future threat scenarios indicates that adversaries will try to negate information operations by the employment of increasingly sophisticated methods. Countering this will require that ISR assets be much more sustainable than other air power assets to ensure adequacy of information availability. Forward deployment will assist in achieving this. They will also require to have a high degree of survivability in order to operate effectively in hostile and at times unprepared battlespaces.

Judicious Precision Attack

> *"Strategic air attack is wasted if it is dissipated piecemeal in sporadic attacks between which enemy has an opportunity to readjust defences or recuperate."*
>
> – General H.H. 'Hap'Arnold

Application of military force has always been a contentious issue. There is debate not only regarding the morality of military operations, but also about the quantum of force that should be applied to achieve the desired outcome. As the capabilities of military forces to inflict lethal damage increase with the aid of technology, the tolerance within the international community to accept the application of force is reducing. Human suffering in the aftermath of armed conflict has become unacceptable and therefore the concept of proportionate use of force has assumed far greater importance than ever before. Today, as in the future, the application of force in all cases will have to be judicious in order to be able to withstand the scrutiny of international conventions.

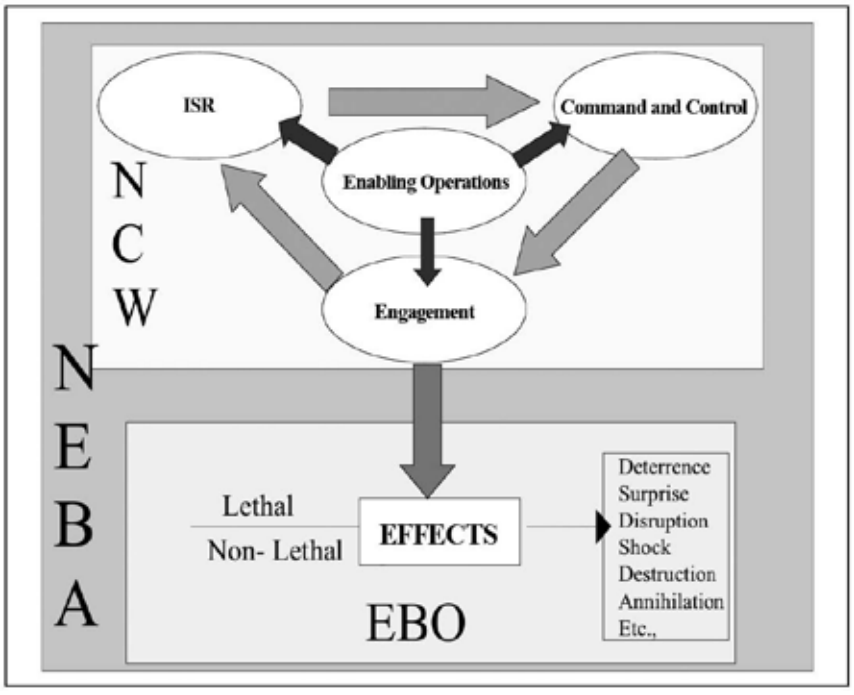
All air forces will have to be cognisant of the need to have a high level of precision and adequate weapon-to-target matching in offensive operations to adhere to the principle of proportionate use of force. At the tactical level, precision will be the primary requirement to counter the trend amongst adversaries to disperse and take advantage of the urban physical environment that will become almost pervasive. Legitimate targets will become more difficult to delineate from friendly areas and will also be extremely small in size. Since these targets will be prone to be hidden within the normal community, the broader effect of collateral damage could be disastrous for follow-on actions aimed at 'winning the peace'.

Under these conditions of having to neutralise targets with extreme precision, air power assumes pre-eminence because of two distinct reasons. First, the characteristics of reach enhanced by air-to-air refuelling,weapons with increasedeffectiveness,precisionthatprovides discrimination and rapid response that provide timeliness in target neutralisation give air power strike capabilities that can create both strategic and tactical effect with minimum effort. Second, air power will be able to achieve the required effect without having to physically occupy the complex physical terrain, thereby avoiding further debate on the legality of such incursions in the long term. As part of joint operations, air strikes will be able to create effects that facilitate land and maritime activities. This enhanced effectiveness of air strikes creates a perceptible shift in its employment and gives primacy to the strike role when air power is offensively used.

In the future, small air forces will have to achieve target neutralisation with precision, leading on to accuracy and exactness and extremely low tolerance for collateral damage. Of necessity, these operations will also have to encapsulate a much wider range of both kinetic and non-kinetic weapons capable of producing lethal, non-lethal, and scalable effects in a discriminatory manner. Offensive use of the electro-magnetic spectrum and the medium of space will have to be factored in by even small air forces since these two elements will assume even greater importance in the future. In any case, space-based assets have become a critical enabler for precision capabilities.

The concept of Judicious Precision Attack will revolve around the capability of the air force to apply proportionate force, both lethal and non-lethal, to create the necessary effect with adequate precision to avoid even the slightest chance of collateral damage. The effects required could be at the highest strategic level or tactical in nature but the basic principles to achieve them would remain the same. However, exact application of force will only be achieved through the combination of a range of enabling activities, and is vital to air power obtaining Battlespace Superiority. Swing-role capabilities of air power assets, and the great flexibility that it offers planning, will further enhance air forces' capability to create the appropriate effect affording greater strategic agility.

There are three basic elements that create the necessary effects that ensure Battlespace Superiority—ISR, Command and Control and Engagement. These elements are not exclusive by themselves but have a great deal of overlap and implicit feedback to each other. A fourth element—Enabling Operations—support the other three elements and although not directly involved in creating effects, except in very rare cases, are critical to the successful application of air power. In effect these four elements together form the basis for network centricity of the force.



Battlespace Superiority[5]

Intelligence, Surveillance and Reconnaissance

ISR is the bedrock from which air force missions emanate. Air power inherently has a broad perspective and its assets are well suited to apply their capabilities towards ISR functions. One of the primary roles of air power in future conflict situations will be the collection and appropriate dissemination of ISR. The ubiquitous nature of air power enhances this capability. Air forces will have to leverage cutting edge technology to ensure that air power ISR assets are best placed to carry out this role effectively. The optimum utilisation of technology will be particularly important to small air forces since a majority will be struggling under the dual pressures of resource scarcity and increasing demand for adequate information availability. Air power ISR will feed directly into the larger National Effects Based Strategy (NEBA) in a number of situations where the emerging scenario may not warrant a military response.

Air power ISR missions will be carried out by both manned as well as unmanned platforms operating in conjunction with each other. Continuous surveillance and reconnaissance will be carried out by long endurance platforms with sensors that are sophisticated enough to collect large quantities of data and in-built computing power to convert them to analysed information. These operations will form an indelible part at the vanguard of Persistent Forward Presence.

A robust space surveillance capability will become necessary to ensure that operations can be conducted even in situations wherein anti-space elements are employed. In order to ensure adequacy of ISR capabilities, there will have to be a judicious mixture of military and commercial satellites used for the purpose. Communications throughout the spectrum of combat will be almost completely reliant on space-based assets, underlying their growing importance. The limitations of commercial space-based communications will be overcome by the use of dedicated satellites for military usage, although bandwidth requirements will continue to be a limiting factor in the full exploitation of space communications. For small air forces, the implications of the absolute need for space capabilities are many. They will have to embark on cornering dedicated assets that will prove to be very expensive, leading to the necessity to prioritise allocation of resources. This will require a fine balancing act in terms of meeting capability requirements within available resources.

Under all circumstances, air forces will have to provide assured information superiority to ensure that the commander will **know** first in order to be able to **decide** first and **engage** first.

Command and Control

The second element in achieving Battlespace Superiority is the function of command and control (C2). It will be necessary to integrate all C2 assets into one centrally visible command spectrum, which will speed up the decision-making cycle and also make it extremely robust. Small air forces will have to seriously consider the importance of Airborne Early Warning and Control assets and assess the feasibility of their obtaining this capability within the constraints on the larger national security strategies. Artificial intelligence will play a major role in future C2 activities. Machine to machine communications will be conducted in nanoseconds and, therefore, the synthesis of human and artificial intelligence will assume greater importance. Air forces will have to ensure that in this speeding up of C2 activities, the human element does not become the weak link.

There is an extremely close and complimentary relationship between ISR and C2 elements. Three factors that affect information dissemination have a direct impact on the decision-making capability of a force. These are:

- the rapidity with which the information is made available to the appropriate authority;
- the volume of information made available, which could have both positive and negative implications; and
- the effectiveness of filters, both human and technical, in extracting the valid information from extraneous inputs.

In a properly networked environment, the aim of ISR will be to ensure the veracity of information provided to the C2 element so that decisions made can be implemented by adopting an effective engagement strategy. Air power C2 assets will also operate jointly within the NEBA control spectrum if the need arises and the national response is going to be other than exclusively military in nature.

Engagement

Engagement forms the third part of the triumvirate that will provide Battlespace Superiority, and is also the element that straddles the gap between network centricity and Effects-Based Operations (EBO). Engagement is the sharp end of the spear that achieves the desired end-state in a conflict. In EBO, engagement translates to undertaking actions, both lethal and non-lethal, that will create the required effect. Balanced and versatile air power will be able to shape the battlespace in both high and low intensity conflicts to optimise the effectiveness of other force projection capabilities. Where necessary, it will also provide rapid and overwhelming response by simultaneous, judicious precision attacks made possible by persistent forward presence.

The effects that air power application can create span a very large and complex hierarchy and will vary depending on the context. Deterrence will be at the low end and annihilation perhaps the highest point. Some effects will enable others and may even have a cascading effect in producing different effects. Surprise, disruption, shock and destruction are some of the effects that form the hierarchy. From a military perspective, these will form the range of effects necessary to engage the enemy comprehensively and also provide the commander with a range of options. Lethal or non-lethal solutions can both be employed to achieve the desired effect based on context and other circumstantial considerations. Air power will achieve this wide range of effects by the proportionate use of force in support of paramount national security imperatives.

Air power will be able to leverage on cutting edge technological innovations, like directed energy weapons for crowd control in urban areas operated from tactical airlift aircraft. In the future, it will also employ hypersonic weapon systems, which will further constrict the OODA loop to near-instantaneous capability. Even though such capabilities are being made available, small air forces will be hard put to acquire these, at least in the near term, because of the prohibitively high expenses involved in doing so. But these emerging capabilities would have to be taken in cognisance of formulating operating strategies.

When necessary air power will engage to carry out judicious precision attacks and achieve the desired effect to create the end-state desired within the grand strategy.

Enabling Operations

Enabling operations will be all support missions—air-to-air refuelling, non-lethal exploitation of the electro-magnetic spectrum and combat support operations—which enable smooth and efficient conduct of all other operations. Direct application of air power in the future will become increasingly reliant on these operations, increasing the possibility of their becoming vulnerable centres of gravity from being merely supporting functions.

In addition to the operations mentioned above, air mobility will also be a vital capability in enabling other more direct actions. The rapid response that airlift can bring to bear on emerging situations and the capability to carry out concurrent operations by simultaneous deployments will make it a coveted capability for surface forces also. In volatile situations wherein control of the air is being contested, large volume, one-time airlift will assume greater importance. Dependent on the context of operations tactical airlift by fixed and rotary wing assets will also become effective force multipliers. Airlift can directly affect the speed and tempo of surface operations both in the short term as well as in prolonged commitments. Air power will be required to provide air mobility and be the mainstay to a variety of operations on a continuous basis well into the future.

It is important to state here that the elements mentioned and the missions so generated do not differentiate between land-based and maritime air operations. There is no doctrinal or conceptual difference between the two, the use and utility of air power is and will be, in principle, fundamentally the same.

CONCLUSION

The FSE presents a multiplicity of threats and challenges, ranging from regional instability caused by rogue states to terrorism in all its guises and conventional wars between nation-states. The strategies that have to be evolved to counter them are intricate and will of necessity involve the combination of military and non-military capabilities. Nations the world over are adapting a holistic approach to national security in which military forces play a lesser but critical role than was the case in the middle of the 20th century. In this geo-strategic environment, the application of military force to achieve political objectives is becoming increasingly complicated.

There cannot be any single template for the application of air power—its versatility negating the very idea at the outset. Its application in support of national security goals will be as varied as the range of political objectives being pursued. However, there is a need to speed up the decision-making cycle at the highest levels and air power assets facilitate this better than any other capability. The contribution of air power to operations should be assessed in terms of its capacity for concurrent operations, enhanced reach, overriding tempo and unrivalled precision. However, it must also be borne in mind that that there is no one absolute solution to the complexity of dealing with emerging threats.

This paper is, in part, a response to the changing nature of war and an application of the opportunities that are being made available for innovative employment of current and future capabilities. The strategic agility to adapt to an uncertain future will remain the enduring principle around which small air forces will have to evolve and tailor their future employment concepts and methodology. Battlespace Superiority achieved through the implementation of Persistent Forward Presence and Judicious Precision Attack will be the starting point for further evolution of small air force employment so that they remain strategically relevant in the pursuance of national security imperatives.

ENDNOTES

1 General Merril A. McPeak. 'Flexibility and Air Power', an address presented at the Air Mobility Command Dining In, 12 June 1993, in US Department of the Air Force, Air Force Update, June 1993, p. 6.

2 Air Marshal A.G. Houston, Keynote Address, 'The Future of Air Power: RAAF Response to the ADF NCW Roadmap', 2004 Air Power Conference, Canberra, 16 September 2004.

3 Professor John R. Ballard, 'The Evolution of the Joint Force Since 1945', in Keith Brent (ed.), Air Power and Joint Forces, Aerospace Centre, Canberra, 2000, p. 52.

4 Air Marshal A.G. Houston, Keynote Address, 'The Future of Air Power: RAAF Response to the ADF NCW Roadmap', 2004 Air Power Conference, Canberra, 16 September 2004.

5 The effects listed are only an indicative subset, ranging from the purely diplomatic to the physical. There can be a number of other effects that air power application will be able to create.