COMMAND AND STAFF TRAINING INSTITUTE

BANGLADESH AIR FORCE

Individual Staff Studies Programme (ISSP)

Employment of Air Power
Phase-4 Part-I

EMPLOYMENT OF AIR POWER
PHASE- 4 : PART-I

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Total Period: 80

INTRODUCTION TO THE PHASE

Scope of the Phase

1. The duration of this phase in 8 weeks. This phase has been prepared to give you a general idea on the topics mentioned under contents in page ii. Knowledge on Air Power is essential for all the Air Force Personnel. The concept on Air Power and its Employment will enable all officers to be more confident in performing any operational assignment during the progression of career in Air Force.

2. The phase is designed to give an idea on the Air Power and its application with the historical perspective. It is expected that student officer will consult other sources to get clear idea on every topic.

3. Obtaining conceptual knowledge in this phase will help in understanding the application of Air Power in different wars over the years in the second phase.

TOPIC-1

WAR AND THE NATION

Introduction

1. It has been said: 'If you wish for peace, understand war : We in the armed forces are the custodians of peace, and it is, therefore, appropriate for you to begin your studies by looking at the nature and causes of war and the variety of situations in which armed forces – or the threat of armed forces – may have to be applied.

2. War is not an exact science, although the impact of scientific development is daily more evident. You should, therefore, treat the various principles and factors that you will consider in this phase as aids to understanding war, and you should beware of applying them too rigidly to actual situations. War is still full of surprises, and there is no formula to guarantee success in battle.

3. Marshal Foot observed, 'No war is like the previous war'. If this were true in his days, it is even more opposite in your own times. If you are to react sensibly and confidently when emergency confronts you will depend on your flexibility of mind in assessing new ideas.

ARMED CONFLICT

4. War is the continuation of policy by other means; its sole purpose is to achieve political objectives. Britain and her allies have long pursued purely defensive policies, which seek to preserve national and international security and stability. However, it cannot be assumed that all nations endorse similar principles or see military power as a purely defensive instrument. Thus, even the most peace-loving nations need to understand war if they are to play their part in preserving international peace and stability,

The Characteristics of War

5. War has certain essential characteristics. The recognition and intelligent exploitation of these characteristics is fundamental to the successful use of armed forces in support of political objectives. The characteristics are as follows:

a. **War is an Instrument of Policy.** Success in war is not measured by the number of casualties inflicted or territory occupied, but by the achievement of political objectives. Therefore, the character of the political objectives shapes military goals and both the scope and intensity of military operations.

b. **War is an Act of Violence.** War is distinguished from the other instruments of policy by its use of organized violence. The use of violence injects elements of emotion and improbability into war, and this can undermine reason on both sides and impede the pursuit of a purely rational course of action. It is essential to recognize this in order to minimize the damaging effects of war.

c. **War is the Province of Uncertainty.** Man wages war, and human frailty and irrationality make the course and outcome of war uncertain and unpredictable. The 'fog' of war – when combined with danger, 'friction' and physical stress – can make apparently simple operations unexpectedly difficult. 'Fog' and 'friction' are always present in war, but sound doctrine, leadership and training can mitigate their effects.

d. **War is of the People.** Groups of people wage war and affect the conduct of war. Group passions, cohesion and determination also affect the conduct of war. A democratic state cannot sustain a significant war effort in the face of public hostility or indifference.

e. **Leadership is Crucial in War.** Man is the central element in war, and leadership is the critical factor in shaping human effort. Leadership inspires and persuades men and women to help a commander achieve his objectives in spite of adversity and danger. Leadership is an exercise of character far more than an application of management skill.

Spectrum of Conflict

6. Within the spectrum of conflict we can define 3 distinct types of warfare :

a. **Nuclear Warfare.** Nuclear warfare is defined as any conflict which involves the employment of nuclear weapons. The enormous destructive capacity of nuclear weapons, the inherent danger of escalation, the very limited experience of nuclear warfare and the long-lasting effects of nuclear radiation all mean that nuclear warfare has a completely different character from warfare in which nuclear weapons are not used.

b. **Non-nuclear Warfare.** Non-nuclear warfare is defined as any conflict between national states of multi-national groups of states which does not involve the use of nuclear weapons. Non-nuclear warfare can encompass the use of both conventional and bio-chemical weapons by the antagonist states.

c. **Insurgent Warfare.** Insurgent warfare embraces all forms of organized and politically motivated armed violence within a state. It is often loosely controlled, and can have factional or international political aims. Each situation is unique but the range of conflict can include the following :

(1) **Civil Disturbance.** Civil disturbance encompasses group acts of violence and disorder which are prejudicial to public law and order.

(2) **Revolutionary War.** Revolutionary war generally aims to overthrow the state and its social system through a series of phases, preparatory, guerrilla activity and near-conventional military operations.

Levels of War

7. Planning for armed conflict takes place at a range of levels. Modern military theory identifies the following 4 levels of war :

a. **The Grand Strategic Level.** Grand strategy is the application of national resources to achieve defence policy objectives. Grand strategy is concerned with the overall conduct of the war, and it involves economic, industrial, diplomatic and military components.

b. **The Military-strategic Level.** The military component of grand strategy is termed military strategy. Military strategy is the art and science of developing and employing military forces to achieve grand-strategic objectives. In the UK, military strategy is developed by the Chiefs of Staff under the direction of national political leaders.

c. **The Operational Level.** The operational level of war is concerned with the direction of military resources to achieve military strategic aims. It is the level at which major campaigns and operations are planned. Operational art, ie the control of military activities at the operational level of war, links military strategy to tactics. It does this by establishing operational objectives, initiating actions and applying resources within individual theatres of war.

d. **The Tactical Level.** The tactical level of war involves the direction of military resources to achieve operational objectives. Tactics is the art of disposing land, sea and air forces, especially in contact with the enemy. The tactical level of war is the level at which forces are deployed directly for battle. Battle is defined as the act of fighting.

WAR POTENTIALS OF A NATION

8. Every student of military affairs should appreciate the importance of those resources of a nation which together determine its military effectiveness. Now a days, when the prime object is the prevention of war, preparedness is the key factor. No matter what spiritual and material resources a nation may possess, it will be unable to play its part in preventing war unless it is militarily prepared and has balanced forces in being.

9. **National Morale.** The national morale or will-power of a nation is the basis of its military effectiveness, since it is only by the will of the people that government can draw fully on all its resources. A nation can be defeated without a fight if its people or government lack the will to face the possibility of war. For example, the dislocation or destruction of the industrial or economic system by internal civil dissension or the collapse of morale at the prospect of being overwhelmed by a superior power could bring about defeat before the armed forces had been beaten or even engaged in battle. A high national morale is, therefore, the most valuable asset a nation can possess and is the foundation of its power to resist aggression.

10. **The Armed Forces.** The armed forces are the instrument by which a nation's government poses a threat or brings pressure to bear on an enemy. Where applicable, a careful balance must be maintained between nuclear and conventional forces. Neither of these forces must be so small as to encourage an aggressor to seek a quick advantage or to risk a local incident escalating into a major war. The armed forces must be maintained in peace-time at a high state of operational readiness, and their survival in the face of a surprise attack must be assured.

11. **Industrial and Economic Strength.** International influence depends upon economic as well as military strength, and no country can be rated as a major power which does not have behind its armed forces a strong economy based on an assured supply of raw material and an efficient industry. The provision of effective military forces can be a heavy drain on a nation's resources, especially in these days of expensive modern weapons, and most countries have come to rely more and more upon a policy of interdependence through the membership of alliances.

12. **Manpower.** Although the application of rapid advances in science and technology to weapons, aircraft and equipment will undoubtedly make them more effective, it will not reduce the need for skilled manpower. A nation must train its manpower and distribute it in peacetime as economically as possible between the competing demands of the fighting Services and defence production on the one hand and the needs of a healthy economy on the other.

13. **Research and Development.** A nation's ability to deter its enemies from aggression and the efficiency and strength of its armed forces will be determined largely by the quality of the equipment and weapons it possesses. A nation must, therefore, keep abreast of scientific research and technical development. However, it may not be possible for any single nation to exploit the whole range of possibilities in this era of immense technological complexity, and interdependence between nations will play its part in spreading the load.

Bibliography

1. BAF ISS Book Phase-5 Part-I.
2. RAF ISS Phase Note-5 Course 43.
3. AP-3000 2nd Edition.

TOPIC-2

MILITARY DOCTRINE AND APPLICATION OF AIR DOCTRINE

Military Doctrine

1. **The Nature of Doctrine** . Doctrine is in essence 'that which is taught'. It is an accumulation of knowledge which is gained primarily from the study and analysis of experience. As such, doctrine reflects what works best.

2. **Military Doctrine** . In NATO, military doctrine is defined as fundamental principles by which military forces guide their actions in support of objectives. It is authoritative but requires judgement in application. Military doctrine is not dogma, nor is mandatory. It represents the collective and officially approved advice on the best way of employing military forces in war; it evolves in response to experience and thought. Military doctrine seeks primarily to influence the way in which service men and women think, and it establishes a framework within which the business of waging war can be understood.

3. **Importance of Military Doctrine**. The Armed Forces, like many comparable organizations, have a requirement to be able to resolve complex activity. However, warfare is an activity in which few hard and fast rules exist. For armed forces to succeed in war they must have the ability to adapt rapidly to changing circumstances and operate effectively in apparently chaotic conditions. If they are to act as a credible deterrent in peacetime, the armed forces must be seen to be physically capable of fighting and be mentally and morally prepared to do so. Service men and women must be clear how to tackle the complex situations, difficulties and hardships that will arise in war. An awareness of military doctrine is important in this respect, particularly under the stress of combat. It enables a subordinate to act in accordance with his commander's recommended course of action and support the larger scheme of operations even when he is unable to communicate with his superior.

4. **The Structure of Military Doctrine** Military doctrine (the structure of which is shown graphically below) falls into 3 categories : the environmental doctrines, joint doctrine and combined doctrine.

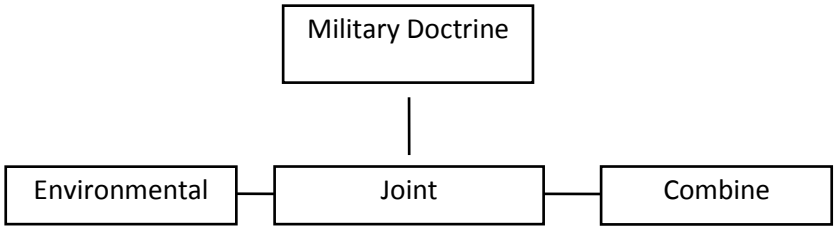


Figure : 1.1

5. **The Environmental doctrines.** The nature of the three environments in which man fights – the land, the sea and the air–are markedly different. Land power, sea power and air power have distinct and specific characteristics and different applications; thus, they provide complementary contributions to national and multi-national defence. As such, each requires distinct and specific doctrines. The environmental doctrines cover the full spectrum of conflict and are normally written at 3 levels: strategic, operational, and tactical. In terms of air power these levels are shown graphically below in figure 1.2 and defined respectively.

LEVELS OF ENVIRONMENTAL DOCTRINE

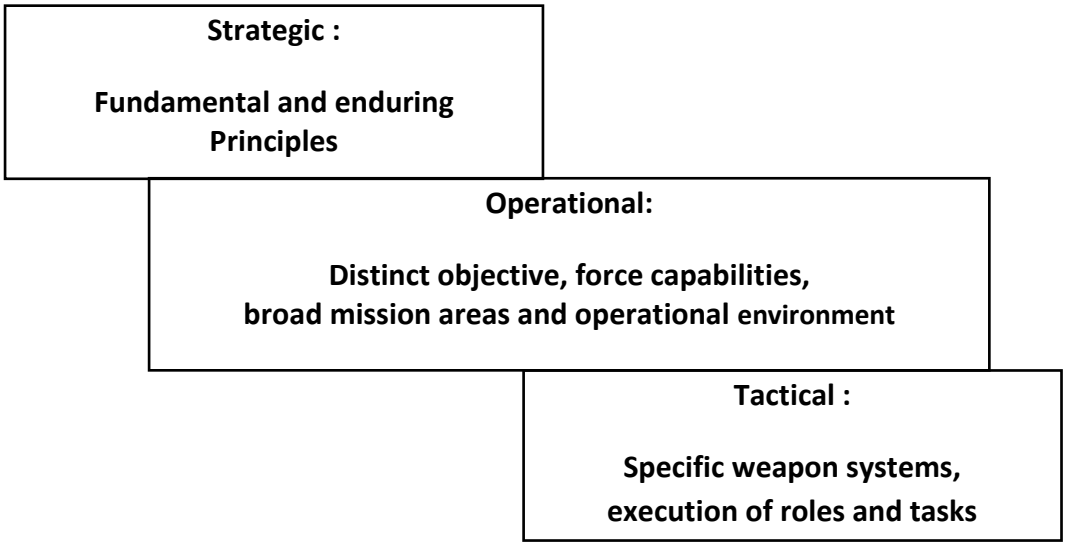


Figure : 1.2

a. **Strategic Doctrine**. Strategic doctrine states the most fundamental and enduring principles which guide the use of air forces in military action. Strategic doctrine is the foundation of all air power doctrine; it establishes the framework of understanding of the approach to air warfare and provides the foundation for its practical application.

b. **Operational Doctrine.** Operational doctrine applies the principles of strategic doctrine to military actions by describing the proper use of air forces in the context of distinct objectives, force capabilities, broad mission areas and operational environments. Operational doctrine describes the organization of air forces, and it anticipates the changes and influences which may affect military operations, such as technological advances.

c. **Tactical Doctrine**. Tactical doctrine applies strategic and operational doctrine to military actions by describing the proper use of specific weapon systems to accomplish detailed objectives. Tactical doctrine deals with the execution of roles and tasks.

6. **Joint Doctrine**. Joint doctrine, in relation to air power, applies air power doctrine to joint operations and describes the best way to integrate and employ air forces with land and naval forces in joint action.

7. **Combined Doctrine**. Combined (ie alliance) doctrine in relation to air power applies air power doctrine to combined operations and describes the best way to integrate and deploy air force with the forces of the allies in coalition warfare. It establishes the principles, organization and fundamental procedures agreed upon between or among allied forces. Combined doctrine supports mutual defence treaties, agreements, or organizations, and promotes compatible arrangements for the employment of armed forces in combined operations.

8. **Interrelationship of the 3 Levels of Air Power Doctrine**. The 3 levels of air power doctrine are neither mutually exclusive nor rigidly limited to precise boundaries. The following example helps to illustrate their interrelationship:

Doctrine Level	**Example**
Strategic	Gaining control of the air is an important goal in air warfare.
Operational	To achieve control of the air, an Air Commander employs air forces in OCA and DCA operations by orchestrating a variety of roles. These include warning, command and control, airfield attack, suppression of air defense, AAR, AEW, logistic, surface-to-air defences, etc
Tactical	As part of the force-mix required to achieve control of the air, Tornado F3 fighters fly DCA missions. For example, they could fly CAPs in specified formations and numbers depending on the tactical objectives and conditions. Tactical doctrine describes how those Tornado F3 combat missions would be integrated and co-ordinated with the actions of other weapon systems.

Figure : 1.3

Application of Air Doctrine at the Operational Level

9. The application of air doctrine at the operational level is achieved through the development of an air campaign operation plan and the management of the subsequent air battle. The objectives of the air campaign plan will primarily depend upon the political or military desired endstate (final desired outcome) and the enemy's centres of gravity (the term 'Centre of Gravity' describes a point of crucial vulnerability, against which a successful attack is likely to be decisive in battle). Decisions during the battle will be driven by the occurrence of the desired events and the tempo of operations.

10. Doctrine is intended to influence thinking and provide guidance for planning and conduct of an air campaign operation. Doctrine should be considered as a stimulus for the thought process rather than rules to be followed blindly.

Air Doctrine Process

11. Doctrinal Development is a continuous and circular process which, at its various levels, provides the guidance for the creation of actual military capability. These created military capabilities are then tested through combat experience. The achievements or draw backs are taken as feed back to adjust/modify the doctrine inputs and then the doctrine itself and the cycle continues. Above all, the national strategy remains as the driving element of the total doctrinal process.

12. Strategy has direct two way interfaces with the inputs, out puts and feed back elements. However, strategy only indirectly influences doctrine through its process; whereas, doctrine can directly influence the strategy. The doctrinal process is shown below:

Figure : 1.4

Doctrine and Technology

13. The rapid advance of technology dictates that operational guidance should continually be examined in the light of the accepted doctrine, to ensure that in its detail it keeps pace with the latest technology available. The examination should be in light with the analysis of recent conflicts, which will enable it to identify trends of application of Air Power and the required technological developments to support it. Experience from contemporary conflicts has shown the importance of exploiting technology to provide air forces with a technological advantage over the enemy. Nevertheless, shortcomings in technology have in the past led to compromises in operational capability. However, procurement must provide capabilities which first and foremost have been identified and justified by the doctrine process.

Doctrine and Training

14. The human factor is the most decisive in conflict. To prevail in war, a force must comprise a wide-ranging group of skilled professional personnel whose full development requires a balance of training, military education, experience and motivation. Training is the basis of operational preparedness. The practical aspects of the relevant level of doctrine provide the framework for the training required to develop the professional capabilities needed for success in war. Therefore, air forces must practise as they plan to fight, and their combat ready status must reflect, as far as it is achievable, exposure in training to the chaos, stress, intensity, tempo, unpredictability and violence of war. Training must be conducted at all levels of the force, including at the most senior command level. Exercises must be rigorously analysed and evaluated by specialist staff in order to validate the doctrine involved and feed back for improvements in organisation, training and equipment.

Flight Safety

15. Realistic training is essential to prepare for combat. However, there is always a balance to be struck between realistic training and ensuring that sufficient combat ready

assets are available when operations commence. Even once hostilities have begun our assets must be protected from prevenaining.

a. Describe air strategy, air campaign, air operations and air roles.

b. Describe various objectives of the components of air strategy, air campaigns and air operations.

c. Describe the broad categories of air operations.

d. Outline various air operations and support activities.

Bibliography

1. BAF ISS Book Phase-5 Part-I.

2. AP-3000 2nd Edition.

TOPIC 3

AIR POWER, ITS CHARACTERISTICS AND APPLICATION OF AIR POWER

Definition of Air Power

1. It has always been difficult to define the concept of air power. In the early years of military aviation, air arms tended to be seen not as agencies for a distinctive type of military force, but as auxiliaries to the ground and naval forces. By the 1950s perceptions had been revolutionised, and many saw air power as an all-encompassing concept.

2. The British Joint Doctrine Publication defines air power s the ability to project military force in air or space by or from a platform or missile operating above the surface of the earth. Air platforms are defined as any aircraft, helicopter or unmanned air vehicle. The means of exercising air power are many and include any system which can be used to wage warfare in the air: for example, manned and unmanned aircraft (fixed and rotary wing), guided missile, balloons and space vehicles. This definition does not exclude civilian elements such as contractor support, particularly to sustain air operations.

3. Indeed, now, airpower is much less distinctively focused exclusively on Air Force. The exploitation of air power has now become a joint and multinational business. Air Warfare is now just as much a part of land maritime warfare as it is a separate discipline. The provision of air power.

a. Is inherently joint, combined and multinational in nature.

b. Encompasses forces drawn from all three Services.

c. Is concerned with effective exploitation of air power assets.

d. Is supported by national civilian and commercial resources.

e. Is influenced by, and in turn influences, the land, sea and space environment.

Air Power Defining Characteristics

4. Air is very different environments in which to fight and operate from either land or sea. Consequently, air forces have different characteristics from land and sea forces. The military advantages of elevation include enhanced observation and perspective of the battle space. In addition to joint utility, air power platforms, sensors and systems are capable of independent, distinct action to attack an opponent’s defined centre of gravity with strategic effect. Furthermore, virtually in any form of modern conflict, control of the air is a pre-condition for the successful conclusion of land and maritime operations. Air power is, therefore, a key enabler in all joint and multinational operations. Historically, the characteristics of air power have been described as either strengths or limitations. Recent experience of conflict suggests that the relative importance of air power characteristics will vary depending on the circumstances. A range of factors which govern the effective employment of air power will apply to a greater or lesser extent, determined by the strategic context, operational campaign plan and tactical scenario.

The Strengths of Air Power

5. Air power has the unique ability to exploit the third dimension above the surface of the Earth. As a result air vehicles are faster and have greater reach than naval ships or land vehicles. Thus, height, speed and reach must be considered as the primary strengths of air power. However, height, speed and reach act together synergistically to produce additional strengths which are listed below and which merit examination.

a. **Height.** The ability of aircraft to operate over a spectrum of heights gives them the ability to observe and dominate activities on the surface and below the sea. It allows direct fire to be used against all of the enemy's forces, whether or not they are in the front line, and it permits manoeuvre in three -rather than just two-dimensions, an important factor in survivability.

b. **Speed.** The speed of aircraft allows rapid projection of military power; greater speed allows missions to be completed in shorter times and a larger number of tasks to be completed within a given period. At the tactical level, high speed reduces the time that aircraft are exposed to hostile fire and thus can increase their survivability in battle.

c. **Reach.** 70% of the world is covered by water, 30% by land and 100% by air; as a result air power possesses unrivalled reach. Aircraft can project military power over great distances in any direction unimpeded by surface features such as mountain barriers or water expanses. Air power reach has been greatly extended in recent years through the use of air-to-air refuelling. Reach is important not only for striking at distant targets and reaching isolated locations, but also for circumventing potential restrictions (e.g. by routing flights around a country which has refused over flight clearance).

d. **Ubiquity.** Within a given level of resources, air power- thanks to its height, speed and reach- can counter or pose simultaneous threats across a far wider geographical area than is possible with surface systems.

e. **Flexibility.** Aircraft can perform a wide variety of actions, produce a wide range of effects and be adapted with comparative ease to meet changing circumstances and situations. For example, the Tornado GR1A can be used for reconnaissance, air-to-surface attack and air-to-air self defence. It can therefore carry out more than one role during a single mission and be re tasked in the air if necessary. Similarly, larger aircraft such as the Hercules can be used for surveillance and air-to-air refuelling as well as its primary role of air transport.

f. **Responsiveness.** Speed and reach make air power uniquely responsive. It can be used to counter or pose simultaneous threats across a far wider geographical area than is possible with surface systems. Air power can be deployed rapidly into distant theatres to provide visible and timely support for an ally or to act as a deterrent to aggression. For closer threats, it can be used to project military power rapidly, direct from its peacetime bases. The responsiveness of. Air power is as important in crisis management as it is in conflict.

g. **Concentration.** Speed, reach and flexibility allow air power to concentrate military force - in any of its many forms - in time and space, when and where required. The moral and physical effects of such a concentration capability are often crucial to achieving operational success.

Limitations

6. Air power has inherent limitations as well as strengths, namely impermanence, limited payloads and fragility. Like the strengths of air power these are relative rather than absolute and need to be understood in that context :

a. **Impermanence.** Aircraft cannot stay airborne indefinitely. Although air-to-air refuelling plan greatly extend the range and endurance of aircraft, no means have yet been found to re-arm, re-crew or service an aircraft in flight. To that extent, air power is an impermanent form of military force; the effects it creates tend to be transient and to sustain those effects, operations have to be repeated. In certain circumstances, the impermanence of airpower can be an advantage. For example, it can help to avoid the potential military and political liabilities which can arise from an extended presence in a foreign country.

b. **Limited Payloads.** The payloads that can be carried by aircraft are far more limited than those that can be carried by ships or by land vehicles. Thus, aircraft are most cost effective when they are used for tasks which give high-value pay-offs. This applies equally to combat and combat support tasks, such as, for example, transportation. While relatively small payloads that can be carried are a disadvantage, they can in part be compensated for by the high sortie rate conferred by an aircraft's speed and by the lethality and precision of modern air-to-surface munitions. Moreover, a small payload deployed quickly may be of far more value in stabilising a critical situation than one many times its size which is deployed later. It is important to note that payload limitations are common to all systems which exploit the third dimension. They are particularly marked in all missiles with small aerofoil lifting sections.

c. **Fragility.** Because air vehicles are by their nature highly stressed and have to be as light as practicable, they carry little or no armour protection. Hence, relatively low levels of battle damage can have catastrophic effects, a fact which tends to limit the extent to which it is sensible to risk exposing aircraft to enemy fire. However, it is important to distinguish between fragility and vulnerability. While aircraft are less robust than land vehicles or ships, this is in large part offset by the ability of aircraft to exploit speed and height, which increases the enemy's targeting difficulties.

Other Considerations

7. In addition to the strengths and limitations discussed above, air power also possesses certain other important and well-known characteristics, which also affect the air power contribution to defence and security. Here are the examples as follows:

a. **Cost.** High-technology equipment inevitably costs more than simple equipment, and as military aircraft tend to be at the cutting edge of technology, they can be costly. Similarly, aircrew training can also be very expensive. But these costs are less related to air power per se as a form of military force, than to the level of air power capability desired and the increase in capability they provide over older/obsolete systems often permits a reduction in the numbers of platforms

required. A modern highly-capable fighter-bomber aircraft will typically cost in the region of $15m to $20m. Less capable aircraft can be purchased for the same price as a main battle tank, while macro light aircraft cost about the same as a car. For certain tasks, a highly capable aircraft is essential, but for others a far less costly solution may suffice. Similarly, training costs are closely related to the complexity of the aircraft that the aircrew are required to fly.

b. **Dependency on Bases.** All forms of modern military power depend on base support. Armies in the field need depots to support them and navies need harbour facilities. However, air power is often seen to be more obviously dependent on its bases than are either land power or sea power. Helicopters and some fixed-wing aircraft can take-off and land vertically, but most aircraft need runways. And all aircraft need a high level of base support if they are to operate at their maximum sortie rate. If this base support is vulnerable to attack, then base-dependency can be a source of potential weakness. However, if the bases are difficult to find or difficult to close, then the converse applies. In these circumstances, the unique ability of air forces to fight directly from their peacetime bases enormously simplifies logistics and expedites the delivery of ordnance from the factory or depot onto the enemy.

c. **Sensitivity to Light and Weather.** Air power is sometimes perceived as being far more sensitive to weather and light conditions than are other forms of military force. Bad weather can certainly create difficulties with take-offs and landings, navigation and target acquisition. But the operations of all types of forces are affected by weather and light conditions. In very high sea states, ships cannot fight and sometimes cannot even leave harbour. Similarly, the mud caused by torrential rain can bog down armies, while intense heat can be a major handicap to carrying out large-scale land force operations. Moreover, in recent years the impact of weather and light on air power operations has changed markedly. Thanks to the rapid advance of technology, many combat aircraft are now able to operate in all light conditions, and many of these can also operate in all weather conditions. In the Gulf War, the weather (the worst in the region since records were kept) did indeed prove to be a limiting factor, but it merely slowed down certain types of operations. Overall, night was not a limiting factor for the attackers; indeed the converse was true and most sorties flown deep into Iraq were made under the cover of darkness. Indeed, the concealment offered by darkness and bad weather is increasingly turning to the advantage of air power, as more advanced all-weather navigation and targeting aids are developed and deployed.

d. **Sensitivity to Technology.** Air power tends to be more sensitive to technological change than sea power or land power. Air power is a product of technology, and technological advances inevitably affect air power development. Experience has shown that even relatively small technological innovations can have major impact on air power effectiveness. The offensive capabilities of air power could be inhibited by, say, advances in surface to air defence technology. But equally, they could be enhanced enormously by developments in "low observables" technology (that is, "stealth"). The nature of the balance will always depend on the overall direction and rate of technological development.

Air Power and the Principles of War

8. The air power considerations which apply to a particular set of operational circumstances will also need to be factored into a campaign plan in accordance with the Principles of War. The Principles of War have endured since the eighteenth century. Various amendments have been made in accordance with historical experience, and the Principles require continual examination in the light of new technical and scientific developments. This is a dynamic process which may shift the relative importance of one more than another. The desired outcome of applying Principles of War is the most effective employment of military force anywhere within the spectrum of conflict. The ten Principles of War recognised by the RAF doctrine are:

a. Selection and maintenance of the aim.

b. Maintenance of morale.

c. Security.

d. Surprise.

e. Offensive action.

f. Concentration of force.

g. Economy of effort.

h. Flexibility.

j. Cooperation.

k. Sustainability.

The Search for Principles

9. It has long been a favourite occupation of military theorists to distil from the great mass of military experience a simple list of principles of war to guide commanders. Usually they have derived such principles from a study of campaigns of the great captains of history. As far back as 400 BC Sun-tzu, a Chinese general, set forth 13 principles. Napoleon assumed 115 maxims related to principles of war. The assumptions varies from person to person. For example, the followers and interpreters of the 19th century theorist Carl von Clausewitz believed that the defeat of the enemy's armed forces was the correct objective and path to victory.

10. Though there is no complete agreement on the number of principles, most lists include the following; the objective, the offensive (unity of command), mass (concentration) economy of force, manoeuvre, surprise, security, and simplicity. The British have added one called "administration ": the Soviets, another, translated as " annihilation " Despite debate over their precise number and meaning, the principles of war are widely taught, and most military students accept them as basic concepts. A comparison of principles of war used by various nations is given in the Table 1.

11. The individual authors of the lists have almost uniformly claimed the principles to be immutable. They have argued that success in military strategy in the past has been the result of adhering to them and that the advantages of the offensive, the concentration of

force, the effort to achieve surprise, the proper movement of forces, and their security from attack, sabotage, or subversion are in the province of modern as well as ancient warfare.

12. Other authorities have argued that the claim of immutability of the principles of war cannot be accepted literally. They are fluid and require constant re-examination. Since no two military situations are ever completely alike, they can't be taken for granted. Therefore, the so-called principles are not really principles at all but merely methods and commonsense procedures adopted by great commanders of the past.

Comparison of the Principle of War

United States	**UK and Australia**	**Soviet Union**	**France**	**China**
Objective	Selection and Maintenance of the aim	Advance and concentration		Selection and Maintenance of the aim
Offensive	Offensive action	Offensive		Offensive action
Mass	Concentration of force	Concentration	Concentration of efforts	Concentration of force
Economy of force	Economy of Force	Economy of Force		
Manoeuvre	Flexibility	Manoeuvre and initiative		Initiative or flexibility
Unity of command	Cooperation	Combined arms		Coordination
Security	Security	Adequate reserves		Security
Surprise	Surprise	Surprise and deception	Surprise	Surprise
Simplicity				
	Maintenance of Morale	Morale		Morale
		Annihilation		
	Sustainability			
			Liberty of action	Freedom of action
				Mobility

Table 1 : Comparison of the Principle of War

13. The value of the Principles of War as a guide to commanders will depend on the understanding of the individual commander, his knowledge of operational art and his skill in applying the principles within a particular operational context. While the relative importance of each principle will depend on circumstances, successful application of the Principles of War requires sound military judgement. Failure to take account of these hard-won lessons can lead to mission failure. There are slight differences in the interpretation of these principles within the maritime, land and air environments.

Selection and Maintenance of the Aim

14. In the conduct of war and all military operations, it is essential to select and define the aim with absolute clarity before joint or multinational air operations begin. Once the military aim is decided, all efforts must be directed at achieving the aim unless the situation changes and re-appreciation requires the commander to adopt a new or modified aim. Every plan of action at every level for the exploitation of air power must be tested by the extent to which it contributes to the achievement of the military aim at the next highest level of command. This leads ultimately to the accomplishment of the overall military aim and hence to the fulfilment of the political aim and the desired end-state. It follows therefore that:

a. The military objectives, which should be attainable, must be directed to achieving the political aim and the intended strategic end-state.

b. Commanders at all levels must know exactly what they are required to achieve and must make that quite clear to their appropriate subordinates. They should not waste effort on courses of action which do not directly, or indirectly, contribute to the attainment of their aim.

c. Air tasks, roles and missions must be consistent and coherent with the overall strategy and campaign plan.

Maintenance of Morale

15. Success in all forms of war depends more on morale than on material conditions. Morale is a mental state but is very sensitive to material conditions. It is based on a clear understanding of the aim, on training and on discipline and is immediately responsive to effective leadership. It is adversely affected by inferior or inefficient equipment and depends to a large degree on sound administration. Outstanding leadership will sustain high morale when all other factors are against it and success in battle is the best stimulant of morale.

Security

16. A degree of security by physical protection and information denial is essential to all operations. Security should enable friendly forces to achieve their objective despite the enemy’s interference. Active measures include the defence of airfields, aircraft carriers, forward operating strips and entry points.

Surprise

17. Surprise action can achieve results out of all proportion to the effort expended. In air operations, when other factors are unfavourable to friendly forces, surprise might be essential to achieve mission success. Air power can achieve surprise strategically, operationally, tactically, or by exploiting new technologies material or techniques. The elements of surprise are secrecy, concealment, deception, originality, audacity and speed. All apply to the exploitation of air power at all levels of military activity.

Offensive Action

18. Offensive action is the chief means open to a commander to influence the outcome of a campaign or operation. Air power remains geared to undertake offensive operations. It would be virtually impossible to achieve a military aim without taking the offensive. Although defensive actions may have to be fought, ultimate success will probably depend on the offensive use of available forces. Offensive air action embodies a state of mind that brings the determination to gain and maintain the initiative and withhold it from the enemy.

Concentration of Force

19. To achieve success in war it is essential to concentrate superior force against the enemy at the decisive time and place - another enduring quality of air power. Concentration does not mean that forces must be massed at one place, but rather that they should be deployed in such a way that an enemy threat could be countered or a decisive blow could be delivered. Concentration of sufficient forces to achieve the decisive or most important task at the time is the cardinal principle in the employment of air power in war and conflict. This principle may entail the employment of all available forces.

Economy of Effort

20. The corollary of concentration of force is economy of effort. It is impossible to be strong everywhere and if decisive strength is to be concentrated at the most critical time and place, there must be no wasteful expenditure of effort where it cannot have a significant impact on the issue at hand. Economy of effort implies that the correct air power weapons systems need to be matched to the task (in what is termed *matching strategy to task)* and that forces allocated to a task need to be carefully balanced.

Flexibility

21. Flexibility is one of the prime advantages of air power. Although the aim might not alter, a commander might be required to exercise judgement and flexibility by modifying plans to meet changing circumstances, take advantage of fleeting opportunities or shift the

main effort of the joint campaign or air operations. Flexibility demands trust, good training, organisation, discipline, staff work and rapid decision-making when time is of the essence. To be flexible requires sustainability and a degree of mobility, which ensures that redeployments can take place both rapidly and economically, so that the weight of effort can be altered as required.

Cooperation

22. Cooperation entails the co-ordination of all activities to achieve the maximum combined effort from the whole. It is the means by which concentration of force with economy of effort can be achieved. Joint action is best achieved by the goodwill and desire to cooperate at all levels, not only within any one service but also among national services and allied forces. Only by full cooperation among services can the right balance of forces be achieved, and plans devised by the nominated joint force commander be effectively implemented.

Sustainability

23. Sustainability encompasses all aspects of the physical, moral and spiritual maintenance of a force. Sustainability is more than logistics; it encompasses all equipment, personnel and industrial support. As a Principle of War, sustainability develops force generation, deployment, and operations in theatre, recovery to home base, recuperation and training. Sustainability is also the ability of a force to maintain the necessary fighting power, in this case combat air power, for the time needed to achieve military objectives. The physical and moral sustenance of personnel, the maintenance and repair of equipment and aircraft, the provision of combat supplies and expendable commodities and the treatment, evacuation and replacement of casualties are all aspects of sustainability. Without due regard for all aspects of sustainability, combat power could be reduced and mission success placed in jeopardy.

Concept of Air Power

24. Air power is defined as the ability to project military force in air or space by or from a platform or missile operating above the surface of the earth. Air platforms are defined as any aircraft, helicopter or unmanned air vehicle'. Starting with this definition, The British RAF doctrine develops a model for the air power which can be considered very suggestive in relation to the mechanisms aggregated from the elements that concur in defining this concept. The British model of air power compliments the concept of fighting power provided by British military doctrine. The model of air power also integrates three major components: the conceptual component, the moral component and the physical component. The link between them is provided by 'training' as it could be seen in following figure.

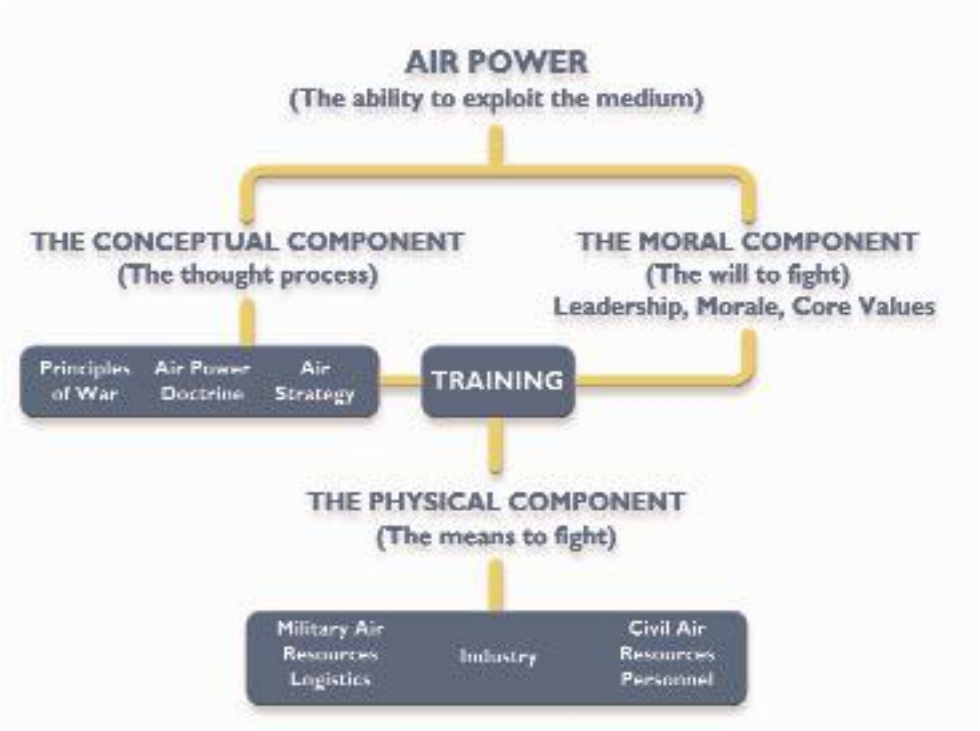


Fig 1: Concept of Combat Air Power

The Conceptual Component

25. Conceptual component comprises both lessons from the past and thinking about how air force can best operate today and in the future. It is made up of:

a. Principles of War and Tenets of Air power
b. Air Power Doctrine
c. Development of Doctrine.

26. The principles of war and doctrine in combination with the initiative and creativity of commanders provide the intellectual drive for an air force, which directs the air power in carrying out the operations. The development ensures that the doctrine, the equipping of the air force and military education and training are continuously adjusting to the changes of air power theory.

The Physical Component

27. Physical component is the quantitative and qualitative indicator of physical strength of an air force. It is the total means of destructive power which an air force can launch against an opponent at a given time. The successful exploitation of air power depends upon superior and timely information exploitation, a quicker decision/action cycle and flexible force that can offer the rapid application of airpower across the spectrum of conflict. Combat air power must be supported by robust and sustainable logistics. Therefore, the physical component of air power includes:

a. Manpower
b. Effective air weapon platforms
c. Operational readiness
d. Sustainability
e. Collective performance

Moral Component

28. In the 'fog and friction' of war, individual airman needs to overcome fear and rise above their personal circumstances in the pursuit of organizational goals. Where the conceptual component provides the 'knowledge to fight', the moral component supplies and sustains the 'will to fight'. The moral component is the other half of the human dimension of air power and is reflected in the willingness to endure hardship, danger and mortal peril. It is stimulated by the confidence in the belief for what every member of an air force is designed to fight. Moral component is nurtured by good 'leadership' and sustained by high 'morale'. It is reflected in the spiritual guidance provided by air force leaders. 'Education' and 'training' plays a vital role which unites moral component with conceptual component. Education and training influences the 'development' factor of conceptual component which forms the doctrinal basis for an air force.

Integrating the Components of Fighting Power

29. Professional mastery integrates the components of fighting power. Professional mastery is the demonstrated level of skill applied to the art and science of war. On a more practical level, professional mastery is an expression of how an individual applies the skills, knowledge and attitudes developed through education, training and experience to meet the requirements of the task at hand. Individual professional mastery forms the basis of the Air force's collective professional mastery, in which excellence in all aspects of the profession of arms represents a unified field of applied knowledge.

Fig 2: Integration of the Components of Fighting Power
Source: Land Warfare Doctrine 1, Australian Army

n, the advancement of airpower has shown a growing trend of applying them in preserving peace and also to manage crisis. The aspects of application of air power is discussed in the following paragraphs.

31. **Preserving Peace.** Air power can be used to help preserve and strengthen international security, both by promoting good international relations and by providing reassurance to nations that they are not under threat of attack:

a. **Promoting International Relations.** When disaster strikes in whatever form; floods, famines, typhoons, volcanoes, plagues or earthquakes; speed of response is

vital, and the speed of air power helps it to play a key part in alleviating suffering. Military transport aircraft are uniquely capable of delivering rapid relief during the critical early stages of natural disasters. For example, in the Ethiopian famine of 1984/5, the starving communities isolated in the Ethiopian high lands could only be supplied from the air. Similarly, during the Bangladesh cyclone disaster of 1991, the broad extent but relatively shallow depth of the flooding meant that aircraft were by far the best means of bringing relief to the survivors. The potential security benefits of such high-visibility operations are obvious: they generate a spirit of goodwill, help to remove suspicion, alleviate grievances and thus promote stability and security. Airpower can also be used by a developing nation to promote her international relation as it was seen by Bangladesh Air Force delivering relief operation to Maldives and Srilanka by using Bell-212 helicopter during Tsunami in year 2004.The BAF C-130's participation in relief operation during Bhuj Earthquake in India provided a great gesture from the country.

b. **Providing Reassurance.** Air power can also be used to help avert threats to peace, both real and imagined. By exploiting the third dimension for surveillance purposes, it can provide assurance that a potential antagonist is not about to attack. It can, in addition, be used to verify arms control agreements and play an important part in furthering confidence and security building measures. While satellite surveillance systems offer expanding contributions, the capabilities, flexibility and unpredictability of airborne systems continue to make a unique contribution in this field. Aerial inspection provisions form a key part of the verification regimes of the Conventional Armed Forces in Europe Treaty of 1990 and the Vienna Document 92 on Confidence and Security Building Measures. The Open Skies agreement which allows surveillance aircraft to roam freely over the territories of signatory states and the information thereby gathered to be shared - will play an important role in fostering security and stability in Europe.

32. **Managing International Crises.** If air power can make a useful contribution to preserving peace, it can play a major part in managing crises. In times of increasing international tension, the unique ability to generate and project military power rapidly, over long distances unimpeded by surface features makes airpower an ideal instrument for international crisis management. Air power has a wide variety of important crisis management applications, most of which involve no recourse to violence. These include - in terms of increasing seriousness - warning, signalling, providing support, international rescue, injecting stability, deterrence (both implicit and explicit), non-lethal coercion and punishment:

a. **Warning.** Air power can be used to give prior and timely warning of an intended aggression and thus allow appropriate preventive action to be taken. The detection of Soviet ballistic missiles in Cuba in 1962 by the American U-2 aircraft allowed the United States to impose a naval 'quarantine' of the island, a measure which led to the removal of this potential threat. Since then capabilities have grown markedly and - despite the advent of reconnaissance satellites - airborne systems continue to provide unique surveillance capabilities. Advanced airborne surveillance systems - such as the E-313 Sentry Airborne Warning and Control System (AWACS) and J-STARS - can provide enormous quantities of detailed data, on the actions of potential aggressors.

b. **Signalling.** Air power can also be used to send clear political signals. These can help to remove uncertainty over intentions and thus reduce what is arguably the greatest danger in any crisis: miscalculation. Air power can do this through a range

of measures including overt increases in readiness states, intensified peacetime training exercises or presence flights.

c. **Supporting Friends.** A third crisis management application for air power is to provide timely moral and physical support for allies and friends, thus strengthening their resolve in times of tension. Here, the Berlin airlift of 1948/49 provides a classic example. During the summer of 1948 the Soviet Union imposed a road and rail blockade on Berlin. This blockade was frustrated by a British and American airlift in which some 2 million Berliners were supplied by air throughout a difficult winter. The Berlin airlift demonstrated the capability and will of the Western powers to provide support for a threatened friend and as such had lasting and worldwide ramifications. On a far smaller scale, the 'persuasion flights' by American F-4 Phantoms over rebel Filipino positions during the attempted coup attempt of December 1989, demonstrated the United States' support for President Aquino's regime and contributed materially to the failure of the coup.

d. **International Rescue.** The use of air power to mount rescue operations in crisis situations has a long history. They include the evacuation of British citizens from Kabul during the Afghan rebellion of 1928/29, the release in 1976 by the Israelis of the passengers and crew of a hijacked Air France A-300 airliner being held hostage in Entebbe, Uganda and the evacuation of Europeans from Kolwezi, Zaire in 1978. However, such operations because they require large and vulnerable aircraft to fly over potentially hostile territory - tend to involve high risks and demand the most careful preparations. If the planning is faulty disaster can result; this was the case with the failed American attempt in April 1980 to use air power to release hostages held in Iran.

e. **Inject Stability.** Air power can also be used to inject air or land forces to improve stability in a region threatened with civil strife or in areas where regional conflict threatens to spill over into neighbouring states. For example, the rapid airlift of French and Belgian troops into Zaire in September 1991 helped to bring stability into a situation of increasing communal violence.

f. **Implicit Deterrence.** Perhaps the best known application of air power in crisis management is to deter aggression, and this can be achieved in a number of ways. At the lowest end of the deterrent scale, the deployment of reconnaissance or surveillance aircraft can - in addition to providing information - have a salutary deterrent effect on a potential aggressor. They can be used to warn him that his actions are being watched and could provoke a response. Because such specialist surveillance aircraft have wartime as well as peacetime functions, they can be invaluable in enhancing the fighting power of regional forces and/or preparing the ground for out-of-region reinforcements. In this context they play a key role in ensuring the continuity of crisis management options between 'implicit' and 'explicit' deterrence.

g. **Explicit Deterrence.** The proven ability to exact rapid retribution, strike into unfriendly territory and deny the potential aggressor the assurance that his homeland can be kept safe from attack is by any measure a strong and explicit deterrent. It is one which can be effective right across the spectrum of potential aggression. At the lower end of the scale, air power can help to protect and strengthen the hand of peacekeeping forces. For example, the Operation PULSATOR deployment of RAF Buccaneers to Cyprus in 1984 - and their subsequent 'demonstration flights' over Beirut - provided an intimidating presence which helped to safeguard British

peacekeeping forces in Lebanon from the potential threats posed by the rival Lebanese militia groups. Similarly, the rapid deployment of RAF Harriers to Belize in 1972 and again in 1977 appears to have been a major factor in deterring the threatened Guatemalan invasion of that territory. More recently, the rapid deployment of Coalition air power to Saudi Arabia in the days following the 1990 Iraqi invasion of Quait acted as a signal deterrent to further Iraqi aggression. Indeed, had it been possible for the international community to divine President Saddam Hussein's intentions earlier, the rapid deployment of friendly air power into Kuwait before the invasion might well have defused the crisis before it had really developed. In many such situations air power will often be the only instrument, which has the requisite speed, reach, and hitting power to deter aggression.

h. **Non-Lethal Coercion.** Towards the top end of crisis management options, air power can be used not merely to deter aggression, but also to 'face down' a potential or actual aggressor without resort to physical violence. For example, in august 1976 the US responded to the killing of two of its soldiers in the Korean demilitarized zone with a rapid and ostentatious deployment of air power to Korea. The implied threat was clear, and North Koreans quickly offered a formal apology.

j. **Punishment.** If necessary, non-lethal coercion can be taken one step further and airpower used for precise punishment operations, short of full blown war. One obvious application of these punishment operations is as a response to an attack by state-sponsored aggression by guerrillas or terrorists. In such cases it is often impossible to strike directly at the aggressors themselves, but it is usually possible to punish those who support and encourage them. Such operations are not - of course - without their difficulties. Firstly, international legal opinion is divided on whether retaliation (or even anticipatory self-defence) breaches the prohibition on the use of aggressive force. Moreover, punishment operations are reactive rather than Proactive and depend for their success on surprise. Hence, they are usually planned at short notice on a 'one-off' basis; there is little opportunity for Practice and much scope for error.

33. **Wartime Applications.** Should crisis management measures fail, and crisis degenerate into armed conflict, then air power can make a decisive contribution to prosecuting operations successfully and with minimum loss of life. The unique ability of air power to concentrate military power in time and space when and where it is needed has in recent years become perhaps the dominant feature of contemporary high-intensity conflict. Here again, air power offers decision-makers a wide range of options. These include observation and destruction and the consequential effects of lethal coercion, denial or containment, dislocation, delay, diversion and demoralisation:

a. **Observation.** In war, observation of the enemy provides the basis for intelligent planning and successful execution of military operations.. Air power's unique ability to exploit the third dimension allows it to make a major contribution to monitoring enemy activities and deployments and thus discovering his intentions. Aerial reconnaissance was the first use of military aviation. In the opening months of World War 1, Allied aircraft detected the divergence of the German 1st Army away from Paris during the invasion of France and thus contributed significantly to the subsequent 'Miracle of the Marne'- the defeat of the German Schliefen Plan. In World War 2, aerial reconnaissance was of major importance not only at the tactical level, but also at the operational and military strategic level. For example, it played a major part in the destruction of the German battleship Bismarck in 1941 and in the

battle against the V-weapons in 1944 and 1945. It also underpinned the strategic air offensive against both Japan and Germany. The importance of air observation continued to increase during the conflicts of the post-World War 2 period. It proved vital to the United States air operations in Vietnam, and the lack of an effective aerial reconnaissance capability was cited in the British Government's. Franks' Committee Report as a major British handicap during, the Falklands War. And during the Gulf War of 1991, air reconnaissance in crisis and conflict was vital to the success of the air campaign. In modern warfare, aerial reconnaissance is nearly always important and frequently essential.

b. **Destruction.** Air power's most obvious wartime application is to destroy. The ability to concentrate firepower - when combined with the direct fire inherent in the nature of aerial attacks - confers on air power enormous, potential destructive power. As early as 1918, the destructive potential of air power against enemy land forces was apparent. In 1918, British air power destroyed the retreating Turkish 8th Army at Wade el Far'a. Twenty six years later in the battle of the Falaise Gap in France, Allied air power destroyed the German 5th Panzer and 7th Armies - a total of sixteen divisions including nine panzer divisions. Speaking of the battle in later years, General Spieled (the Chief of Staff to General von Kluge - German Commander-in-Chief West) stated that their 'armoured operation was completely wrecked exclusively by the Allied Air Forces'. In the Vietnam War the North Vietnamese 9th Division attacking An Loc during the Tat offer save of 1972 was decimated by the concentrated use of airborne firepower. And during the Gulf War, air power destroyed nearly half of the Iraqi tanks, artillery and armoured troop carriers deployed in the Kuwait Theatre of Operations before the start of the Allied land offensive. At sea, the destructive potential of air power developed even more quickly. During the battles of the Coral Sea and Midway in 1942 five Japanese aircraft carriers were sunk by United States aircraft. Two years later in the Battle of Elite Gulf in the Philippines, American air action accounted for the lion's share of the four carriers, three battleships, six heavy cruisers, three light cruisers and eight destroyers lost by the Japanese. During the Gulf War, air power accounted for all of the fourteen Iraqi warships (87% of Iraq's Navy) that were sunk by the Coalition. But the contribution to military victory of destruction per se can be exaggerated. It is not only destruction but also the consequential effects of air power's destructive capacity - set out below -that gives air power a true war-winning potential.

c. **Lethal Coercion.** The ability of air power to reach deep into enemy territory at any time and attack the full spectrum of target sets allows air power to be used to coerce an enemy during a conflict. Any state which faces an opponent with strong air power has to accept the possibility that opponent can escalate the scale or scope of the conflict rapidly and at will by extending the intensity and scope of his attacks. For example, in December 1972 -when the North Vietnamese stalled the Paris peace negotiations - the United States extended its bombing attacks to Hanoi and Haiphong. After eleven days of the bombing, the North Vietnamese leaders agreed to return to meaningful peace negotiations. As a result of this coercion, North Vietnam signed virtually the same the treaty that it had rejected the previous October.

d. **Denial.** Air power can also be used to deny an enemy the ability to employ his air, surface and sub-surface forces effectively. The most prominent example of an air-to-air denial battle is the Battle of Britain, where air forces were the only practicable means open to Britain of denying the enemy the opportunity to launch a potentially war-winning

invasion against the United Kingdom. An example of an air-to-surface denial battle is provided by the Golan Heights battle in the 1973 Yom Kippur War. Caught by surprise, the Israelis had to use air power to contain the Syrian army's offensive until Israeli ground forces had deployed in sufficient strength. That the Israeli Air Force suffered relatively heavy losses during this operation is not of key importance; air power was the only means available to the Israelis of avoiding a major military and political disaster.

e. **Dislocation.** The capacity of air power to inflict dislocation is a key quality. Even if an aircraft fails to destroy its target, the impact on morale of a near-miss or of collateral damage may still cause the enemy major mental, moral and physical dislocation. Dislocation causes delay and confusion, and it breaks up unit cohesion. It also makes the enemy far more vulnerable to follow-up attacks by all types of forces. For example, in June 1944 the German Panzer Lehr division was subjected to continuous Allied air interdiction attacks during its deployment from Le Mans to contain the Allied D-Day landings. The attrition sustained by Panzer Lehr during this journey was significant (about 10% or 220 vehicles), but more importantly unit cohesion was lost and the division arrived on the battlefield in ineffective ‘penny packets'.

f. **Diversion.** Air power can be used to divert enemy forces in order either to delay or destroy them. At the military-strategic and operational levels of war, diversion can be achieved by concentrating attacks against sensitive target sets, compelling an enemy to divert forces and resources from offensive into defensive duties. For example, the Allied Strategic Bombing Offensive forced the Germans to divert an estimated 10,000 artillery pieces, badly needed by their land forces, into their anti-aircraft artillery force. As early as 1942, anti-aircraft artillery took 25%-30% of the value of Germany's total weapon production. At the tactical level, air power can achieve diversion by selectively attacking choke points such as bridges etc. This can either delay the arrival of enemy surface forces or channel their movement into areas where they can more easily be contained or destroyed.

g. **Delay.** The effects of dislocation, destruction or diversion can in turn create delay, another important war time effect of air power. In defensive situations, imposing delays on the enemy allows friendly forces to deal more effectively with an attack, either by strengthening defences or by launch spoiling attacks. In offensive situations it allows friendly forces to prevent the enemy's escape. For example, in June 1944 two German Panzer divisions were transferred from the eastern front to help contain the D-Day landings. It took them only five days to cover the 1,000 miles to Nancy. In eastern France. But - because of air interdiction attacks - a further nine days of difficult travel were needed to cover the remaining two hundred and seventy miles to Normandy.

h. **Demoralisation.** One of the important effects that air power can create is demoralisation, because demoralisation is a factor which pervades all aspects of combat capability. Air attack has always had a particularly sapping effect on morale, almost irrespective of the damage inflicted. Perhaps the prime example of the demoralising impact of air power was in the Gulf War. By the commencement of Operation DESERT SABRE (the coalition land attack on Kuwait and Southern Iraq), aerial bombing had reduced the Iraqi army to a demoralised rabble, largely incapable of effective defence. It was this demoralising effect of the air attacks on the Iraqi Army that allowed the Coalition forces to liberate Kuwait, taking some 100,000 prisoners in just five days for the cost of less than five hundred Allied casualties.

TOPIC-4

DEGREES OF CONTROL OF THE AIR

Introduction

1. Control of air means preventing the enemy to use his air power effectively against friendly forces, rear areas & homelands, while allowing allied use of air power against him. These control varies with the effectiveness. Such prevention to enemy to use his air power dates back to WWI.

2. The development of modern weapons couples with deterioration in standards of international behaviour, have greatly increased the dangers of knock-out blow, through surprise attack. The Japanese attack on Pearl Harbour was an example of what may happen in the future. It is, therefore, essential that nation's Air Force should be in a position to secure control of air over vital areas from the outbreak of war. Control of air is a matter for fighters and ground defences and is mainly a defensive concept.

3. The first aim of the Air Force, however, must be to win air superiority, and this is a condition which can only be achieved by the offensive. The air war must be taken to the enemy's own territory. He must be forced on to the defensive and kept there by relentless and continuous attacks. This will take time and hard fighting to reach culmination.

The History

4. **World War I.** As the effectiveness of air power in the scouting role became apparent, so the need to contain enemy air power increased. In September 1914 the first direct attacks were made against airfields and other air power facilities. By the end of World War I the need to achieve control of the air was recognized as an important aim in its own right.

5. **World War II.** In World War II the importance of control of the air became apparent. The air forces of Poland, Belgium, Holland, Yugoslavia and Greece were rapidly destroyed by German offensive counter-air action, while those of France and Russia were crippled. In the Western Desert, the Atlantic and Western Europe, control of the air was again shown to be crucial to the success not only of air operations, but also of virtually all types of surface and sub-surface operations. Speaking in 1947, Lord Tedder remarked that "the outstanding lesson of the last war was that air superiority is the pre-requisite for all war-winning operations, whether at sea, on land or in the air".

6. **Post-World War II.** The advent of nuclear weapons in 1945 and the apparent impossibility of providing an adequate defence against nuclear bombers seemed to show that the established concepts of control of the air were no longer valid. However, the limited military utility of nuclear weapons soon became apparent, and the over-riding importance of establishing control of the air reasserted itself. During a series of post-war conflicts – particularly in Korea, Indo-China, the Arab-Israeli wars, Vietnam, and the Falklands, control of the air proved to be the key to the effective use of air power. In 1971, IAF enjoyed complete control of the air over the then 'East Pakistan'.

Degrees of Control of the Air

7. There are three basic degrees of control of the air :

a. **Favourable Air Situation.** A favourable air situation is one in which the extent of air effort applied by the enemy air forces is insufficient to prejudice the success of friendly land, sea or air operations. Favourable air situation is generally temporary and usually precarious & is often secured for a limited period and special purpose.

b. **Air Superiority.** Air superiority is defined as that degree of dominance in the air battle of one force over another which permits the conduct of operations by the former and its related land, sea and air forces at a given time and place without prohibitive interference by the opposing force. A high degree of air superiority is a pre-requisite to victory on the ground, at sea and in the air. It is not an end in itself, but the means to an end, the means by which we gain freedom of action for our air forces, armies and fleets and impose our will upon the enemy.

c. **Air Supremacy**. Air supremacy is defined as that degree of air superiority wherein the opposing air force is incapable of effective interference. Air supremacy is a condition of virtually complete command of the air like what prevailed in Europe in 1945. Air supremacy is unlikely to be reached until late in war. Short of that is a condition which calls for continuous hard fighting. Even an air superiority situation may be reversed by a resolute enemy who is given time and opportunity to stage a recovery. It may also be seriously jeopardised by some unexpected scientific or technological development by the enemy. Even a condition of air supremacy cannot afford absolute immunity from enemy air attack. There may still be sporadic and fleeting flashes of activity which, as the LUFTWAFFE proved on New Year's Day 1945, may be damaging. This should not, however, lead to an over insurance of defensive measures which cannot be justified by the damage to be expected from such sporadic action. In other words, the premium must not be disproportionate to the risk.

Degree	**Condition**
Favourable Air Situation	Enemy air effort is insufficient to prejudice friendly success.
Air Superiority	Allows conduct of friendly operations to proceed at a given time and place without prohibitive enemy interference.
Air Supremacy	Enemy air force incapable of effective interference

Means to achieve Control of Air

8. There is no fixed formula or simple solution to the problem of gaining control of air. A weak air force may be quickly destroyed on the ground at its bases or in the air by a vastly superior enemy as was the Polish Air Force in 1939. Control of Air is not as a rule, a straight forward issue to be decided outright by one great air battle or group of battles.

9. Favourable Air Situation/Air superiority / Air Supremacy is largely a moral condition, but there is one material factor which is of crucial importance. No morale can be sustained, and no skill or gallantry can avail unless the aircraft and armament of the Service are at least a match for those of the enemy. Modern warfare, specially in the air, is technical and scientific, and the aim must always be to keep at least one jump ahead of the enemy. Good equipment, soundly designed, robustly made and simple to handle and maintain, is an indispensable element of air superiority.

10. In addition to good equipment control of air is achieved through morale. Its characteristics are, an indomitable offensive spirit, an ingrained conviction of personal superiority over the enemy, and a light hearted contempt for the idea that defeat is possible. It is a spiritual quality compounded of audacity, devotion to duty, skill at arms and confidence in leadership.

11. At the root of all sound morale lies training and discipline; training that is imaginative and practical and keeps constantly abreast of new ideas and technical developments. Sound training creates an instinctive skill that provides a bountiful reserve of resource in emergency; discipline that inculcates a high sense of devotion to duty and dispels natural fears.

12. This state of morale ascendancy results from practical achievements, which can be summarised as destroying enemy aircraft in the air and on the ground and forcing the enemy to concentrate on trying to defend himself instead of attacking.

13. Organised air defence, well handled, can take a heavy toll or enemy aircraft and bring about a positive condition for control of air. Air superiority/Air Supremacy however, can only be established through a bomber offensive.

14. If the offensive is stoutly maintained and well directed, the result will be that the enemy will concentrate the cream of his crews on home defence and will progressively turn to the production of defensive fighters instead of offensive aircraft. As the production develops, our own territories and our armies and fleets in the land and sea theatres of war will enjoy an increasing immunity from enemy air action. Finally, the enemy will lose all control of the air over his own country, and by then his early defeat is assured. That is what happened to the Germans in the Second World War.

Conclusion

15. The major doctrinal points which emerge from the history of air operations are as follows :

a. Control of the air is of crucial importance not only to air operations, but also to virtually all types of surface and sub-surface operations.

b. To achieve the required degree of control of the air, a dedicated campaign to suppress the enemy air power is required. However, experience in the Gulf War suggests that, in certain operational situations, stealth technology can produce a sufficiently favourable air situation.

c. Even in a generally hostile air situation. It is usually possible to achieve temporary and / or local air superiority for specific operations.

16. Favourable air situation is a condition which is likely to prevail in the early stages of a major war. It must, however, either develop into a condition of air superiority/air supremacy which is bound to take time, or it will be lost and the enemy will have air superiority, with results certainly detrimental to the loser.

Bibliography

1. AP-3000 – 2nd Edition
2. RAF Air Operations.
3. RAF ISS Precis.

TOPIC-5

AIR POWER COMMAND AND CONTROL

Introduction

1. Effective command and control is fundamental to the efficient execution of air operations.

2. **Definitions**

a. **Command**. Command is defined as the authority vested in an individual of the armed forces for the direction, co-ordination and control of military forces. The NATO nations, recognizes the following types of command :

(1) **Full Command**. Full command is the military authority and responsibility of a superior to issue orders to subordinates. It covers every aspect of military operations and administration and exits only within national Services. The term command, as used internationally, implies a lesser degree of authority than when it is used in a purely national sense. It follows that no NATO commander has full command over the forces that are assigned to him. This is because nations, in assigning forces to NATO, assign only operational command or operational control.

(2) **Operational Command**. Operational command is the authority granted to a commander to assign missions or tasks to subordinate commanders, to deploy units, to reassign forces, and to retain or delegate operational and/or tactical control as may be deemed necessary. It does not, of itself, include responsibility for administration or logistics.

(3) **Tactical Command.** Tactical Command is the authority delegated to a commander to assign tasks to forces under his command for the accomplishment of the mission assigned by higher authority.

b. **Control**. Control is defined as the authority exercised by a commander over part of the activities of subordinate organizations, or other organizations not normally under his command, which encompasses the responsibility for implementing orders or directives. The NATO nations, recognizes the following types of control :

(1) **Operational Control**. Operational Control is the authority delegated to a commander to direct forces assigned so that the commander may accomplish specific missions or tasks which are usually limited by function, time or location, to deploy units concerned, and to retain or assign tactical control of those units. It does not include authority to assign separate

employment of components of the units concerned. Neither does it, of itself, include administrative or logistic control.

(2) **Tactical Control**. Tactical control is concerned with the detailed and, usually, local direction and control of movements or manoeuvres necessary to accomplish missions or tasks assigned.

c. **Concept of Operations**. Concept of operations is defined within NATO as 'A clear and concise statement of the line of action chosen by a commander in order to accomplish his mission.'

d. **Operations Plan**. NATO defines the term 'operations plan' as ' A plan for a single operation or series of connected operations to be carried out simultaneously or in succession'.

Key Principle

3. **Introduction.** Experience has shown that unified action is essential for the effective use of air power. As Marshal of the Royal Air Force The Lord Tedder pointed out, "The old fable of the bundle of faggots compared with the individual stick is abundantly true of air power. Its strength lies in unity ....." . However, the inherent speed, reach and flexibility of air power allow it to be employed in diverse and multiple tasks, and this can lead to fragmentation of forces and thus dissipation of effort. Moreover, there will rarely be sufficient air resources to meet all demands, and tasking priorities will invariably have to be set. To achieve unified air action, and to ensure that air power capabilities are used as the overall operational situation demands, certain key principles must be applied :

a. Centralize command and control.

b. Exercise command and control from the highest practicable level.

c. Decentralize execution.

4. **Centralize Command and Control.** Centralized command and control promotes and integrated effort and enables forces to be employed to meet the recognized overall priorities. It also allows air action to be refused quickly to exploit fleeting opportunities, be responsive to the changing demands of the operational situation and be concentrated at the critical place and time to achieve decisive results. Centralized command and control helps to avoid air power being :

a. Divided into fixed 'penny - packets' which would inhibit flexibility and hinder speedy concentration of force.

b. Employed in un-coordinated actions or for impractical objectives.

5. **Exercise Command and Control at the Highest Practical Level.** Unity of air effort is best achieved when authority for command and control is exercised from the highest practicable level under a designated air commander.

6. **Decentralize Execution.** No single commander can direct personally all of the detailed actions of a large number of air units or individuals. Therefore, decentralised execution is essential, and it is accomplished by delegating appropriate authority to execute tasks and missions. Decentralized execution allows subordinate commanders to use their judgement and initiative within the overall pattern of employment laid down by their superiors. It becomes especial important when command and control systems are lost through enemy action.

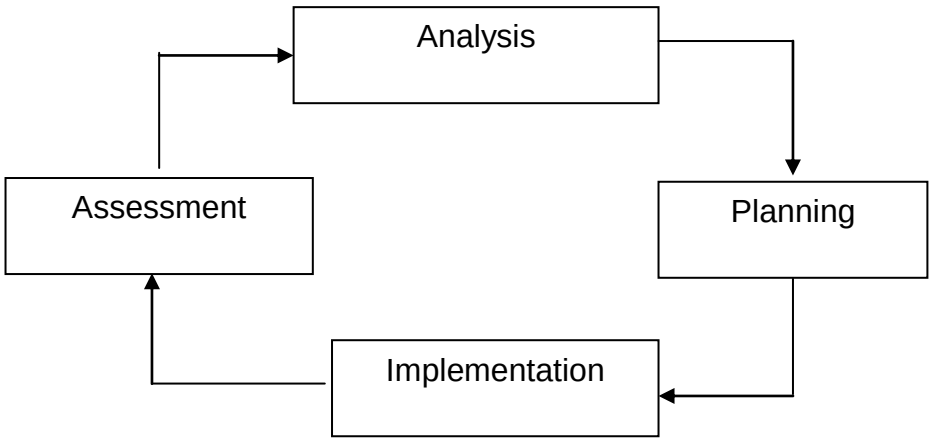
Command and Control Organization

7. **General.** Effective implementation of the key command and a control principles depends heavily on organizational arrangements. These consist of two basic elements :

a. A command and control process.

b. An organization structure.

8. **The C2 Process.** The process of commanding and controlling air forces normally falls into four main phases :



a. **Analysis.** Effective analysis of the situations fundamental to the process of command and control of air forces. It involves continuous effort to collect and evaluate all available information on the location, nature and actions of friendly and hostile forces.

b. **Planning.** The planning phase is based on the situation analysis. It examines the scope for co-operation and co-ordinated action with other commands, seeks to exploit fully forces available, develops and assesses alternative options and as a result - sets out the best course of action.

c. **Implementation.** Once the planning phase is complete, operational directives and orders must be promulgated to all participating units and agencies so that the plan can be implemented.

d. **Assessment .** Throughout its implementation, the progress of the operation must be monitored and the results assessed. The effectiveness of friendly force actions should be gauged, deficiencies corrected and the plan modified accordingly.

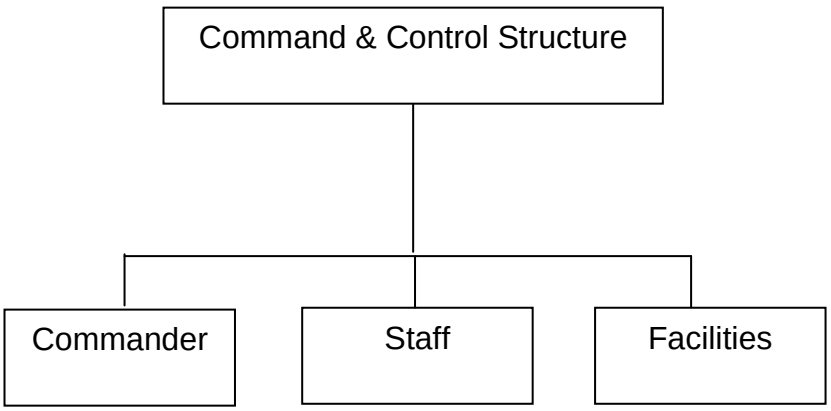
9. This decision/action cycle is sometimes termed the 'observation - orientation - decision -action loop 'which is also referred to as the' OODA loop' or 'Boyd Cycle.' The importance of this cycle in battle management cannot be over-emphasised. To obtain the initiative the commander must complete his control cycle (ie produce his Air Task Order) more quickly than his enemy, otherwise his plans will be overtaken by enemy action and he will be restricted to reactive decisions.

10. **Structure.** The successful execution of the planning process depends on establishing a command and control organization composed of a commander, his staff and facilities.

a. **Commander.** At the highest level of a military force there should be only one overall commander. he alone must be responsible to higher authority for all operational matters. His responsibilities should be defined in terms of duties and areas of responsibility.

b. **Staff.** Each commander should be supported by a staff. The structure of this staff should reflect the composition of the resources under his command.

c. **Facilities.** Commanders and their staffs must have the necessary facilities to execute their command and control functions. These include operations centers and an appropriate range of communications.



11. **Levels of Assignment.** The assignment of air assets is carried out at four levels :

a. **Allotment.** Allotment is the temporary assignment of air forces between subordinate commands. The authority to allot assets is vested in the commander having operational command. The process of allotment is used to provide a balance of forces needed to achieve the objectives stipulated by that commander.

b. **Appointment.** Apportionment is the determination and assignment of the total expected effort by percentage and / or priority that should be devoted to the various air operations and / or geographic areas for a given period of time.

c. **Allocation.** Allocation is the translation of the apportionment into total numbers of sorties by aircraft type available for each operation or task. Allocation explicitly takes into account the practicalities of geography and aircraft capabilities. Apportionment should have taken these into account implicitly; if it has not, then feedback will be required.

d. **Tasking.** Tasking is the process of translating the allocation into orders, and passing those orders to the units involved. Each order should normally contain sufficient detailed instructions to enable the executing agency to accomplish the mission successfully.

12. **The Allotment/Apportionment/Allocation Process.** The disposition of the total air resources to execute air operations should be made by the commander in operational command. It should be made in accordance with priorities established between specific tasks and is normally abased on the allotment (if necessary) and apportionment. Factors which have to be taken into consideration during this process include :

a. The objective to be achieved.

b. The nature and intensity of the conflict, the strategy being employed, and in particular the threat, the probable types of targets, the likely response times required and the force generation requirements.

c. The operational capabilities, limitations and security of all weapons systems, the terrain and the weather conditions.

d. The availability of logistic support.

e. The political restraints in effect.

13. **Authority and Responsibility of Assisted and Assessing Commanders.** The commander of the assisted force will indicate in detail to the assisting commander the support missions he wishes to have fulfilled. He will provide the information needed for complete coordination of the supporting action with the action of his own force. The commander of the assisting force will ascertain the requirements of the assisted force and take such actions to fulfil those that are within his capabilities. In the case of supporting naval forces, these control does not include authority to deploy or redeploy assisting air assets, nor does it include authority to deploy or relocate ships of the fleet.

14. **Combined/Joint Operations.** When air operations act in support of land or sea objectives, or when land or naval forces act in support of air objectives, the supporting commander and the supported commanders (s) and their staffs must work as a team throughout the period from the creation of join/combined surface/air plans to their final execution. A combined or joint headquarters should be established with separate command centres under the control of that headquarters. When these alternatives are not possible, it is essential that adequate communications and coordinating procedures are established between them.

15. **Basic Composition.** The basic composition of air control organizations are as follows :

a. **Air Agencies.** Planning and direction of air operations should originate or be supervised from a primary agency such as an Air Command Operations Centre. Staff composition of the agencies should reflect the functions and nationalities of the elements they control, to ensure that the air commander appreciates the tactics, techniques, capabilities, needs and limitations of those elements.

b. **Land-base Air Control Orgnaizations.** Within a land-based air control organization the agencies and components are related to the level of the control authority and/or the air activity involved. Linked agencies and components should be established at appropriate levels with the supported land/maritime force and be able to communicate with the primary air agency.

c. **Shipborne Air Control Organizations.** Shipborne air control organizations can be compared to land-based air control organizations in their essential characteristics, capabilities and service. Dissimilarities are primarily the ones of terminology and organization. Shipborne air control organizations are capable of controlling and coordinating all air operations within an assigned area or responsibility.

d. **Airborne Air Control Organizations.** Airborne air control assets are intended to complement and supplement existing land-based and shipborne organizations. Although airborne systems may be able to perform all air surveillance

and control operations, their limited availability and restricted time-on-task may curtail their capability to conduct autonomous operations.

16. **Airspace Control.** Airspace control is a combination of airspace organization and planning procedures. The resulting control structure and coordination functions to minimize risks and allow for efficient and flexible use of airspace by all the elements involved in joint air, land and sea operations.

17. **Methods for Airspace Control.** There are two basic methods of exercising airspace control :

a. **Positive Control.** Positive airspace control employs positive identification, tracking, and direction of aircraft within an airspace and is conducted with electronic means by an agency having the authority and responsibility therein. Positive airspace control relies upon real-time data using facilities equipped with capabilities such as primary radar, secondary radar and communications.

b. **Procedural Control**. Procedural airspace control is a method of airspace control which relies on a combination of previously agreed and promulgated orders and procedures. Procedural airspace control includes techniques such as the segmenting of airspace by volume and time and/or the use of weapon control but is less vulnerable to interference by electronic and physical attack.

18. **Selection of Method.** A combination of the two methods may be employed; the degree to which each method is used should be determined by considering the following factors :

a. The nature and magnitude of the enemy threat and operations.

b. The availability, capability and vulnerability of friendly management facilities, including airborne and surface-to-air defences as well as peacetime air traffic control and terminal control facilities.

c. The number, flight profiles and speeds of friendly aircraft.

d. The type of terrain and likely weather conditions in the combat zone.

e. The number, deployment and characteristics of friendly surface weapons systems.

Conclusion

19. Few operations and campaigns can be expected to proceed as planned. Success will depend on effective command and control being exercised at every stage. Effective command and control depends on centralizing command and control, exercising command and control from the highest practicable level and decentralizing execution. These principles are implemented by means of a planning process carried out in four phases; analyze the situation, plan, direct, and control.

Bibliography

1. AP-3000-2nd Edition.
2. RAF Air Operations.

TOPIC-6

AIR STRATEGY

1. **Air Strategy - Definition**. Air strategy is defined as the overall employment plan for air forces in a war.

2. **Air Strategy - Structure**. Air power, thanks to unique characteristics, has very wide potential military strategic applications. These fall essentially into three areas:

   a. **Counter-Air Action**. Counter-air action is defined as the use of air power to deter, contain or defeat the enemy air forces. The strategic aim of counter-air action is to achieve the desired degree of control of the air.

   b. **Anti-Surface-Force Action**. Anti-surface-force action involves the use of air power, in cooperation with friendly surface and sub-surface forces to deter, contain or defeat the enemy's army and/or navy. The strategic aim of anti-surface-force action is to deprive an enemy of the military power needed to occupy territory or exploit sea space.

   c. **Strategic Air Offensive**. Strategic air offensive action encompasses the use of air power in precision operations to destroy or damage an enemy's war making capacity. The strategic aim of strategic air offensive action is to undermine the enemy's ability and will to continue with his aggression.

3. **Air Strategic Priorities**. Each conflict will generate its own air strategic priorities. However, when facing an enemy who is capable of exercising air power, priority in air strategy must be given to achieving the required level of control of the air. Experience has shown that unless this is achieved, all other types of air, surface and sub- surface operations become increasingly difficult, and often impossible, to sustain.

THE AIR CAMPAIGNS

4. To prosecute each of the military-strategic applications of air power, specific types of operational-level and tactical-level capabilities are required. These capabilities can only be fully effective if they are brought together in cohesive, dedicated air campaigns.

5. **Definition**. The term air campaign is defined as a coordinated series of air operations designed to achieve a specific air strategic objective.

6. **Air Campaign Structure**. The three air campaigns (examined in Chapters 5, 6 and 7 respectively and shown graphically in Figure 3.3 below) are complementary, rather than alternative, strategic instruments. In most major conflicts they have been prosecuted concurrently. However, the proportion of total air effort that different nations have devoted to each air campaign has varied considerably, reflecting their differing strategic priorities. This has been true not only for different conflicts, but also for different phases of the same conflict. The following two examples help to illustrate this:

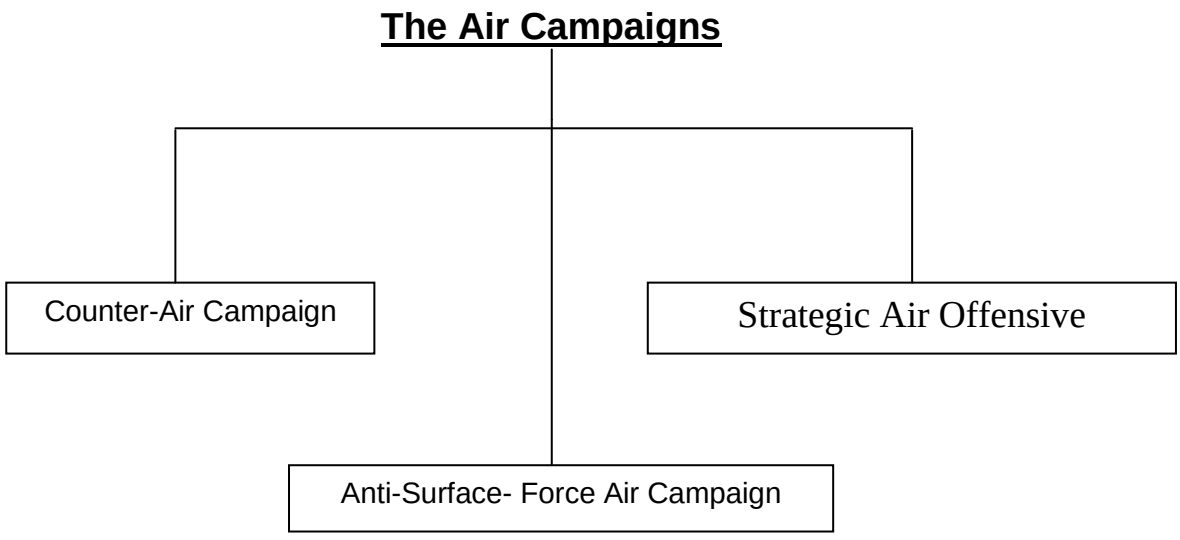


Figure 3.3: The Air Campaigns

AIR OPERATIONS

7. **Categories of Air Operations**. Air operations fall into two broad categories: combat air operations and combat-support air operations.

8. **Combat Air Operations**. A combat air operation is defined as the integrated employment of combat air power to achieve a specific campaign objective. The combat air operations required to prosecute the counter-air, anti-surface-force and strategic air offensive campaigns are examined in Chapters 5, 6 and 7 respectively.

9. **Combat-Support Air Operations**. Combat-support air operations are defined as non-combat air operations designed to enhance the combat capabilities of air, surface and sub-surface forces. They are examined in Chapter 8.

10. **Ground Combat-Support Activities**. Effective prosecution of all types of air operations depends on a range of supporting ground functions. These are termed ground combat-support activities. Ground combat-support activities are defined as the major non-flying" activities needed to support air operations, and they are examined in Chapter 9. The different categories of air operation are shown graphically in Figure 3.4 below.

Categories of Air Operations

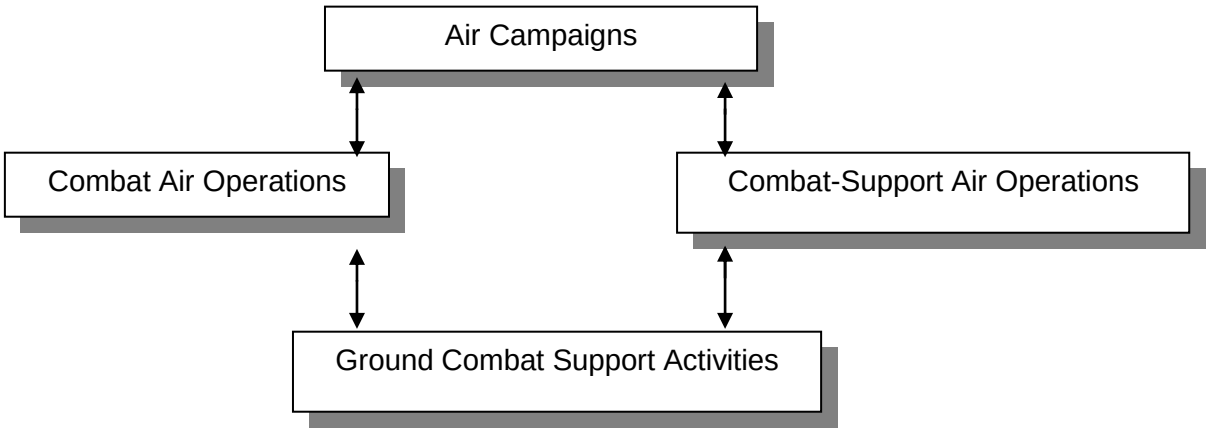


Figure 3.4 : Categories of Air Operations

AIR ROLES

11. The successful prosecution of combat and combat support operations requires the employment of air power in a number of specific, inter-related roles. An air power role is defined as a tactical-level function of air power. Air roles are prosecuted through tasks, missions and sorties. Tasks are undertaken to achieve a specifically defined objective. A mission is defined as one or more aircraft ordered to accomplish one particular task. A sortie is defined as one flight by one aircraft. The overall air power operational hierarchy is shown graphically in Figure 3.5 below.

The Air Power Operational Hierarchy

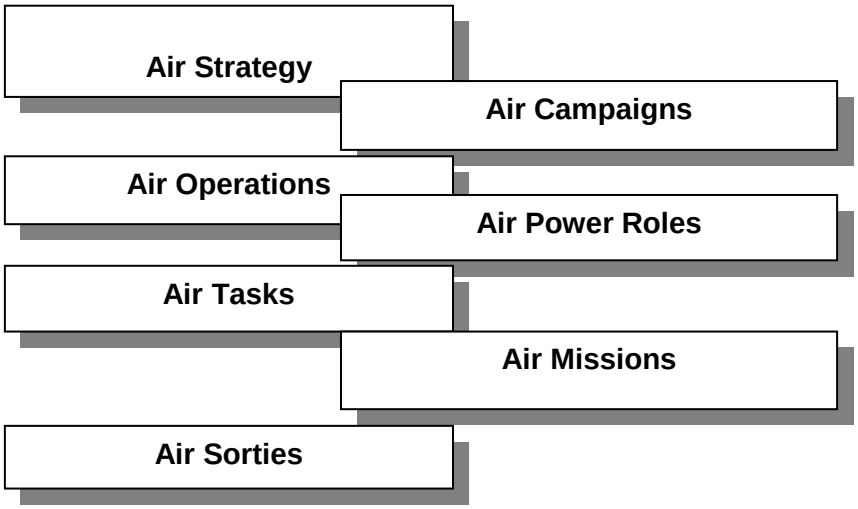


Figure 3.5 : The Air Power Operational Hierarchy

TOPIC-7

STRATEGIC EFFECT OF AIR POWER

Aim of the Strategic Air Offensive

1. The strategic air offensive involves the use of air power to strike directly and with precision at the enemy's political, industrial and economic power. Its strategic aim is to undermine the enemy's capability and determination to continue fighting.

The History of Strategic Air Offensive in War

First World War

2. Strategic air offensive operations were first carried out in January 1915 when German Zeppel in airships attacked town in Norfolk. A total of 20 Zeppel in raids took place that year, inflicting some 1900 casualties of whom 1700 were civilians. The Zeppelins proved to be relatively vulnerable to air defences and were replaced by the Gotha bombers, which first made appearance in May 1917. The Gotha force never numbered more than 40 aircraft, but it proved to be a strategic weapon whose effects were out of all proportion to its size. The Gotha attacks on London inflicted hardly more damage and casualties than the Zeppelins. However, they disrupted war production, caused widespread fear and often panic amongst the civilian population and forced the diversion of a substantial force of fighters from France to defend London. They also led directly to the creation of the Smuts Committee, which was tasked to examine the home air defence arrangements, the air organization generally, and the direction of aerial operations. In his key Second Report, Smuts concluded :

'the day may not be far off when aerial operations with their devastation of enemy lands and the destruction of populous centres on a vast scale may become the principal operations of war to which the older forms of military and naval operations are secondary and subordinate.'

The Inter-War Period

3. During the inter-war period, strategic air offensive action was increasingly seen as a potentially decisive weapon and, as the dominant factor in air power, it was considered to be the inevitable aerial strategy. The creation of strong strategic bomber forces was therefore advocated and the destruction by bombers of Shanghai in the Sino-Japense War and of Guernicca in the Spanish Civil War seemed to validate this view. During the 1930s Britain came to see herself to be uniquely vulnerable to a knock-out blow from the air, and

British defence experts came to see the strategic air counter-offensive as her soundest defence against that threat.

Second World War

4. The Second World War witnessed strategic air offensive action on a grand scale but with mixed results. The bombing of Warsaw and Rotterdam appeared to show the effectiveness of strategic air attacks, but the Luftwaffe was unsuccessful in the Battle of Britain and unable to inflict decisive damage in the subsequent 'Blitz'. German strategic attacks using V1 CMs and V2 BMs in 1944 and 1945 were no more decisive. The Allied Strategic Bombing Offensive against Germany inflicted enormous damage. It destroyed the Luftwaffe as an effective force; it made possible the Allied D-Day invasion; it brought the full impact of Germany's aggression. But it did not, on its own, cause Germany to collapse. The pre-war strategic bombing doctrines proved to be based too much on theory and not enough on training and trails. Targeting priorities proved difficult to formulate, and differences in strategy were never completely resolved. Strategic air offensive operations did not always succeed, and it came to be realised that, if they were to be sustained without unacceptable loss, control of the air had to be established. Experience in Europe also suggested that strategic air attacks could not be fully effective unless they were properly integrated with the other air and surface campaigns. However, the effectiveness of the US nuclear bombing attacks on the Japanese cities of Hiroshima and Nagasaki seemed to indicate that the strategic air offensive could, after all, be used independently of other air and surface operations and would become the principal weapon in future wars.

After the Second World War

5. The post-Second World War decades proved that nuclear weapons could deter major attacks, but, because of political factors, could not be used in limited conflicts. Nuclear weapons progressively came to be seen as political instruments : to be used for signaling purposes or as a last resort. Moreover, the appearance of land-launched and submarine-launched BMs, and subsequently CMs, removed the monopoly of the manned aircraft as a nuclear delivery vehicle. The 1970s and 1980s witnessed a number of successful strategic air attacks using conventional seasons. These included the US Linebakcer 2 operation against Hanoi and Haiphong in 1973, the Israeli attacks on the Iraqi Osirak nuclear reactor in 1981 and the Palestinian Liberation Organization headquarters in Tunis in 1985, the US Eldorado Canyon operation against Libya in 1986 and the Iraqi attacks on the Iranian oil installations (an economic target) during the Iran-Iraq war.

The Gulf War

6. During the Gulf War of 1991, Coalition strategic air offensive operations achieved major results. The attacks disrupted Iraq's nuclear research and production capabilities and severely damaged its chemical and bio-logical warfare facilities. Half of Iraq's oil-refining capacity was destroyed, the national electricity grid was 'broken', transport feeder routes to Kuwait cut by half and communications were severely disrupted. Baghdad was short of food and without electricity and mains water. The precision of the Coalition air attacks was of a completely different order from that achieved during previous wars; this enabled Coalition air forces to attack successfully a large number of strategic centres of gravity within a single wave, thus achieving strategic paralysis of the enemy. Despite some tragic instances, Iraqi civilian casualties and collateral damage sustained were very low indeed in relation to the wide-ranging damage, inflicted upon Iraq's strategic and military installations. The Gulf War also witnessed the usefulness of stealth technology in strategic air offensive operations. Stealthy F-117 As flew hundreds of sorties without loss. Though comprising only 25% of the Coalition force, the F-117s struck 31% of the strategic targets and 80% of the targets in Baghdad.

7. **Main Lessons.** The main lessons which emerge from the history of strategic air offensive operations are as follows :

a. Strategic air offensive operations can be carried out largely independently of other air and surface operations, but they tend to be more effective when fully integrated into theatre campaigns.

b. Control of the air is needed if strategic air offensive operations are to be sustained.

c Unfocused attacks are unlikely to yield decisive results; the target sets must be carefully chosen and linked directly to the grand-strategic objective of the war.

d. Strategic air offensive operations are likely to be shaped by political constraints and aims far more than are counter-air or anti-surface force operations.

Elements Of The Strategic Air Offensive Campaign

8. The classification of an offensive air operation as 'strategic' is determined not as a function of range, platform type or even weaponry; it is determined by the target (s) and objectives. Strategic air offensive action is directed at undermining the enemy's ability and

will to continue his aggression, by attacking industrial, political and economic target sets, rather than direct action against the enemy's forces. The strategic air offensive campaign can be divided into 2 basic types of operations : nuclear and conventional.

Nuclear Strategic Air Offensive Operations

9. **General.** All nuclear air operations must, in essence, be considered as strategic operations. NATO considers nuclear weapons to be weapons of last resort and not war-fighting weapons in the accepted sense of the term. Nuclear weapons are intended to be used to convey political signals and to act as the ultimate national or multinational defence sanction and safeguard. Consequently, the authority to decide when or where nuclear weapons should be used rests not with military commanders but at the highest political level.

10. **Deterrence.** The enormous power of nuclear weapons, the lack of experience in their use and the inherent dangers of escalation confer a major deterrent capability on all types of nuclear forces. Nuclear operations can be carried out by land-based CMs and BMs, sea-launched CMs, or BMs or manned aircraft carrying free-fall or stand-off weapons. These systems are essentially complementary instruments of deterrence.

11. **Missile Systems**. Missile systems possess the following attributes :

a. **Readiness**. Modern land-based and submarine-based BM and CM systems can be held at very high readiness states for extended periods. Thus, they provide an insurance against surprise attack and can be used for rapid retaliation.

b. **Survivability**. Land-based, and particularly submarine-based, BM (and to a lesser extent CM) systems enjoy a high level of pre-launch survivability. They are also difficult to intercept while in flight, and thus have a high probability of arrival at their targets.

12. **Manned Aircraft**. Manned aircraft have the following attributes :

a. **Capability.** If used in conjunction with pure missile systems, manned aircraft increases the enemy defensive problems. Their attack profiles differ from those of missiles, and they pose different problems for the defence. Moreover, they can react flexibly to the defences, and are able to cope more effectively with technological surprises than missiles can. Thus, manned aircraft enhance the credibility of the nuclear deterrent.

b. **Stability.** Aircraft takes a relatively long time to reach their targets, and this allows time for leaders on both sides to resolve their differences. Because of the time they take to reach their targets, manned aircraft are not a credible first-strike weapon. Thus, manned aircraft enhance stability.

c. **Flexibility.** Manned aircraft can be generated, dispersed, launched, recalled and re-launched, all under positive control. Moreover, they are an effective instrument for selective release. Thus, they provide national leaders with a highly flexible deterrent instrument, well suited to limited applications.

d. **Visibility.** Like missiles in silos or on submarines, aircraft in hardened aircraft shelters can be generated covertly. But the readiness states of manned air craft can also be increased overtly, thus allowing unmistakable signals to be sent to an adversary. In comparison, surface-launched missiles and on-station missile cannot be used for this purpose. Moreover, attempts to 'flush', ie rapidly deploy, submarines refitting in ports could take too long to be useful in a rapidly escalating crisis situation.

Conventional Strategic Air Offensive Operations

13. Conventional strategic air offensive operations can be used for political signalling purposes, to punish small-scale aggressions or as an integrated element of a theatre campaign.

14. **Political Signalling**. The threat, or the use of, conventional strategic air offensive action provides governments with a flexible and responsive instrument of crisis management. It can be used, as a means of signalling political intentions, either independently or in conjunction with other force elements. For example strategic air action could be linked with the deployment or mobilization of additional forces. Conventional strategic air offensive action can also be used to deter impending aggression, to signal resolve, to threaten escalation, to demonstrate capabilities or to eliminate specific enemy capabilities. Moreover, threatened or actual attacks on economic, industrial and political targets – because they would mark an escalation of a conflict – indicate the victim's resolve to fight back with everything at his disposal. An aggressor must always take into account that, if the victim has a strategic air offensive capability, it can retaliate immediately and strike at any part of his national infrastructure.

15. **Punishment Operations.** Strategic air offensive action is well suited as an instrument for punishing small-scale aggressions, eg a state-sponsored terrorist attack

where the deployment of troops on the ground would be either impracticable, or too costly, or disproportionate to the original aggression and thus contrary to international law . Such operations require precision attacks, to avoid collateral damage.

16. **Campaign Element**. Strategic air offensive operations can also form a valuable element of a joint campaign. The inter – war and Second World War concepts – that conventional strategic air attacks could, in isolation, force an adversary to submit – have given way to the concept of integrating strategic air action with other air, surface and sub-surface operations. Strategic air action can be used to remove a particular type of enemy capability which threatens the success of friendly operations, eg the destruction of CW facilities. Alternatively, it could be used synergistically with sea, land or other air operations. For example, strategic air attacks and air interdiction action are likely to be far more effective if they are directed against complementary rather than unconnected target sets.

17. **Possible Target Sets**. The accuracy and destructive power of modern weapons allow significant results to be achieved with relatively small numbers of strategic air offensive sorties. Target sets must be selected carefully; one of the clearest lessons from the Vietnam War was that unfocused destruction was unable to achieve precise strategic goals. The Vietnam campaign also demonstrated that strategic air action against an agricultural, undeveloped nation is likely to be far less effective than strategic air action against a developed industrial society. Target sets for conventional strategic air attack could include the following :

a. **Command and Control Structures**. The true military object in any war is to thwart the enemy's strategy; thus those who formulate and control the enemy's strategy are natural targets for strategic air attack. Because they are so critical, national Command and Control structures can be very difficult to attack effectively. Thus, they will not always present practicable targets. However, if they are accessible, attacks mounted on them can be decisive. For example, in the Third Afghan War of 1919, and after 4 months of heavy and costly fighting by ground forces, a single RAF aircraft dropped 4 bombs on the Afghan Royal Palace in Kabul. This attack shook the Amir's nerves so much that he immediately sued for peace. Similarly, Operation ELDORADO CANYON in 1986 had a salutary effect on the Libyan leadership. In both cases, it was the psychological rather than the physical impact that proved to be the key.

b. **Key Industries.** The term 'key industries' includes not only those which are directly concerned with supporting the enemy's armed forces, ie munitions

industries, but also those which are indispensable to his overall war effort, eg the fuel supply and power generation industries. Attacking such industries would probably not have an immediate impact at the front and therefore is unlikely to prove useful in short conflicts. However, destroying or damaging a nation's key industries could have a decisive impact on its ability to prosecute a sustained conflict.

c. **Transportation Grids.** The ability to move goods, services and information from one point to another is essential to the effective functioning of any state. The more difficult this movement becomes for an enemy state, the less possible it becomes for that state to continue with its aggression. Thus, a nation's transportation grid presents a potentially important target for strategic air attack. However, modern transportation grids tend to be robust and multiplex. Therefore, a major effort might have to be mounted to achieve any worthwhile effect.

d. **Enemy Population.** International legal and moral implications aside, it is difficult to attack a population directly. There are too many targets and, especially in police states, the population may well be willing to suffer grievously before it will turn on its own government. Thus, strategic air attacks on populations are unlikely to be decisive and could be counter-productive. Even though the Iran/Iraq war saw a re-emergence of 'city-busting' attacks directed principally at the morale of the civilian populations, doubts remain about both the military and the political effectiveness of such operations.

18. **Intelligence**. To be effective, strategic air attacks need accurate pre-attack and post-attack intelligence. Clear and precise intelligence, preferably gathered in peacetime, is essential for logical for logical target selection. As a corollary, accurate post-attack reconnaissance is a prerequisite, not only in deciding whether to mount further operations, but also in assessing the likely impact of the results achieved so far.

19. **Weapon System Options.** Conventional strategic air attacks can be carried out either by CM or BM systems alone or by manned aircraft. Missile systems offer sustained levels of high readiness and a strong probability of reaching the target, attributes which could be of key importance in mounting selective attacks. In mounting sustained conventional strategic air offensive action operations, manned aircraft possess the following decisive advantages :

a. **Accuracy.** Even the latest-generation SSMs lack the accuracy needed for attacking fixed-point targets such as bridges. Moreover, few missiles are capable of being used against moving targets, and those that are rely on real-time, third-party

targeting information. Manned aircraft using, for example , laser-guided weapons currently offer greater accuracy than do missiles, and they can also be used autonomously against moving targets.

b. **Flexibility**. SSMs are inherently inflexible. Their warhead and guidance systems are normally optimized to a particular target type and this limits the scope of their employment. The manned aircraft is inherently flexible and can be switched between strategic air offensive tasks and a wide range of other tasks as the operational situation demands.

c. **Aircraft are Reusable**. Missiles are one-shot weapons, whereas aircraft can be reused.

d. **Weight of Ordnance**. Weight of ordnance remains a key factor in destroying strongly built targets. Thanks to aerodynamic lift, the manned aircraft can deliver a far higher warload onto a target than can a BM. Similarly, the need to limit the size of CMs, for survivability, imposes restrictions on the weight of their warheads.

Bibliography

1. RAF ISS Phase-5 Notes Course No 43.

2. AP-3000 2nd edition.

TOPIC-8

COUNTER AIR OPERATION

Introduction

1. The strategic aim of counter-air campaign is to achieve and maintain the required degree of control of the air. As Winston Churchill stated, only security upon which sound military principles will rely is that you should be master of your own air'. Achieving friendly control of the air is both an end in itself and a means to an end. It prevents the enemy from using his air power effectively against friendly forces, rear areas and home lands, while allowing us to use our air power against him. Control of the air is achieved by deterring, containing or defeating the enemy air forces. Counter-air campaign include both offensive and defensive operations.

The Primary Campaign

2. In most major conflicts all 3 of the air campaigns, ie counter-air, anti-surface-force and strategic offensive, have had to be prosecuted simultaneously. But experience has shown that, when facing an enemy with powerful air power, priority has to be given to achieving control of the air. The more formidable the opposing air power, the more important this task becomes. Thus, invariably, the counter-air campaign will be the primary air campaign, and the other air campaigns will be of subordinate importance. Emergency situations may occur when assets needed to achieve or maintain control of the air have to be diverted to other tasks. But such diversions must be only temporary, and they should never be used as the basis for planning.

The Offensive/Defensive Balance

3. **Offensive Air Action**. Carrying the fight to the enemy in the counter-air campaign confers the following inherent advantages :

a. Offensive action allows the attacker to seize the initiative, to exploit to the full the capabilities of air power and to concentrate strength against weakness.

b. It carries the war to the enemy, reduces the number of offensive sorties that he can mount and compels him to devote a proportion of his total air power assets to purely defensive duties.

c. It can better exploit the 3-dimensional space of the skies, the vagaries of light and weather and the masking effect of terrain.

d. It denies the enemy a sanctuary (a safe home).

4. **Defensive Air Action**. Some defensive air action will invariably be necessary to protect friendly air and surface forces. Moreover, defensive action may be unavoidable for several reasons. There may be overriding political constraint on offensive action, or an enemy's technological superiority in defensive operations may make offensive operations too costly. The enemy's bases and supporting facilities may be out of range, in which case defensive operations may be the only option. Moreover, defensive operations may have to

be undertaken in order to weaken an enemy's air forces as a prelude to offensive operations. Defensive air action also possesses certain inherent advantages :

a. A defensive battle is normally fought over the defender's territory. This allows the defender to draw upon his supporting infrastructure and bring a greater number and diversity of weapon systems into the battle.

b. Defending aircrew who abandon their aircraft over friendly territory can frequently be fed back into the battle, whereas aircrew who survive an abandonment over hostile territory are generally taken prisoner.

c. The defender's airfields are normally far closer to the battle area than those of the attacker. Thus, the defender is able to achieve a higher sortie rate and hence make more intensive use of the assets at his disposal.

d. Historically, defensive operations have proved less difficult to sustain than offensive operations.

5. **Variable Factors**. Accessing correctly where the balance lies between offensive and defensive is crucial to operational success. The advantages offered by offensive air action have traditionally been seen as decisive. However, a number of variables such as defensive depth, force-to-space ratio and technology can affect the extent to which offensive action is practicable.

Offensive Counter Air Operations

6. **Roles.**. OCA operations are mounted to destroy, disrupt or limit enemy air power as close to its source as possible. To prosecute OCA operations, the following spectrum of offensive roles may be employed:

a. Suppression of enemy air defences (SEAD).

b. Fighter sweep.

c. Escort.

d. Airfield attack.

7. **Suppression of Enemy Air Defence (SEAD)**. Suppression of enemy air defences is that activity which destroys, neutralizes or temporarily degrades enemy air defence systems in a specific area by physical attack and/or electronic warfare to enable air operations to be conducted successfully. Experience has shown that, when faced with an enemy who has a strong surface-to-air defence system, defence suppression can greatly reduce loss rates and help to sustain offensive air action. The extremely low Allied air loss rates sustained during the first two weeks of the Gulf War were due to large part to very effective defence suppression. Target sets include radars and other sensors, surface-to-air missiles and anti-aircraft artillery batteries. Suppression of enemy air defences is a role in which specialized weapons and tactics tend to play a particularly important part. All surface-to-air systems have certain inherent potential weaknesses : they are finite and

normally have flanks, they are orientated towards the expected approach routes of the enemy, they are rarely equally strong throughout their width and depth and they are either fixed or relatively immobile. Others–deployed in zones or areas to provide all round defence–have fewer weaknesses. Suppression of enemy air defence tactics are designed to exploit any potential weaknesses to the full.

8. **Fighter Sweep**. Fighter sweep involves offensive action by fighter aircraft to seek out and destroy enemy aircraft or targets of opportunity in an allocated area of operations. Fighter sweep is most effective when linked to air-to-surface offensive action. The air-to-surface attack force draws the enemy into the air where he can be destroyed, and the fighter sweep clears the way for the air-to-surface attack force's penetration to its targets. The RAF 'Rhubarb' fighter sweeps over France in 1941 were costly failures, but fighter sweep proved particularly effective during the later stages of the Allied strategic bombing offensive against Germany in the Second World War and in the US air attacks on North Vietnam. Today fighter sweep is broken down into two groups :

a. **Area Sweep.** An area sweep is used to establish air superiority in a given area. It may be used in isolation from other air assets or it may be used indirectly to support an attack force by decoying or destroying enemy aircraft that pose direct threat to the attack force.

b. **Route Sweep.** A route sweep is used indirect support of an attack force, clearly the planned route of enemy aircraft that may pose a threat to the attack force.

9. **Escort**. The escort role involves the assignment of aircraft to protect other aircraft during a mission. Escort fighters present a counter-threat to the enemy's air defence fighters, and can be used in both offensive and defensive operations. For offensive operations the enemy must break through the escort before he can engage the air-to-surface attack force. There are two sub-groups of fighter escort :

a. **Detached Escort.** The detached escort is tasked with providing a forward screen of fighters to protect the attack force from enemy aircraft. It is positioned ahead of the attack force.

b. **Close Escort.** Fighters in the close escort role are integrated within or positioned around the attack force but within visual range of the escorted aircraft. In practice, a combination of escort and fighter sweep has been found to be an effective means of destroying an enemy's air-to'-air defensive capability. Close escort of high-speed, penetrating formations has proved to be problematical, and detached escort is generally favoured.

10. **Airfield Attack.** Airfields are static and usually contain densely-packed, high-value targets. Thus, they provide attractive targets for OCA action. Harassing attacks can reduce the enemy's sortie rate through disruption and diversion, while sustained major attacks can bring his operations to a halt. In the 1967 Six Day Arab Israel War, airfield attack was used by the Israeli Air Force to devastating effect to destroy the Arab air forces. However, airfield attacks may not always be profitable. On 01 January 1945, in

Operation HERMAN, the Luftwaffe lost more aircraft attacking allied air fields than they managed to destroy. Attacks against hardened airfields protected by effective point defences could be equally lacking in cost-effectiveness. In choosing to attack potential airfield target sets which include operating surfaces, weapon and fuel dumps, aircraft and personnel, the following considerations must be taken into account :

a. **Operating Surfaces**. Attacks on operating surfaces can close airfields, but because operating surfaces can be repaired, the effects of such attacks can be only temporary. Closure of operating surfaces, per se, cannot reduce the enemy's overall sortie generation potential; it can only delay the enemy air power's entry into the battle. This may in itself be a worthwhile objective, particularly if it is important to win time for friendly forces. But it must be borne in mind that the losses that may be incurred in an extended effort to keep operating surfaces closed may render the attacker too weak to counter the opposing air power when operating surfaces are eventually repaired.

b. **Other Airfield Targets**. The disruption of operating surfaces ‘fixes’ enemy air power to its airfields, but, for full effectiveness, aircraft, personnel and any support infrastructure must also be attacked. Replacing advanced aircraft and weapons or highly trained personnel is far more difficult than repairing operating surfaces.

11. **Participation of Surface Forces**. The major part of OCA operations will invariably fall to air forces, but the surface forces can also make an important contribution. The SAS raid on the Pebble Island airfield in the 1982 Falklands Conflict was an example of surface forces acting in the airfield attack role. Similarly, the Israeli use of artillery to silence Syrian surface-to-air missile batteries in the 1982 Bekaa Valley operation demonstrated the potential for surface forces to act in the ‘suppression of enemy air defences’ role. Thus, to ensure maximum effectiveness in OCA operations, the relevant capabilities of the surface both land and seas forces should always be integrated as closely as possible with those of the air forces.

Defensive Counter-Air Operations

12. **Definition**. Defensive counter-air (or Air Defence) operations comprise all measures designed to nullify or reduce the effectiveness of hostile air action.

13. **Aim.** Establishing the correct aim is fundamental to the success of defensive counter-air operations. Essentially, there are two choices :

a. To minimize the damage sustained by friendly forces and facilities.

b. To inflict the maximum attrition on the enemy.

14. **Implications of Aim on Resource Allocation**. To a certain extent these aims are interdependent; the more enemy aircraft that are shot down, the fewer that are available to inflict damage in future raids. The less damage that the one sustain, the more capable one

is of defending if the enemy continues with his attacks. Deciding where the priority lies between these two aims has major implications for operational art and force structuring, and thus for resource allocation.

a. **Operational Art**. If the over-riding priority is to inflict maximum attrition, then enemy aircraft can be intercepted wherever they can be found, before or after they have attacked their targets. In contrast, if minimum damage is the aim, then all the resources need to be devoted to deterring or containing the incoming raids, even if that means leaving vulnerable home bound enemy aircraft.

b. **Force Structuring**. If the prime aim is to minimize damage, then significant resources will need to be allocated to passive defence and resilience measures. However, if the aim is to inflict maximum attrition on the attackers, then passive defence measures will play a less important part, and the need to provide the strongest possible active defence forces will dominate resource allocation.

15. **Priorities**. Deciding where the priority lies between the 'minimum damage' aim and the 'maximum attrition' aim will depend partly on friendly vulnerability and partly on the nature of the threat. For example, if the friendly infrastructure is seen to be particularly fragile or if the enemy is able to attack only intermittently, then a 'minimum damage' approach may well be best. On the other hand, if friendly infrastructure is robust or if one is faced with the threat of a sustained attack, then 'maximum attrition' could well be the better option.

Requirements of an Air Defence System

16. An effective air defence system should fulfil the following requirements :

a. To destroy the maximum possible number of hostile aircraft/missiles so as to inflict serious long-term losses on the enemy's offensive forces as a whole.

b. To provide security to those key areas and key points regarded as irreplaceable and vital by the Government and thereby reduce damage which can be inflicted by enemy offensive air action.

c. To be able to keep itself in being for as long as the situation requires without serious loss of efficiency.

17. To achieve these requirements, the air defence system must satisfy the following conditions :

a. Enemy aircraft must be intercepted and destroyed before they release their warload, ie before the bombers reach the line of bomb-release in relation to a given target. This means that there must be adequate depth in defence, particularly when air to surface missiles are used by the enemy.

b. The system must be as flexible as possible so that force can be switched quickly and smoothly to those points where the enemy threat materialises.

c. The air defence of any area is a unified commitment. The air defence system must not, therefore, be split up under a number of different authorities, but centralised under a single commander to form. One integrated organisation with clear channels of control and responsibility, with powers of instant decision, and with ability to mobilise resources without loss of time.

d. There must be adequate reserves of all resources so as to prevent collapse of the system through attrition before it has fulfilled its task.

Aspects of Air Defence

18. There are two aspects of air defence :

a. **Active Air Defence**. Direct defensive action to destroy or reduce the effectiveness of an enemy air attack.

b. **Passive Air Defence**. All measures, other than Active Air Defence, taken to minimize the effects of hostile air action.

Active Air Defence

19. **Main Components**. An active AD system consists of 3 main components (Shown in figure 2.6.a) :

a. **Detection System.** A detection system is required to provide adequate warning of the approach of aircraft and the means for directing the defence. This system might include AEW/AWACS aircraft to augment static cover and to counter the low-level threat; this latter task is of primary importance.

b. **Weapons System.** A weapons system is needed to intercept and destroy attacking enemy aircraft before they reach the point of weapon release and as far as possible from the area being defended. The system might include integrated employment of fighter aircraft, SAMs and SHORAD weapons, which may be guns and or missiles.

c. **C^3 I System**. A C^3I system is required to link all the AD system components and provide the means to alert and control the integrated AD system. (C^3I is command, control, communication and intelligence).

20. **Centralized Control**. To ensure economical use of forces it is essential to control the activities of the components of an active AD system centrally, although units must be able to act independently if communication is lost. The size of the territory to be defended may necessitate division in to geographical areas; within each area, control must be centralized, and the areas must be linked to a supreme authority responsible for coordinating the operations of the entire organization and disposing the available forces as the situation demands. This authority is known as the Air Defence Commander.

21. **Fighter Aircraft**. Interception from the ground is the normal method of operating defensive fighter aircraft. Aircraft are held at readiness on the ground and are launched to engage the enemy when information is received from the raid reporting system that an

attack is imminent. This method has the advantage that the force dispatched can be suited to the requirements of the particular situation and that aircraft can take off with full operational endurance. The effectiveness of the fighter aircraft to intercept and destroy enemy aircraft before they (enemy) launch their weapons is governed by the following factors :

a. The performance of the enemy aircraft.

b. The performance of the defensive fighters, which ideally should combine a very short scramble time with the ability to remain at the highest state of ground readiness for long periods, and have a large excess of power for acceleration, climb and manoeuvre.

c. The performance of the defensive fighter aircraft weapons system, which includes an AI radar capable of detecting, from long range, attackers flying at low level, and guided weapons and guns for close – range attack.

d. The range and efficiency of the detection system which must be sited as far forward as possible so that interception delays can be kept to a minimum.

e. The distance the enemy has to penetrate before launching his weapons.

f. The siting of the fighter bases, which should, if possible, be deployed on the most likely line of approach and as far forward as is practicable.

g. The time interval between the initial detection of a raid and the take-off of the fighter aircraft.

h. The time interval between the gaining of contact with the enemy and his destruction.

Ground–Based Anti–Aircraft Systems

22. **SAMs**. The methods by which SAMs are integrated into the air defence system are largely governed by the performance of these weapons; for security reasons this subject cannot be discussed in these notes. It is very difficult to operate fighters and SAMs in the same airspace without degrading the performance of both, and the elements are therefore normally allocated to separate and clearly defined zones. The main characteristics of SAMs can be summarized as follows :

a. **Advantages**

(1) SAMs can be maintained at very high states of readiness for long periods.

(2) SAMs have a very quick reaction.

(3) Compared with fighter aircraft, SAMs are inexpensive to buy and to maintain.

b. **Disadvantages**

(1) SAMs are unable to identify their targets visually, although fire-control systems can make use of IFF.

(2) Even the long-range versions of SAMs are point-defence weapons and large numbers are required to provide effective area defence.

(3) ECM can reduce SAMs' effectiveness in the same way as fighter radars can be degraded.

23. **SHORAD Weapons**. SHORAD weapons provide the close in air defence of vital installations such as airfields, early warning radars and command post locations. SHORAD weapons include missile systems such as Rapier, shoulder – launched missiles such as Javelin, anti aircraft artillery such as the Oerlikon gun and even infantry weapons such as general-purpose machine guns. To be fully effective against modern aircraft, SHORAD weapons should have an all-weather capability. Around airfields, special procedures are required to allow the safe passage of friendly aircraft in and out of the defended airspace, which is known as the Battle field Defence Zone (BDZ). The main BDZ characteristics of SHORAD weapons can be summarized as follows :

a. **Advantages**

(1) SHORAD weapons can provide a very dense defence over the area the enemy might target.

(2) SHORAD weapons are usually operated within line-of-sight ranges to the target and, in good weather, operators are able to identify their targets visually.

(3) SHORAD weapons have quick engagement times, usually less than 10 seconds, and have high rates of fire.

Mix of Fighter and Surface-to-Air Defences

24. The preferred force mix between fighters and surface-to-air defences with an AD system, and the nature of their operational deployment, will depend on a variety of factors of which perhaps the most important are warning time and geography.

a. **Warning Time**. When warning time is short, and hence interception opportunities limited, effective defence is best provided by a screen of high readiness surface-to-air systems backed up by a mobile reserve of AD fighters. As warning time increases, so the opportunities grow for exploiting the AD fighter's far greater mobility and ability to concentrate fire-power in space and time.

b. **Geography.** The larger the area, the more difficult and expensive it is to provide an effective level of surface-to-air defence cover. When large areas have to be defended, the mobility offered by AD fighters makes them particularly cost-effective. In general, surface-to-air defences are best suited to local and point defence whereas AD fighters are best suited to area defence.

c. **Layered Air Defence.** No single weapon system can effectively fulfil all the requirements of air defence. To meet the full spectrum of the enemy air threat an optimum weapon combination must be selected, and the various systems must be integrated in such a way that the characteristics of all the systems are employed to their maximum extent. This integration is known as layered air defence system. The layers are mentioned below :

(1) Early Warning – long range detection by AEW/AWACS and land based radars.

(2) Long range interception – by Combat Air Patrols with AAR (Air-to-Air Refuelling) support.

(3) Interception – by land based QRA aircraft.

(4) Area SAM (Surface-to-Air Missile).

(5) SHORAD (Short Range Air Defence) – and point defence, including IDF aircraft.

Passive Defence

25. **Definition.** Passive defence includes all measures, other than active air defence, taken to minimize the effectiveness of hostile air action. These measures include deception, dispersion and the use of protective construction.

25. **The Elements of Passive Defence**

a. **Dispersal or Concentration .** In general, dispersal offers the best protection against air attack, whereas concentration offers the best opportunity to defeat ground attack. The balance between dispersal and concentration will thus be dynamic and will be closely linked to the nature of the threat. Basing policies should be formulated to enable this balance to be changed in response to an evolving threat. In practice, the greater the number of potential basing options, the greater the targeting difficulties faced by an attacker. The degree to which the resources of a unit can be dispersed is a question of judgement for the unit commander. Vital assets which cannot be adequately protected should be dispersed to aid their survivability.

b. **Mobility.** The periodic movement of air force units between a number of different operating locations ie mobile basing – can confuse the enemy and thus aid survivability. Clearly, a unit can only be targeted if its location is known, and thus frequent movements to new locations can force the enemy to devote attack forces to the less operationally-rewarding tasks of armed or unarmed reconnaissance. However, moving units to different locations takes time, incurs disruption and reduces sortie rates. Supplying dispersed units that are moving their base frequently can be highly problematical, and deep servicing of aircraft in such circumstances becomes very difficult. Moreover, exercising effective command and control in such a situation is complicated. Furthermore, because mobile basing will normally involve

the use of unhardened airfields or even roads, the consequent loss of physical protection will increase vulnerability if such bases are found by the enemy. In short, mobile basing makes everything more difficult. Hence, it will normally only be justified when operations from main bases become unsustainable and when an abundance of alternate bases is available.

c. **Physical Protection**. An airfield, air installation or deployed unit will contain key personnel, equipment and facilities, which must be protected from small arms fire and bomb and rocket splinters. Where unit self-help is the only source of protection, it must set priorities as to what and who should be protected. Deciding the level of protection that should be provided is the responsibility of the unit commander.

d. **Concealment**. Concealment of installations and equipment can provide a valuable contribution to survivability, particularly against fast, low-flying aircraft. Concealment can either confuse enemy target acquisition or reduce the time from acquisition to weapon release ; in either case the accuracy of the attack is reduced. Concealment can also deny the enemy the ability to pinpoint and designate individual targets and gather criti cal intelligence. Visual concealment can be achieved by applying tone-down and camouflage, augmented by deception techniques. Reducing or disguising a units' electronic signature (particularly that of a mobile unit in the field) can also make a major contribution to its survivability. An effective emission control policy forms a key part of a unit's concealment plan.

d. **Tactical Deception.** Tactical deception includes not only the deployment of decoys, but also activities such as varying unit procedures, obscuring and disguising the purpose of buildings and facilities and deploying radar reflectors to distort ground attack navigation and bombing radars. Tactical deception is closely associated with concealment, therefore, concealment and deception measures must always be planned and implemented in concert.

Bibliography :

1. AP-3000 2nd edition.

2. RAF ISS Ph-5 Note Course – 43.

3. AP-1300.

4. BAF ISS Ph-5 Note (Part-II) Reprint 1998.

TOPIC-9

ANTI SURFACE FORCE CAMPAIGN

Introduction

1. The strategic aim of the anti-surface-force campaign is to deprive the enemy of the military power he needs to occupy territory or exploit seascape. Anti-surface-force action involves the use of air power, in cooperation with friendly surface and sub-surface forces to deter, contain or defeat the enemy's army and/or navy. The ability to prosecute the anti-surface-force campaign effectively will depend heavily on the success of the counter-air campaign, and invariably these two campaigns will be closely integrated. Anti-surface-force combat air operations - like those of the counter-air and strategic air offensive campaigns - will also depend on the full range of combat-support air operations and ground combat-support activities (discussed in Chapters 8 and 9 respectively). However, this chapter will consider only those combat operations and roles which are unique to the anti-surface-force campaign.

The History of Anti-Surface-Force Action in War

2. **World War I**. Aircraft were first used to project military power against the surface forces in 1911, when Italian aircraft bombed Turkish troops. However, it was not until World War I that large-scale air-to-ground attacks took place. Aircraft were used in the early weeks of the war to harass ground troops, and the first air interdiction attacks against land targets took place in early 1915. During the following year, air interdiction played a significant part in the Allied offensive on the Somme, and in the last two years of the War the scale and effectiveness of air attacks against land forces increased rapidly. In September 1918, concentrated British air attacks effectively destroyed the Turkish 8th Army at Wadi el Far'a. At sea, aircraft were, from 1915 onwards, used to attack naval shipping and dockyards, and during the last two years of the war they also played a useful role in helping to counter the U-Boat menace. While the overall impact of air power on the course and the outcome of World War I was relatively modest, the rapid development of aircraft attack capabilities showed clearly that aircraft would make a growing contribution to future surface campaigns.

3. **The Inter-War Period**. During the inter-war period air power anti-surface-force expertise and capabilities evolved slowly, although a number of pioneering experiments were carried out. During the 1920s the RAF - in Somaliland, Iraq, the Aden Protectorate and the North West Frontier of India - proved that air control could be a cost-effective substitute for land force manpower in policing remote and thinly populated areas. By sinking the captured German battleship Ostfriesland, Brigadier General William (Billy) Mitchell showed that airborne firepower could also be an effective substitute for naval gunfire. In the Spanish Civil War, the Luftwaffe's Condor Legion sank a number of Republican ships and they developed effective procedures for integrating air action with the fire and movement of friendly ground forces. However, many of the lessons learned in World War I were forgotten, and the potential impact of air power on surface operations continued to be generally underestimated. National doctrines were largely polarized between those who saw air power purely as an auxiliary to the surface forces, and those who saw it purely as an independent war-winner.

4. **World War II**. During World War II, the importance of anti-surface-force operations in military strategy soon became apparent. The Luftwaffe played a crucial part in the destruction of the armies of Poland in 1939, and those of Denmark, Belgium, Holland, France and particularly Norway in 1940. As General JodI, Wehrmacht Chief of Operations, remarked "The Luftwaffe proved to be the decisive factor in the success of the operation [against Norway]". In 1941 German air power played an equally important role in the invasion of the Soviet Union. In each case, air attack dislocated the defending army, rendering it vulnerable to the follow-on land force armoured thrusts. In subsequent years. Allied air-to-ground action dominated the campaigns in North Africa, Italy and Western Europe. In August 1944, timely Allied air attack broke a German ground assault by five armoured and three infantry divisions, and during the subsequent Battle of the Falaise Gap, concentrated Allied air attack coupled with artillery fire destroyed the German 7th Army and 5th Panzer Army. The impact of Allied anti-surface-force attacks on Axis land operations can be gauged from Field Marshal Erwin Rommel's remark that "anyone who has to fight, even with the most modern weapons, against an enemy in complete control of the air, fights like a savage against modern European troops". At sea aircraft accounted for more than half the U-boats sunk in the Battle of the Atlantic, they crippled the Italian and United States' fleets at Tarranto and Pearl Harbour respectively and they were the instrument of victory in the sea battles of the Coral Sea, Midway Island and Leyte Gulf. More warships were sunk by air attack in World War II than by any other single cause, and of these 61 (Yo were sunk by land-based aircraft. Thus, by 1945 air power anti-surface-force capabilities were recognised as a powerful and indispensable element of military strategy.

5. **Post-World War II**. After World War II, the relative importance of airborne firepower on surface operations continued to grow. The principles of land/air operations, evolved during World War II, were increasingly refined in a series of wars. In Korea, United Nations air power played a key role in securing the Pusan perimeter against North Korean attack and later in depriving the Chinese communist forces of their offensive potential. In the i 967 Six-Day War, Israeli air power effectively broke the Egyptian army at the Mitla and Giddi passes destroying seven Egyptian divisions with 10.000 vehicles (including 800 ranks). Six years later in the Yom Kippur War Israeli air power again played a key part this time by containing the Syrian army's surprise attack on the Golan heights while Israeli ground forces dep!oyed. In Vietnam, United States air power provided constant tire support for friendly ground troops, broke the siege of Khe Sanh in 1968 and proved the key instrument in the defeat of the North Vietnamese invasion in the Spring of 1972: over 17,000 US and South Vietnamese sorties were launched during April alone. Air power also played an important role in lesser conflicts such as the Malayan and Kenyan Emergencies, Aden, the Indonesian Confrontation with Malaysia and the various French colonial wars. The West, in particular, came to see airborne fire power and mobility as a cost-effective supplement and substitute for the surface forces: a means of ensuring success while reducing friendly casualties. Aircraft also consolidated their position as the dominant weapon system in the maritime surface battle; in the Falklands conflict the Argentine air forces proved to be the most serious threat to the British Task Force, and the Harriers and Sea Harriers its best protection.

6. **The Gulf War**. During the six weeks of the Gulf War Coalition air power exercised a dominant influence in the conduct of land/air operations. It destroyed nearly half of the Iraqi Army's 'battle winning equipment'. At least as important as the destructive force

of air power was its ability to dislocate and demoralise enemy ground forces. It was the combination of all these effects which wrecked. the Iraqi army as an effective fighting force and paved the way for the rapid and for the Allies relatively bloodless - liberation of Kuwait. During that liberation, Allied air power continued to exercise a dominant influence. It was used to break up Iraqi troop concentrations and devastate retreating Iraqi columns, and it played a key role in ensuring a rapid Allied land advance with minimum loss of life. Indeed, the one hundred hours so-called 'Ground War' was in reality a truly joint land-air campaign in which the land and air components of the joint force operated together synergistically, providing each other with mutual support and opportunities. Of the 1560 tanks, 1508 artillery pieces and 1210 armoured personnel carriers lost by the Iraqis before G-Day (the start of the Coalition land forces attack), all but eighteen were accounted for by air power. And of the 3,400 Iraqi tanks, armoured fighting vehicles and artillery pieces destroyed after 'G' Day, all but five hundred were destroyed from the air. It is noteworthy that the overall combat loss rate sustained by Coalition air forces during the Gulf War was less than one tenth of one per cent, an unprecedented low figure but one which was broadly consistent with the post-World War II trend.

7. **Principles for the conduct of ASF Operation**. The key doctrinal points which emerge from the history of antisurface-force operations are as follows:

a. Anti-surface-force air action can be used either to supplement or to substitute for surface-force action. It is particularly effective in responding to surface force operational emergencies and dominating seaspace.

b. Anti-surface-force air action works best when used in direct cooperation with friendly surface operations and where the enemy is forced to expose and attempt to manoeuvre his forces while under fire.

c. Air attack against surface forces is particularly effective when an enemy is confronted by geographical restrictions - such as being forced to operate without cover (as in a desert situation), or being forced to traverse narrow defiles, causeways or roads bordering inhospitable ground (for example marshes).

d. Air attack has a profound impact on ground troops, often out of all proportion to the physical damage and destruction caused. However, this can result in troops fearing the enemy air force more than they respect friendly air forces, with consequent pressure from ground force commanders to press for direct control of air assets at too Iowa level to exploit their capabilities.

e. Surface and air commanders must work as a team, particularly in fighting the land/air and maritime/air battles.

f. Command of air forces in anti-surface-force operations must be retained at the highest practicable level.

g. At any given level of command, the surface force commander should deal with only one air commander.

THE ELEMENTS OF THE ANTI-SURFACE FORCE CAMPAIGN

8. **Structure of ASF Campaign**. The ability to prosecute the anti-surface-force campaign effectively will depend heavily on the success of the counter-air campaign. At the same time, progress with the anti-surface-force campaign can have important implications for maintaining control of the air; for example, the occupation of enemy airfields by friendly ground forces can be a most effective counter-air measure. Thus, invariably the counter-air and anti-surface campaigns will be closely integrated. Moreover, like all types of combat air operations, anti-surface force operations will depend on the full range of combat- support air operations and ground combat-support activities. The anti-surface-force campaign itself can be divided into two distinct types of operations: Land/Air Operations, and the Maritime/Air Operations. This structure is shown graphically in Figure 6.1 below.

The Structure of the Anti-Surface-Force Campaign

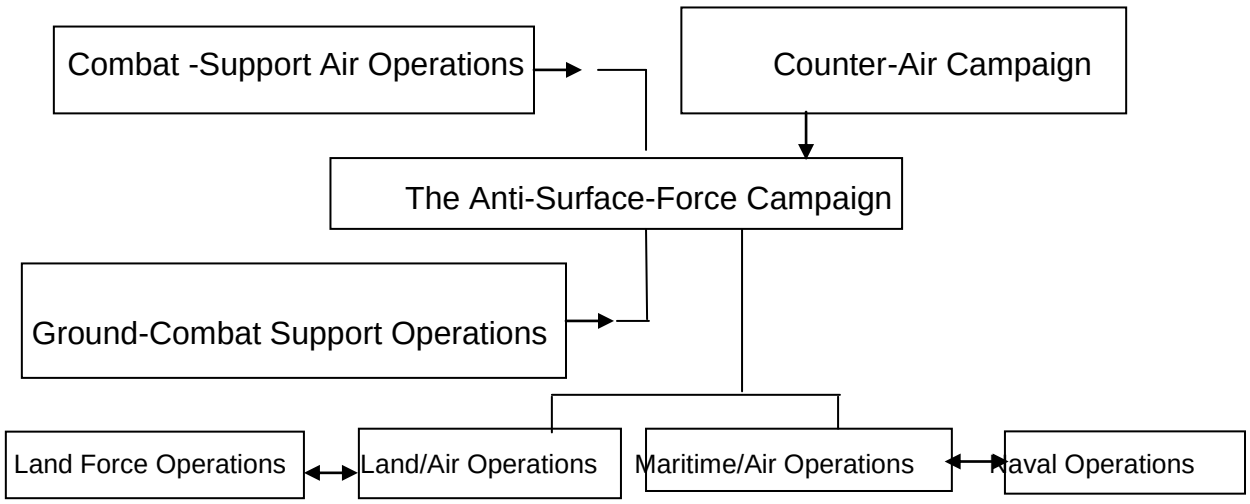


Figure 6.1: The Structure of the Anti-Surface-Force Campaign

LAND/AIR OPERATIONS

9. **Combat Air Power Role**. The inherent taxability, reach and speed of air power allows combat aircraft to project firepower rapidly against enemy land force targets, both laterally and in depth. Land air operations include the following combat air power roles:

a. Air interdiction.

b. Offensive air support, which itself consists of:

(1) Close air support.
(2) Battlefield air interdiction.

c. Armed reconnaissance.

d. Tactical air reconnaissance.

10. **Air Interdiction**. Air interdiction operations are defined as those conducted to delay, isolate, neutralize or destroy the enemy's military potential before it can be brought to bear effectively against friendly forces and at such a distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required. These missions are normally flown against targets further than 80 km into enemy-held territory. Interdiction is therefore concentrated beyond the close-combat area and includes ASF operations against such targets as troop and vehicle concentrations, supply trains and convoys, communication centres, bridges, railways, roads and waterways. In addition to the obvious advantages of reducing an enemy's potential before it can be brought to bear against friendly forces, it is often more economical to attack troops on lines of communication than when they are dispersed on the battlefield. Normally, railways present the most profitable targets for air attack but, in less developed countries, their place may be taken by motor, boat, animal or even human transport. To be fully effective, interdiction attacks must be sustained for long periods.

11. **Factors Affecting Air Interdiction**. The greater the enemy land force's need for supplies and reinforcement, the more effective air interdiction is likely to be. Air interdiction is likely to have only a limited effect against regular land forces holding static positions or guerrilla forces with low logistic support requirements. In contrast, it can have a major impact on a hostile army conducting an intensive, highly mobile battle. This is particularly true for a retreating enemy, where the cooperation between air and land force offensive action is most likely to yield decisive results. However, there is inevitably a delay between an air interdiction attack and its effects being felt at the battle front. Moreover, the effects of air interdiction are cumulative, and to be fully effective air interdiction should be pursued for an extended period. Air interdiction also requires careful planning and the expenditure of a great deal of effort. Therefore, the following are important :

a. Air-interdiction attacks should be linked with continuous action by friendly land forces to compel the enemy to exhaust his reserves of combat strength and supplies. It must deny the enemy more resources than he is consuming at the front; it therefore calls for joint planning and joint operations.

b. Diversion of effort away from air interdiction should not be undertaken lightly.

Offensive Air Support

12. **BAI**. BAI is defined as air action, against hostile land targets in a position directly to affect friendly forces, which requires joint planning and coordination. The basic difference between BAI and CAS lies in the proximity of targets to friendly forces and the control arrangements which are therefore needed. BAI attacks are conducted to delay, neutralize or destroy enemy forces which are in the battle area but not yet engaged by friendly land forces. They may be used to isolate the enemy forces in the battle zone from their reinforcements and supply, and to restrict their freedom of manoeuvre. BAI missions are planned against targets in the area located either side of the Fire Support Co-ordination Line and are normally carried out beyond the range of the army's own conventional artillery and out to the extent of the corps commander's area of influence. As a guide, this would normally be in the band approximately 30 km to 80 km beyond the FLOT. While BAI

missions require joint planning, they may not require continuous co-ordination during the execution stage. Typical targets are similar to those which would be targeted by air interdiction operations. BAI missions are conducted away from the confusion of the active battle front and are potentially the most effective form of OAS.

13. **CAS**. CAS operations are defined as air attacks against targets which are so close to friendly forces that detailed integration of each air mission with the fire and movement of those forces is required. CAS provides quick results and raises the morale of friendly troops who see it, but its effects are local; the less direct and less obvious forms of offensive support will often be of greater value. There is seldom sufficient CAS to meet all demands, and when surface-to-surface weapons can deal with targets effectively they should be used in preference. Such weapons are often more timely, sustain support more easily and are often able to deal with targets more economically than are air-delivered weapons. However, if surface-to-surface weapons are out of range or cannot by themselves produce the desired concentration of fire, CAS is necessary. Typical targets would include armoured formations, artillery and infantry. FACs, suitably equipped with ground/air communications can be of considerable assistance in directing ground-attack aircraft on to CAS targets within sight of forward ground positions; FACs are specially trained Army or AF personnel. An important feature of CAS operations in Vietnam was the dominant role of the airborne FAC. He was involved in all stages of the planning and execution of offensive operations; rarely did ground formations go into battle without a FAC even when no air support was planned.

14. **Factors Affecting CAS**. CAS has a unique ability to concentrate fire-power in time and space, when and where required. The psychological effects of fire-power concentration are likely to be even more important than the physical effects. However, CAS is one of the sources of fire support available to friendly land forces. It can have a decisive effect on a battle, but it can also be difficult to execute effectively. There are inherent problems with target acquisition, and inevitable complications and limitations in co-ordinating air attacks with the fire and movement of ground forces. Moreover, CAS can also be an expensive form of fire support if the enemy troops are protected by an effective, layered AD system.

15. **Air Interdiction/ BAI Versus CAS.** It is usually necessary to concentrate air efforts effectively on only one priority role at a time; there are rarely sufficient air assets, or the justification, to attempt more. Whatever role is chosen, it should be prosecuted as a sustained and concentrated effort. One or 2 missions by a handful of aircraft are unlikely to achieve anything worthwhile. In general, while shallow attacks are likely to have significant impact on the battle in progress, deep attacks are likely to have a greater impact on the conduct of the campaign as a whole. Therefore, in circumstances short of the greatest urgency of potential gain, air interdiction or BAI are better able to exploit the inherent reach of air power than is CAS. Diverting the limited air assets from interdiction to CAS tasks would normally be justified only if the timely commitment of concentrated airborne fire-

power would achieve decisive results in a particular operation or battle, as in the 2 following examples :

a. Friendly ground forces are under great pressure from the enemy and need additional and immediate fire support to avoid defeat.

b. Timely additional fire support would ensure the success of a friendly land-force offensive operation.

Armed Reconnaissance

16. Armed reconnaissance is defined as air missions flown with the primary purpose of locating and attacking targets of opportunity, ie enemy material, personnel and facilities in assigned general areas or along assigned ground communications routes. Essentially, it is a form of air interdiction against opportunity targets. Historically, armed reconnaissance tended to prove wasteful in terms of assets and expensive in terms of attrition. Any ground-attack aircraft can be tasked to undertake armed reconnaissance.

Tactical Air Reconnaissance

17. Although traditionally linked to the other land/air roles, tactical air reconnaissance is not a combat role. It is more properly considered as an element of combat-support air operations.

MARITIME AIR OPERATIONS

18. **Maritime Air Power Roles**. Maritime air power roles may be performed independently or in coordination with friendly surface and sub-surface units. Joint operations help to exploit the natural synergies between air and naval forces. Because of their far greater speed and reach, air forces may also have to carry out independent actions. Those combat roles specific to maritime air operations are as follows:

19. **Anti-Submarine Warfare**. The potential threat posed by submarine attack depend to a large extent on geography and hydrography, but the experiences of World Wars I and II show the scale of damage and disruption that submarines can inflict on both trade and naval operations. The submarine today is a formidable weapon system than ever; nuclear submarines in particular can cruise at higher speeds and for longer periods than can surface vessels. This superior speed can be used either to maintain contact with surface forces or to attack without unduly advertising the submarine's presence. A skillfully conducted submarine offensive can be switched rapidly from one area to another, and submarine forces may be concentrated or dispersed within relatively short periods of time. Countering such a threat demands an extensive range of capabilities and a force-mix of air, surface and sub-surface platforms, systems and weapons. The aim of anti-submarine warfare is to deny the enemy effective use of submarines. This may be done initially by

surveillance, overt or covert, then deterring the submariner by making him aware of the aircraft's presence and as a result limiting his freedom of action. Alternatively, the situation may demand that the submarine be destroyed. Detection, location and tracking may be done either covertly or overtly, using fixed wing maritime patrol aircraft or helicopters. In turn, these can either work independently or in cooperation with friendly submarines, surface ships or other aircraft. Any or all of these assets may be used subsequently to destroy the submarine; destruction can be achieved by a variety of weapons eg homing torpedoes or mines.

20. **Anti-Surface-Vessel Warfare.** The aim of anti-surface-vessel warfare by aircraft is to deny, at the earliest opportunity, the effective employment of enemy naval surface forces. Essentially, anti-surface vessel warfare tasks are carried out in three phases: detection, identification, and attack. Aircraft, submarines or surface warships can be used in co-ordinated action to carry out any or all of these phases. For example, in the case of an all-aircraft operation, maritime patrol aircraft or helicopters may be tasked to search, locate and identify enemy surface forces by overt or covert means. A shadowing operation may then be ordered, and it too may be carried out overtly or covertly. Maritime patrol aircraft or helicopter may subsequently be tasked to attack the target independently or in concert with missile-armed Strike/Attack aircraft. They can also be used to provide attack support for those aircraft. Alternatively, attack support could be provided by an airborne early warning aircraft. It should be noted that aircraft are particularly useful for responding to short notice requests by the sea commander to counter short-range enemy surface threats, or for carrying out operations close to shore to counter enemy amphibious forces. Aircraft can also be used to lay mines in waters which are inaccessible to friendly naval forces.

21. **Maritime Anti-Air Warfare**. Maritime anti-air warfare can involve the use of the same aircraft, sensor systems and weapon systems against the same enemy as the counter-air campaign. Thus, while it plays a key part in maritime air operations, maritime anti-air warfare is best considered as an integral element of the wider counter-air campaign.

22. **Employment of Ship-Based and Shore-Based Aircraft.** Where a choice exists between ship-based and shore-based aircraft, the advantages and limitations of each should be evaluated before selecting the optimum force-mix. Ship-based aircraft can react more rapidly from alert. However, shore-based aircraft are not so restricted in size, and thus tend to have longer range and endurance, greater payloads and more capability. Thus, ship-based aircraft are best suited to providing quick-reaction forces and local defence, whereas shore-based aircraft are best suited to providing area cover and the outer defensive layers.

TOPIC-10

COMBAT SUPPORT AIR OPERATION

Introduction

1. **Definition.** Combat support air operations are those designed to enhance or support the effectiveness of air, surface or sub-surface combat forces :

2. **Types of Combat - Support Air Operation.** Combat Support air ops fall into the following major categories (figure 2.9.a) :

a. Air Transport.

b. Air to Air Refueling.

c. Aerospace Surveillance and Reconnaissance.

d. Airborne Early Warning (AEW)/ Airborne Warning and Control Systems (AWACS).

e. Search and Rescue.

f. Electronic Warfare.

AIR TRANSPORT OPERATION

3. **Definition**. Air Transport operations are defined as those which involve the movement by air of personnel and cargo within and between theatres of operation. Air transport operations can be conducted in support of all types of sea, land and air forces.

4. **Characteristics of Air Transport Operation** - Air transport forces have the following characteristics.

a. **Speed and Load.** The payload that can be carried by air transport is more limited in weight and bulk, but it can be delivered faster, than that carried by surface transportation systems. Air transport is fast and flexible, whereas surface transportation offers greater capacity; they thus offer complementary capabilities. The high speed of air transport greatly reduces the man days lost in transit and allows rapid and timely re-supply. It also allows a high sortie rate which can, in part, compensate for limited load-carrying capability. It can be of crucial importance in helping to contain a rapidly developing crisis. For example, during the 1973 Yom Kippur War, although only 26% of the US equipment supplied to Israel was sent by air, none of the 74% sent by sea arrived before the fighting had stopped.

b. **Ubiquity.** Air transport cannot be blocked or delayed by surface obstructions en route to the destination. Hence, it can be the only means of supplying isolated bases and communities, particularly in siege or disaster relief situations. For example, air transport was the only practicable means of sustaining Berlin in the winter of 1948/49. Khe Sanh in 1968 and Eritrea in 1984 or Sarajevo in

1993. Air transport can also be of key importance for reaching land locked countries (of which there are now over twenty in the world).

c. **Vulnerability**. Air transport aircraft tend to be unarmed and are slower and often less manoeuvrable than combat types. Consequently, they need a favourable air situation if they are to operate with peak efficiency. If this is not available, air transport aircraft can attempt to elude the defences by using evasive action or other tactics. However, higher attrition is likely to be sustained perhaps to unacceptable levels.

5. **Categories of Air Transport Ops.** Air transport operations can be divided into two broad categories :

a. **Strategic Airlift**. Strategic (or more properly inter-theatre) airlift is the carriage of passengers and cargo between theatres.

b. **Tactical Airlift**. Tactical (or more properly intra-theatre) airlift is the carriage of passengers and cargo within a theatre.

Roles of Air Transport Operations

6. Air transport operations encompass five major roles:

Scheduled Services

7. The term ‘scheduled services’ is the name given to the routine airline-type operations undertaken in peacetime when it would clearly be uneconomic not to make use of the large airlift capability of the AT force. Using the AT force to operate scheduled services provides training for air and ground crews and fulfils a requirement for peacetime movement of personnel and material which would otherwise have to be met by the charter of civil aircraft. A further advantage derives from exercising the routes which may be needed for strategic reinforcement; staging posts are given practice in fulfilling their task, ATC authorities become used to handling defence aircraft, and the political impact of military AT aircraft movements is reduced.

Airborne Operations

8. Airborne operations are defined as those which involve the movement of combat forces and their logistic support into an objective area by air. These operations include parachute assault, helicopter - borne assault and air - landing operations :

a. **Parachute Assault**. Assault by paratroops may be used to obtain tactical surprise and to attack objectives not otherwise readily accessible. Such operations demand a very high standard of training and rehearsal by both troops and aircrew. Paratroops may be dropped from either fixed-wing aircraft or helicopters.

b. **Helicopter-borne Assault**. Helicopter-borne assault is particularly flexible method of mounting small-scale operations. Such airborne operations can be mounted quickly to take advantage of favourable and fleeting tactical situations, as US forces demonstrated many times in Vietnam, and the British found in the retaking of South Georgia in the Falklands conflict. There is currently much controversy and conflicting evidence about the vulnerability of the helicopter to small arms fire, but advances in technology and in operating techniques are being made which should improve the survivability of helicopters in the battle area.

c. **Air Landing**. Air landing operations normally involve the move of tactically loaded units. They may be used to establish a force which can subsequently develop operations against an enemy, to deliver follow-up forces after a successful assault or to redeploy forces. Depending on the availability of suitable airstrips, either fixed-wing aircraft or Helicopter may be used.

Special Air Operations

9. Special air operations involve the movement by AT of a specific load by other than scheduled air services. They may vary from delivery of a load to a remote airfield to carrying VIPs on an extended tour. Both Strategic Transport and Tactical Transport aircraft are used in peacetime for disaster relief and civil aid operations. Relief operation conducted by BAF is an example of this operation.

Air Logistic Support

10. The carriage of material for logistic support of ground and air forces is expensive, and the amount which can be carried by air may be limited. There are, nevertheless, many occasions when logistic support by air is vital. In particular, during the early stages of an intervention operation, only air logistic support would be likely to provide timely initial support for forces which have been deployed by air. Furthermore, in areas poorly provided with natural or man-made facilities for surface movement, air logistic support might be the only way in which deployed forces could be adequately supplied.

Aeromedical Evacuation

11. The knowledge that the injured will be quickly conveyed to proper hospital facilities is a factor in maintaining morale. In peacetime, aeromedical evacuation helps to keep down the cost of basing forces overseas because the need for expensive medical facilities is reduced. In war there would probably be considerable spare capacity in aircraft returning from operational areas but occasionally it would be necessary to provide aircraft specifically for aeromedical evacuation. The normal practice is that casualties await aircraft rather than aircraft await casualties; in this way air movements can be organised so that the flow of returning aircraft is not interrupted. However, should the need arise, special aeromedical flights could be provided.

AIR-TO-AIR REFUELLING OPERATIONS

12. **Definition**. Air-to-air refuelling operations are those which involve the transfer of fuel from one aircraft to another in flight. Air-to-air refuelling can contribute to combat-air and combat support air operations by extending the range, payload, time-on-task and flexibility of aircraft. It can be used to support all three air campaigns as well as all types of combat air support operations. Air-to-air refuelling can be used to enhance the capabilities of virtually all types of aircraft in air power roles. For example, it enables :

a. Short-range fighter-bomber aircraft to be given strategic air offensive tasks.

b. Combat or combat-support air missions to be extended in duration and range.

c. Aircraft under threat of attack to be held airborne for survival or delayed tasking.

d. Combat aircraft to be held airborne, thus increasing their ability to respond to short-notice tasks.

e. Short-range combat aircraft to escort large combat or combat-support aircraft over long ranges.

f. Deeper incursions and variable routing to be made to targets.

g. Range and mission endurance to be limited only by aircrew fatigue, weapon availability and engineering constraints.

h. Aircraft to take -off at lower weights, permitting greater opportunities for sort-field operations (and hence dispersal) with greater weapon loads.

13. **Roles**. Air-to-air refuelling operations are divided into two roles:

a. **Towline**. In the towline role, tanker aircraft fly a set pattern (typically a racetrack) in predetermined position. Aircraft that require air-to-air refuelling plan their routes via that pattern to take on fuel as required.

b. **Trail.** The trail role can be carried out in one of two ways; accompanied transits and en route rendezvous. In accompanied transits, the tanker aircraft escorts the receiver aircraft along a route, transferring fuel as required. The enroute rendezvous technique requires the tanker and the receiver aircraft to meet at predetermined locations along the route to conduct air -to-air refuelling.

AEROSPACE SURVEILLANCE AND RECONNAISSANCE

Introduction

14. Aerospace surveillance and reconnaissance operations involve the collection of information, from airborne, ground-based and space-based sensors, on the activities, forces and resources of an enemy or potential enemy. Reconnaissance was the earliest role of air power and it has lost none of its importance. Until 1939, British air reconnaissance units were limited to close support of the RN and the Army. During the Second World War, however, there was an increasing demand for intelligence about Germany and the occupied countries, which could be met only by air reconnaissance, and special purpose. These aircraft were unarmed and relied on speed and height to reconnoitre deep into enemy territory. Eventually, the photographic reconnaissance (PR) squadrons provided much of the intelligence on which strategy was based and over 80% of all tactical intelligence came from aerospace photographs.

15. Since 1945 notable advances have been made in the techniques of air reconnaissance. Cameras and sensors have been improved to permit reconnaissance at the high speeds and low levels now necessary for aircraft to penetrate modern defences successfully. Radar has alleviated the problem of cloud interference and new types of sensors, including IR, have been introduced, giving a near all-weather, day/night capability. Increasing use is being made of satellites for surveillance and reconnaissance purposes.

16. **Categories and Roles.** Aerospace surveillance and reconnaissance operations are divided into 2 broad categories :

a. **Surveillance.** Surveillance is the systematic observation of aerospace, surface and sub-surface areas, places, persons or objects by visual, aural, photographic, electronic or other means.

b. **Reconnaissance**. Reconnaissance is the obtaining, by visual observation or other detection methods, of information about the activities and resources of an enemy, or the securing of data concerning the meteorological, hydrographic or geographic characteristics of a particular area.

17. **Roles**. Surveillance and reconnaissance operations encompass the following roles:

a. **Strategic Reconnaissance** . Strategic reconnaissance provides information about an enemy's or potential enemy's, overall military and economic capability and possible intentions, for example the main dispositions of his defences and his scientific and industrial development. This type of reconnaissance is usually conducted in peacetime or in time of tension.

b. **Tactical Reconnaissance.** Tactical reconnaissance operations collect information on the enemy, weather and geographical features required for the planning and conduct of combat operations, and provide information about targets

within defined areas. A large proportion of the information gathered is required for tactical decision-making, and the speed with which it is provided is therefore of prime importance.

c. **Target Acquisition**. Target acquisition involves the detection, identification and location of targets in sufficient detail and in the appropriate time-scale to permit the effective employment of weapons.

Method of Surveillance

18. There are 5 sensory means used for surveillance and reconnaissance operations : visual, photographic, radar, electronic and IRLS.

Visual

19. Visual reconnaissance is used when tactical information is required very quickly; it is normally carried out only at low level and in daylight. The transmission of information from the aircraft by voice radio in the form of an in-flight report provides intelligence quickly, but because the human eye and memory are fallible the results are often limited, especially when high-speed aircraft are used. Aircrew must be highly trained but even the best of them may fail to obtain positive results; they may be hindered by the nature of the terrain or by camouflage. Additionally, modern aircraft subject aircrew to a high cockpit work-load which, particularly in a hostile environment, would severely limit their capacity to analyse a target. For these reasons confirmatory imagery is taken whenever possible.

Photographic

20. Day photography is currently the most common source of reconnaissance intelligence, especially that acquired by tactical reconnaissance aircraft. Cloud, poor visibility and enemy defences are the biggest obstacles to successful photography reconnaissance, and to overcome some of these obstacles and to meet the urgency of the requirement, tactical photographic reconnaissance is frequently carried out at low altitude.

21. Reconnaissance aircraft can be fitted with a variety of sensor installations to suit the particular task. The following are examples :

a. **Fan of Cameras**. A number of optical cameras may be arranged in a fan to give continuous across-track coverage of a suitable scale for interpretation. The resultant series of overlapping photographs can be studied with the aid of a stereoscope which presents details on the ground in relief; these photographs can be very accurately interpreted. This installation may be used for high-altitude cover where the need for true vertical photography is not specifically important, as it is, for instance, in the survey task.

b. **Oblique Cameras**. Cameras can be mounted to face forwards and to either side of the aircraft. The oblique installation is used when cloud or operational factors limit the aircraft's altitude. Oblique photography is normally used to confirm visual

reports and for detailed identification of small targets from low-flying aircraft. High-level oblique photography can cover targets at some distance from the aircraft's track and can thus provide information which might not otherwise be obtainable.

c. **Survey Cameras**. Surveying is essentially a peacetime task and for this work a single camera, usually of short focal length, is mounted vertically in the aircraft. The camera has an accurately calibrated lens which, when used at high altitude, covers a large area of ground on a small scale. Such cameras provide a rapid means of obtaining cover for map making and survey.

Radar

22. Visual and photographic surveillance and reconnaissance can be severely hampered by cloud, poor visibility and bad light conditions in the target area. These limitations can be partially overcome by the use of radar, either plan or side-looking. As yet photographic methods are superior for detailed intelligence purposes because they give better definition, but radar reconnaissance has the following advantages over photographic methods :

a. It is relatively independent of conditions of cloud, visibility and light.

b. It provides wider coverage.

c. It provides greater tactical freedom at night.

d. It can be conducted at a safe stand-off distance from the target.

e. Data from modern systems can be viewed in real time either in the cockpit or at a ground station linked to the reconnaissance platform by data link.

Electronic

23. Electronic surveillance and reconnaissance is the means of obtaining information about radar and electronic systems, for example, C^3I and missile-guidance systems.

Infra-red Line Scan (IRLS)

24. Thermal IR equipment translates heat emissions from objects into a recognizable picture for use by the interpreter. The temperature pattern is recorded on film or digital tape and produces results similar to those of optical photography although of inferior definition. The film record can reveal such things as hot engines, campaign fires under jungle canopy, whether a factory is active or idle and whether a ship is under power. Two forms of IR reconnaissance sensors are available: the wide-angle coverage IR line scanner (IRFLS) and the oblique-look thermal imager. As with radar sensors modern IR sensors produce images which are capable of being viewed in real time.

Surveillance and Reconnaissance from Satellites

25. Large parts of the space programmes of both the USA and the Russia are dedicated to surveillance and reconnaissance. Satellites can survey the whole world rapidly, they are relatively invulnerable and they can be fitted with sensors to gather information across the

whole of the electromagnetic spectrum. Television, multi-spectral radar and infra-red sensors, and electronic-reconnaissance equipment can be carried, but most of the current effort is directed towards normal daylight imagery. Films can be processed in space and the resulting pictures transmitted to receiving stations by radio, or the film can be recovered for processing on earth. Resolutions of 2-3 ft can be achieved in favourable conditions, and it should be possible to improve this further. However, when pictures are transmitted by radio some degradation in quality often results.

26. The capability of conducting detailed world wide surveillance from space has given the superpowers the ability to detect any current military build-up and has thus reduced their vulnerability to surprise attack. It could be argued, therefore, that reconnaissance satellites are exerting a strong stabilizing influence on world affairs. Satellite reconnaissance was used extensively during the Gulf War to enable Allied commanders to ascertain the results of the strategic air offensive missions flown against targets in Iraq and Kuwait.

27. Commercial surveillance satellite programmes are today well advanced and applications range from agricultural remote sensing to the media. Imagery from a wide range of sensors including radar, multi-spectral scanners and thematic mappers is data-linked either direct or via a chain of relay satellites to a series of ground stations around the world . While today's commercial systems are capable of spatial resolutions down to 10m, sufficient to identify a jumbo-jet-size target, resolutions similar to those of today's military systems may be achieved by the end of the century.

28. **Production of Intelligence.** Air reconnaissance as a swift means of obtaining information may be of little value unless the ground organization can analyse and distribute the results quickly. Intelligence from photographs can be obtained only as rapidly as the support facilities can process and interpret the film. High-speed processing equipment is therefore essential, and many photographic interpreters, or imagery analysts as they are now called, are necessary to support the flying effort. Imagery analysis demands great skill and painstaking attention to detail. Since the time factor is so often overriding, tasks are given an order of priority and only in peacetime can detailed reports be expected. Because intelligence is so often urgently required, new techniques such as in-flight processing, radio reporting or sensor read-out while airborne and data-link transmission are of great significance.

AEW/AWACS

29. AEW/AWACS is defined as air surveillance and control provided by airborne vehicles equipped with search and height-finding radar and communication equipment for controlling weapon systems. AEW can provide timely information about an enemy's air activity and his potential to attack the homeland or interfere with friendly air, land and sea operations. AWACS can, in addition to these functions, provide positive control, direction and integration of friendly offensive and defensive air operations. This capability may also be used to assist friendly air forces to penetrate enemy defences.

SAR OPERATIONS

Introduction

30. Air SAR operations involve the use of aircraft, usually helicopters, to locate and rescue personnel in distress and, in particular, to recover aircrew who have abandoned their aircraft.

31. SAR is not a role of maritime air power, but in war it confers morale and intelligence advantages by recovering ‘downed’ friendly and enemy aircrew and so supports the overall air effort. SAR is thus an important function to which air force devotes much of its resources, and therefore SAR operations contribute to the prosecution of all air campaigns by :

a. Allowing aircrew who have survived abandonment to resume the fight.

b. Denying the enemy a potential source of intelligence.

c. Promoting high morale amongst aircrew.

Organisation

32. SAR can involve many agencies including, for example, the BN, and the civil police, and can entail the use of fixed-wing aircraft, helicopters, marine craft, lifeboats and mountain rescue teams, operating singly or in concert.

33. **SAR Regions**. There is one SAR Region in Bangladesh with one RCC. The RCC co-ordinate requests for assistance and direct SAR helicopters as required, although the helicopters may respond to alerts by local authorities and, in such cases, they would then advise RCC while en route to the incident.

ELECTRONIC WARFARE OPERATIONS

34. **Definition**. Electronic warfare involves the military use of electronics to determine, exploit, reduce or prevent hostile use of the electromagnetic spectrum and actions taken to ensure its effective use by friendly forces.

35. **Applications**. Electromagnetic capabilities permeate all aspects of air power, and electronic warfare considerations should form an integral part of the planning and execution of all types of air operations. It can be used to confuse the enemy, reduce friendly losses and increase the operational effectiveness of friendly air, surface and sub-surface forces. Electronic warfare is increasingly important for all types of combat air operations (and many other combat-support air operations). There is a particularly close inter-connection between electronic warfare and the suppression of enemy air defences role; they provide both complementary and alternative capabilities.

36. **Roles**. Electronic warfare is divided into three main roles:

a. **Electronic Warfare Support Measures**. Electronic warfare support measures involve actions taken to search for, intercept, identify and locate radiated electromagnetic energy for the purpose of immediate threat recognition. They give warning of detection, target acquisition and engagement. They also provide the information required to conduct electronic counter-measures and electronic counter-countermeasures activity.

b. **Electronic Countermeasures**. Electronic countermeasures involve actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum. The main electronic counter-measure techniques are concerned either with the use of various types of electronic noise or deception jamming, or the employment of mechanical devices such as chaff of infra-red flares or the launching or towing of decoys. Electronic countermeasures equipment may be carried by aircraft for self-protection or employed by specialist electronic warfare aircraft in an escort or stand-off role. In the latter role, such aircraft can be used in support of friendly operations or to disrupt enemy operations.

c. **Electronic Protection Measures.** Electronic protection measures involve actions taken to ensure friendly effective use of the electromagnetic spectrum despite the enemy's use of electronic warfare. Since the use of electronic protection measures is a reaction to a hostile electronic counter-measure threat, the equipment, operating procedures and tactics employed must be constantly reviewed in the light of intelligence on the known threat. This point is equally applicable to electronic countermeasures.

Bibliography

1. AP - 3000

2. RAF ISS Phase-5 Notes, Course No 43.

TOPIC-11

AIR POWER IN UNCONVENTIONAL WARFARE

Introduction

1. The nature of warfare is changing. The rapid developments in technology, their innovative exploitation, combined with dramatic changes in military doctrine and operational concepts have modified the characteristics of warfare. The accelerating rate of technological development places a premium on not only recognizing the importance of a change but on quickly adapting to it. It is predicted that future wars would be short, intense and highly destructive. The corollary of geo-strategic situation of Bangladesh implies that, she is located in one of the most conflict-prone areas of the world – South Asia[i]. This requires Bangladesh to maintain strong and credible armed forces with balanced assets. But the economic and other existential realities do not permit her to have balanced military resources. The existing military capability of Bangladesh vis-à-vis her neighbours reflect existence of high disparity. Recognizing this, necessity is felt to use force multiplier concepts like unconventional warfare (UCW). Traditionally, the military strategists of Bangladesh considered that UCW could start only when the conventional efforts of the armed forces would become exhausted. But recent thought process views that significant advantage can be achieved through concurrent conduct of conventional and UCW.

Definition of UCW

2. The Oxford Dictionary defines ‘unconventional’ as ‘not based on or conforming to what is generally done or believed’. If interpreted militarily, ‘UCW’ would mean – employing capabilities other than weapon systems that produces traditional heat, blast and fragmentation to achieve the desired effect. It could equally mean the application of these traditional kinetic effects in unusual or innovative ways to upset, disorient, or weaken an enemy. By turning weaknesses into strength, they can compel an enemy to give up its political purpose. “Unconventional warfare are operations conducted during war for military, political or economic purposes in designated area of operations having a pre-designated organizational framework making use of local population and resources.” The American definition of *UW* is:

> “A broad spectrum of military and paramilitary operations, normally of long duration, predominantly conducted through, with, or by indigenous or surrogate forces who are organized, trained, equipped, supported, and directed in varying degrees by an external source. It includes, but is not limited to, guerrilla warfare, subversion, sabotage, intelligence activities, and unconventional assisted recovery."

History

3. **World War II**. The idea of UW came from Second World War resistance movements assisted by U.S. personnel, especially against the Empire of Japan's invasion of the Philippines as well as numerous European national resistance to the invasion by Nazi Germany. The main strength of these movements came not from U.S., but local personnel. U.S. "behind the lines" units such as Merrill's Marauders, in modern doctrine, were not conducting UW but DA and SR. The idea extended to resistance against an expected Soviet invasion of Europe following World War II. Rarely, however, did the U.S. create a guerrilla force. Far more often, the U.S. supported an existing national organization. The earliest US soldiers involved in UW were in the Philippines, soon allied with Filipino forces, were soldiers that declined to follow Japanese orders to surrender, such as Wendell Fertig. Fertig, along with other U.S. and Filipino leaders, while not trained in UW, eventually created guerrilla forces fighting the Japanese, forces that numbered in the tens of thousands. The ability of a few experienced soldiers to train and lead a quite large resistance (i.e., insurgency against the Japanese) was a guiding principle of the formation of United States Army Special Forces in 1952.

4. **1950s model of resistance to invasion of Europe.** After World War II, the original SF mission of UW, as shown in the first SF deployment of the 10th Special Forces Group to Europe, was in expectation of a Soviet attack on Western Europe. SF would help organize, train, and lead resistance movements to such an invasion. A 1951 doctrine for UW, still called guerrilla warfare at that point, was Guerilla Warfare is defined....as operations carried out by small independent forces, generally in the rear of the enemy, with the objective of harassing, delaying, and disrupting military operations of the enemy. The term is sometimes limited to the military operations and tactics of small forces whose objective is to inflict casualties and damage on the enemy rather than seize or defend terrain; these operations are characterized by the extensive use of surprise and the emphasis on the avoidance of casualties. The term...includes organized and directed passive resistance, espionage, assassination, sabotage and propaganda, and, in some cases, ordinary combat. Guerilla warfare is normally carried on by irregular, or partisan forces'; however, regular forces which have been cut off behind enemy lines or which have infiltrated into the enemy rear areas may use guerilla tactics

5. **1960s model of dealing with wars of national liberation**. When American advisors were sent to Laos and South Vietnam in the fifties and early sixties, the major problem was not to create guerrilla units, but to fight existing Laotian and Vietnamese guerrilla forces. To them it seemed logical that soldiers trained to *be* guerrillas would have a deep understanding of how to *fight* guerrillas, so Special Forces was given that mission. The White Star mission in Laos was initially covert, and used Special Forces and other personnel under Central Intelligence Agency control. Whether the mission is called counterguerrilla, counterinsurgency, or foreign internal defense, it involves assisting a friendly government—the "foreign" in FID—to defend against guerrillas acting inside its

borders. FID can also involve training a foreign government to deal with a future internal guerrilla threat. Later in Southeast Asia, SF personnel, often assigned to the Studies and Observation Group, carried out SR missions against infiltrators from the North, directing air strikes and assessing damage.

6. **1970s and 1980s**. In the 1970s, until the NCA withdrew them as part of its "tilt" to Iraq, SF supported Kurdish resistance to Iraq under Saddam Hussein. In the 1980s, SF worked with the Afghan mujahadeen against the Soviets, but in a role of supporting rather than leading the local personnel. They did not need to create an underground and an auxiliary, and often supported the guerrillas from outside the area of operations. Parts of the Afghan resistance, supported by SF and CIA elements, later became hostile to the U.S.

7. **1990s**. Following the 1990 Iraqi invasion of Kuwait, SF teams worked with the Kuwaiti resistance. When they can direct, using long-distance secure communications, air and missile strikes on targets, the guerrillas need not risk their limited resources in raids and ambushes. While U.S. special operations doctrine had conceived of guiding strikes, that was seen as being done directly by SF specialists. The evolving model would have SF UW trainers teach the guerrillas how to guide strikes against targets. Separating the means of destruction from the guerrillas not only makes them safer, but avoids the problem of "blowback" if the guerrillas later turn against the U.S.

8. **2000s**. In the 2001 joint operations with the Afghan Northern Alliance, the SF teams with the Afghans provided the precision targeting information to air units, but did not operate in a SR mode, separate from the local force. The SR targeting function was performed, but in a UW support context rather than a separate U.S. operation. SF produced intelligence for their own operations, for their supported regional command, and national-level authorities. "Arriving in their operational areas, SF cultivated relationships with local leaders citizens of the area, much as in the Balkans." Their mission was neither pure UW nor pure FID, but the intelligence preparation featured in the fifth step, Buildup, of the operational model.

9. **BAF Experience in UCW**. BAF personnel are no strangers to UCW. During the Liberation War, 1971, the freedom fighters of BAF fought valiantly in a blended environment where ‘Mukti Bahini’, comprising both the regular forces (Niomita Bahini) and unconventional forces (Gono Bahini), had been fighting for the freedom of Bangladesh[ii]. The Sectors 6 and 11 were commanded by BAF officers[iii]. With the passage of time, BAF has come up to a very mature stage in carrying out operations in counter insurgency environment. For approximately three decades, BAF helicopters have been operating in the Chittagong Hill Tracts (CHT) in support of counter insurgency operations. Since August 2003, BAF has been operating five helicopters under United Nations’ peace enforcement mission in a difficult and complex environment of the Democratic Republic of Congo (DRC). Although these are conventional operations against unconventional forces, the experiences could be effectively utilized in case if BAF engages in UCW.

Airpower and Unconventional Warfare

10**.** **"A**irpower" and "unconventional warfare" have radically changed the concept of war in the 20th century. Following are the attributes of Air Power in UCW:

a. The fourth dimension, the air, has brought speed, flexibility and dynamism to the modern battlefield while "unconventional war" has meant a non-linear battlefield with no front and no rear, with soldiers without uniforms targeting combatants and non-combatants alike without observing rules of gentlemanly conduct. The savagery of unconventional warfare can be very pervasive, even regular forces have resorted to conduct anathema to the Geneva Convention.

b. Airpower had already become a decisive factor during conventional war, Stealth technology and precision guided bombs has force multiplied its lethality. However, airpower is costly, fragile and can never be a substitute for clear military objectives. Rapid advances in science and technology ensured that airpower has accuracy, speed and is difficult in countering, making it also more decisive in unconventional wars, unconventional warriors not having the resources to afford counter-measures or avoid being manipulated into providing conventional targets. World War II and the Arab-Israeli wars show the decisive effect of airpower on conventional forces, a number of intangible factors delayed decisiveness in unconventional warfare till very fairly recently. The major intangible, intelligence, unless reliable, can limit the influence of airpower on conduct of military operations, effectiveness of airpower depending upon its timely and accurate availability.

c. Achieving or not achieving air superiority can decide the outcome of other conventional or unconventional war, it is a balancing factor that can change the equation for the positive.

d. Airpower brings great flexibility to land forces and can cause severe psychological damage not only on the enemy leadership but also rank and file as we have seen in Afghanistan recently. With Afghanistan in the throes of impending famine, US used another strategic employment of airpower, dropping hundreds of thousands of food packets in a bid to reach directly into the hearts and minds of the Afghan population. The result of these "food bombs" strategy is not yet known.

e. Airpower as an offensive weapon must be employed primarily to accomplish strategic objectives before turning to tactical needs. Sound intelligence and all air resources must be pooled to be virtually and laterally integrated, commanded and controlled by air experts rather than being employed by jacks of all trades. There is a case for a poor man's airforce to meet the land forces needs while the battle for air superiority is raping.

f. Strategic and tactical planners firstly ensured that application of superior technology was combat effective and well integrated. The Taliban did not have the means of countering either the force and/or its effects. They did not have the military sense to avoid giving lucrative targets to airpower, resulting in a total rout. Aircraft were used in multi-role or multi-tasked wherever necessary and whenever possible to create “strategic paralysis”. However, this does not equate to defeat, if opposition forces had remained tactically vital, they would have required defeat in detail.

Possible Role of Air Power in UCW

11. **Blending Unconventional Warfare with Conventional Warfare**. “When both conventional and unconventional warfare are integrated together for achieving common objective, it is termed as blending. To tie unconventional warfare with conventional efforts, two things are essential. First, there must be an organizational framework within which the unconventional forces must operate. Second, a chain of command must exist between the conventional and unconventional forces. Blending can be achieved only when the efforts of both the forces are synchronized to accomplish the overall mission.”[iv]

12. **Blending – During Initial Phase of Hostility**. Air Power can be employed in limited scale UCW during initial phase of hostilities. Following are few possible ways to blend conventional and UCW during such stage:

a. Airborne operations for UWF.

b. Clandestine operations.

c. PSYOP.

d. Logistic support to UWF.

e. Integration of Air Assets with intelligence network with UWF.

13. **Blending – During Later Phase of Hostility**. Conventional efforts of Air Power are likely to be exhausted after a certain period of a conflict. It is therefore rational to explore the ways and means for Air Assets to blend conventional and UCW in such situation. In addition to the ways and means mentioned before, blending can be achieved by following ways:

a. Utilization of Air Force manpower and equipment in UCW.

b. Utilization of communication expertise.

c. Integration of second line of defence.

d. Utilization of civil assets.

Airpower and the nature of war Impact

14. Despite some severe limitations airpower has transformed the nature of war. In the very first minutes of hostilities aircraft can appear over the very heart of a country, bringing death and destruction instantly to locations and populations that would normally need much campaigning and loss of lives as well as material. In keeping with the threat of this new military capability defence against air attack-interceptors, ground-based anti-aircraft guns, and surface-to-air missiles — have also improved rapidly. The race between offensive and defensive technologies has generally ended in favour of the offence.

TOPIC-12

OVERVIEW OF MOOTW

Introduction

1. The Military Operations Other Than War (MOOTW) encompasses the use of military capabilities across the range of military operations short of war. When instruments of national power are unable to achieve national objectives or protect national interests any other way, the national leadership may decide to conduct large-scale, sustained combat operations to achieve national objectives or protect national interests, placing the country in a wartime state. On the other hand, MOOTW focus on deterring war, resolving conflict, promoting peace, and supporting civil authorities in response to domestic crises. MOOTW may involve elements of both combat and noncombat operations in peacetime, conflict, and war situations. MOOTW involving combat, such as peace enforcement, may have many of the same characteristics of war, including active combat operations and employment of most combat capabilities.

2. All military operations are driven by political considerations. However, MOOTW are more sensitive to such considerations due to the overriding goal to prevent, preempt, or limit potential hostilities. In MOOTW, political considerations permeate all levels and the military may not be the primary player. As a result, these operations normally have more restrictive rules of engagement (ROE) than in war. As in war, the goal of MOOTW is to achieve national objectives as quickly as possible and conclude military operations on terms favorable to the United States and its allies. The purposes for conducting MOOTW may be multiple, with the importance or hierarchy of such purposes changing or unclear; for example, to deter potential aggressors, protect national interests, support the United Nations (UN), or provide humanitarian assistance.

Political Objectives and MOOTW

3. Political objectives drive MOOTW at every level, from strategic to tactical. A distinguishing characteristic of MOOTW is the degree to which political objectives influence operations and tactics. Two important factors about political primacy stand out.

a. First, all military personnel should understand the political objective and the potential impact of inappropriate actions. It is not uncommon in some MOOTW, for example, peacekeeping, for junior leaders to make decisions which have significant political implications.

b. Secondly, commanders should remain aware of changes not only in the operational situation, but also to changes in political objectives that may warrant a change in military operations. These changes may not always be obvious, but it is imperative that they are recognized, because failure to do so early on may lead to ineffective or counterproductive military operations.

Range of MOOTW

4. MOOTW provides the National Command Authorities with a wide range of possible response options, from noncombat operations such as HA to combat operations such as peace enforcement, strikes, and raids. I will now outline three specific types of MOOTW.

a. **MOOTW involving the use or threat of force**. In spite of efforts to promote peace, conditions within a country or region may result in armed conflict. When other instruments of national power are unable to influence a deteriorating or potentially hostile situation, military force or threat of its use may be required. The physical presence of these forces, coupled with their potential employment, can serve as a deterrent and facilitate achieving strategic aims. Should this deterrence fail, force may be required to compel compliance, in the forms of strikes or raids. There exists a singularly important threshold which may be crossed by use (or threat of use) of military force of any kind. In the range of military operations, this threshold marks the distinction between noncombat and combat operations.

b. **MOOTW not involving the use or threat of force**. Use of military forces in peacetime helps keep the day-to-day tensions between nations below the threshold of armed conflict or war and maintains US influence in foreign lands. Such operations include HA, disaster relief, arms control, support to US civil authorities, and peacekeeping. Such operations are inherently joint in nature. Although these operations do not normally involve combat, military forces always need to be prepared to protect themselves and respond to changing situations.

c. **Simultaneous Operations**: MOOTW often involve simultaneous operations. Noncombat MOOTW may be conducted simultaneously with combat MOOTW, such as HA in conjunction with peace enforcement operations (PEO). It is possible for part of a theater to be in a wartime state while MOOTW is being conducted elsewhere within the same theater. For example, during the final stages of Operation DESERT STORM, US Central Command conducted a noncombatant evacuation operation (NEO) in Somalia. In such situations, geographic combatant commanders should pay particular attention to integrating, coordinating, and synchronizing the effects and activities of their operations with other agencies.

d. **Duration of Operations**. Many MOOTW may be conducted on short notice and last for a relatively short period of time (for example, strikes and raids). On the other hand, some types of MOOTW may last for an extended period of time to achieve the desired end state.

Basic Principles of MOOTW

5. As we have discussed, MOOTW encompass a broad range of military operations and support a variety of purposes. The principles of war, though primarily associated with large scale combat operations, generally apply to MOOTW. There are six MOOTW principles: objective, unity of effort, security, restraint, perseverance, and legitimacy. The first three are derived from the principles of war, and the remaining three are MOOTW-specific.

a. **Objective**. The objective of MOOTW is to direct every military operation toward a clearly defined, decisive, and attainable objective. Commanders must understand the strategic aims, set appropriate objectives, and ensure that these aims and objectives contribute to unity of effort. Inherent in the principle of objective is the need to understand what constitutes mission success, and what might cause the operation to be terminated before success is achieved. Defining mission success may be more difficult in MOOTW but specifying measures of success helps define mission accomplishment. Commanders should translate their political guidance into appropriate military objectives through continuous mission and threat analysis. Finally, Commanders should be aware of shifts in the political objectives, or in the situation itself that necessitate a change in the military objective.

b. **Unity of Effort**. The goal here is to seek unity of effort in every operation. This MOOTW principle is derived from the principle of war, unity of command. It emphasizes the need for ensuring all means are directed to a common purpose. In MOOTW it is important that Commanders rely heavily on consensus building to achieve unity of effort. Commanders must also establish procedures for liaison and coordination to achieve unity of effort.

c. **Security**. The goal here is to never permit hostile factions to acquire a military, political, or informational advantage. This principle enhances freedom of action by reducing vulnerability to hostile acts, influence, or surprise. The inherent right of self-defense against hostile acts or hostile intent applies in all operations. Commanders should avoid complacency and be ready to counter activity that could bring harm to units or jeopardize the operation. Operations security is an important component of this principle of MOOTW. Security may also involve the protection of civilians or participating agencies and organizations.

d. **Restraint**. Judicious use of force is necessary, carefully balancing the need for security, the conduct of operations, and the political objective. Commanders at all levels must take proactive steps to ensure their personnel know and understand the ROE and are quickly informed of changes, otherwise it can result in fratricide, mission failure, and national embarrassment. ROE in MOOTW are generally more restrictive, detailed, and sensitive to political concerns than in war.

e. **Perseverance**. The purpose of this is to prepare for the measured, protracted application of military capability in support of strategic aims. Some MOOTW may require years to achieve the desired results. It is important to assess possible responses to a crisis in terms of each option's impact on the achievement of the long-term political objective. Often the patient, resolute, and persistent pursuit of national goals and objectives, for as long as necessary to achieve them, is a requirement for success.

f. **Legitimacy**. The goal here is to have committed forces sustain the legitimacy of the operation and of the host government, where applicable. In MOOTW, legitimacy is a condition based on the perception by a specific audience of the legality, morality, or rightness of a set of actions. If an operation is perceived as legitimate, there is a strong impulse to support the action, and in MOOTW, legitimacy is frequently a decisive element. Legitimacy may depend on adherence to objectives agreed to by the international community, ensuring the action is appropriate to the situation, and fairness in dealing with various factions. Another aspect of this principle is the legitimacy bestowed upon a government through the perception of the populace which it governs.

Types of MOOTW

6. There are several types of MOOTW that are appropriate for different situations, which are discussed below:

a. **Arms Control**. This is a concept that connotes any plan, arrangement, or process, resting upon explicit or implicit international agreement. Arms control governs any aspect of the following: the numbers, types, and performance characteristics of weapon systems (including the command and control, logistic support arrangements, and any related intelligence gathering mechanism); and the numerical strength, organization, equipment, deployment or employment of the armed forces retained by the parties (it encompasses disarmament). Although it may be viewed as a diplomatic mission, the military can play an important role. They may be involved in seizing WMD, escorting authorized deliveries of weapons, or dismantling, destroying, or disposing of weapons and hazardous material, all actions which help reduce threats to regional security.

b. **Combating Terrorism**. This involves actions taken to oppose terrorism from wherever the threat. It includes antiterrorism and counterterrorism. Antiterrorism programs are defensive measures taken to reduce vulnerability to terrorist acts and form the foundation for effectively combating terrorism. Counterterrorism is offensive measures taken to prevent, deter and respond to terrorism, which provides response measures that include preemptive, retaliatory, and rescue operations.

c. **Humanitarian Assistance**. HA operations relieve or reduce the results of natural or man-made disasters or other endemic conditions such as human pain, disease, hunger, or privation in countries or regions outside the country. HA provided by the military is generally limited in scope and duration, and is intended to supplement or complement efforts of host-nation civil authorities or agencies. HA operations can cover a broad range of missions. There are three basic types of HA operations: those coordinated by the UN, those where the country acts in concert with other multinational forces, or those where the country responds unilaterally.

d. **Nation Assistance and/or Support to Counterinsurgency**. Nation assistance is civil or military assistance (other than HA) rendered to a nation by the military forces within that nation's territory during peacetime, crises or emergencies, or war, based on agreements mutually concluded between the nations. Nation assistance operations support a host nation (HN) by promoting sustainable development and growth of responsive institutions. The goal is to promote long-term regional stability. These programs can be security assistance, foreign internal defense (FID), and humanitarian and civic assistance (HCA).

e. **Peace Operations (PO)**. PO are military operations to support diplomatic efforts to reach a long-term political settlement and are tailored to each situation and may be conducted in support of diplomatic activities before, during, or after conflict. Military PO are categorized as peacekeeping operations (PKO) and PEO. PKO are military operations undertaken with the consent of all major parties to a dispute, designed to monitor and facilitate implementation of an agreement and support diplomatic efforts to reach a long-term political settlement. PEO are the application of military force, or threat of its use, normally pursuant to international authorization, to compel compliance with resolutions or sanctions designed to maintain or restore peace and order. Unlike PKO, PEO does not require the consent of the states involved or of other parties to the conflict.

f. **Recovery Operations**. Recovery operations are conducted to search for, locate, identify, rescue, and return personnel or human remains, sensitive equipment, or items critical to national security. These operations are generally sophisticated activities requiring detailed planning in order to execute them. They may be clandestine, covert, or overt.

g. **Show of Force Operations**. These operations, designed to demonstrate US resolve, involve increased visibility of US deployed forces in an attempt to defuse a specific situation that if allowed to continue may be detrimental to US interests or national objectives. US forces deployed abroad lend credibility to US promises and commitments, increase its regional influence, and demonstrate its resolve to use military force if necessary. Shows of force operations are military in nature but often serve both political and military purposes.

h. **Military Support to Civil Authorities (MSCA)**. These operations provide temporary support to domestic civil authorities when permitted by law, and are normally taken when an emergency overtaxes the capabilities of the civil authorities. They can consist of temporary augmentation of air traffic controllers and postal workers during strikes, restoration of law and order after a riot, protection of life and federal property, or providing relief in the aftermath of natural disaster.

j**.** **Enforcing Exclusion Zones**. An exclusion zone is established by a sanctioning body to prohibit specified activities in a distinct geographic area. These zones can be established in the air, sea, or on land. The purpose may be to persuade nations or groups to modify their behavior to meet the desires of the sanctioning body or face continued imposition of sanctions, or use or threat of force. The measures are usually imposed by the UN, or other international bodies. However, they may also be imposed unilaterally by the Nations.

Planning Considerations of MOOTW

7. Plans for MOOTW are prepared in a similar manner as plans for war. The mission analysis and command estimate processes are as critical in planning for MOOTW as they are in planning for war. Of particular importance in the planning process for MOOTW is the development of a clear definition, understanding, and appreciation of all potential threats. Moreover, efforts should be made to include an intelligence element in the first deployment package and commanders should always plan to have the right mix of forces available to quickly transition to combat operations or evacuate.

MOOTW Command and Control Options

8. No single command and control (C2) option works best for all MOOTW. Commanders and their subordinates should be flexible in modifying standard arrangements to meet specific requirements of each situation and promote unity of effort. Communications planners must be prepared for rapid changes in mission that alter the types and priority of support provided. Interoperability of communications systems is critical to the success of the operation. C2 arrangements may vary based on necessary coordination with civil authorities and local agencies involved in domestic and foreign operations. C2 arrangements during support to civil authorities must be planned with unity of effort in mind, and provide communications links to appropriate agencies. In a disaster situation, routine communications may be disrupted and civil authorities may have to rely on backup communications systems. Military leaders should be prepared to establish communication linkages with these authorities.

Public Affairs

9. The worldwide media coverage provided by satellite communications makes planning for public affairs more important than in the past. This is especially critical in MOOTW, where there can be significant political impact. The media can affect the perceived legitimacy of an operation and, therefore, influence the success or failure of that operation. Commanders should develop a well-defined and concise public affairs plan to minimize adverse effect upon the operation by the media, and include their public affairs officer early in the planning process.

Logistics

10. In MOOTW, logistics elements may be employed in quantities disproportionate to their normal military roles, and in nonstandard tasks. Logistics elements may precede other military forces or may be the only forces deployed. Logistics personnel may be deployed to a foreign nation to support either national or multinational forces. These forces must be familiar with and adhere to any applicable status-of-forces agreement or legal, regulatory, or political restraints to which the United States is a party. Logistics planners should analyze the capability of the HN economy to accommodate the logistic support required by the national or multinational forces and exercise care to limit adverse effects on the HN economy. Logistics units, like all others, must also be capable of self-defense.

Education and Training

11. Readying forces for MOOTW requires building on the primary purpose of the Armed Forces — to fight and win the nation's wars. For most types of MOOTW, military personnel adapt their war fighting skills to the situation. However, for some MOOTW, like HA and PKO, war fighting skills are not always appropriate. Training for MOOTW requires a two-pronged approach.

a. The first prong is the professional military education of all officers and noncommissioned officers (NCOs). This education begins with basic leadership training and culminates at the senior Service or academy level. The focus of MOOTW education is to ensure leaders at all levels understand the objectives, principles, and characteristics of MOOTW and can plan and conduct these operations.

b. The second prong is the training of individuals, units, and staffs. The focus of this training is to ensure that individuals and units have the necessary skills for a given MOOTW, and that the staffs can plan, control, and support the operation. Some of the training includes joint training exercises and military skills training at individual and unit levels. There will most likely be insufficient time to train for a specific operation, which is why the two-pronged approach to preparing for MOOTW is critical. A well-trained force can adapt to MOOTW under the leadership of officers and NCOs educated in the principles and types of MOOTW

Conclusion

12. In MOOTW, commanders should rely on their knowledge of war fighting and training doctrine, but must understand the demands of MOOTW and be prepared to tailor war fighting skills to meet the MOOTW situation. Forces engaged in noncombat MOOTW should always prepare for transition to combat. Finally, success during MOOTW is founded in professional, skilled, trained, educated, and disciplined Soldiers, Sailors, Airmen, Marines, and Coast Guardsmen.