COMMAND AND STAFF TRAINING INSTITUTE
BANGLADESH AIR FORCE

Individual Staff Studies Programme (ISSP)

HISTORY OF AIR POWER
PHASE-12 : PART-II

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First Edition : January 2012

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Approved vide Air HQ/10066/Air Trg//Vol-46/64A date 18 Jan 2011.

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INTRODUCTION TO THE PHASE

Scope of the Phase

1. This phase has been prepared to give you a general idea on the topics mentioned under contents in page ii. Knowledge on History of Air Power is essential for all the Air Force Personnel. The concept on History of Air Power 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 History of Air Power and its application with the historical perspective. It is expected 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 History of Air Power in different wars over the years in the second phase.

TASK-1

EVOLUTION OF AIR POWER

The Beginning

1. The use of the expression 'air power' was first recorded in H.G. Wells's novel 'The War in the Air' in 1908. However, according to Professor Tony Mason the official birthday of air power has arbitrarily been selected as 1893, when a Major Fullerton of the British Army had presented a paper to a meeting of army engineers in Chicago in which he prophesied that the impact of aeronautics foreshadowed 'as great a revolution in the art of war as the discovery of gun powder' that 'future wars may well start with a great air battle' that 'the arrival over the enemy capital will probably conclude the campaign' and that 'command of the air would be an essential prerequisite for all land and air warfare. This date has been selected in preference to 1803 when the first airship company was formed in France; or 1883 when Albert Robida envisaged a sudden crushing air strike in his War of the Twentieth Century, or 1903 that marked the first heavier than air machine flight by the Wright brothers.

2. While the 19th century may well be credited with 'the conceptual visualization of air power, it was the epic heavier than air machine flight by the Wright brothers in 1903, which was the first concrete step in the fulfilment of the vision by 1909, aircraft had been inducted in military service. The first official record of the use of aircraft in actual combat was made in 1911 by the Italians in the Libyan campaign when Captain Moizo and De Rada flying in a military bi-plane Forman spotted an Arab encampment and proceeded to drop hand carried bombs on them.

3. Britain was amongst the pioneers in developing its air power Royal Flying Corps with its military and naval wings was established in 1912. Inter-Service rivalry soon surfaced and by 1914, despite opposition by Ghurchill, Royal Navy unilaterally broke away from RFC and established its own Royal Naval Air Service, under the direct control of the British admiralty. At the outbreak of WWI, RFC and RNAS thus formed two separate bodies under the aegis of British Army and Navy respectively. In the meanwhile, Germany, France and USA had also developed their air corps as a part of their land forces.

The First World War

4. At the outbreak of WWI in 1914, military aviation consisted of light wooden bi/tri planes with maximum speeds of under 100 mph and very limited load carrying capacity. Their roles were initially restricted to reconnaissance and artillery observations. While there may not have been any air power doctrine on the eve of WWI, there was no shortage of alarming speculations about strikes from the sky. Within seven weeks of WWI Sop with Tabloid of RNAS conducted an air raid on the Zeppelin sheds in Germany. A year later Germany retaliated when Zeppelins (airships) in turn bombed the English cities. The actual damage in all these raids may have been minimal but the psychological impact on civilians and populations was profound. With both sides using increasing number of aircraft for reconnaissance, artillery observations and occasional bombing raids, the inevitable

happened and aircraft started to shoot at each other to prevent the adversary from taking military advantage of the new medium. It marked the birth of fighter aircraft whose numbers proliferated and their performance took a quantum leap. The battle for 'control of the air' had truly begun. The first air power doctrine of gaining', control of the air had been established.

5. July 1917 marked a watershed in air power's history when German Gotha bombers raided London. The damage again was more psychological than real as the images of HG Wells's destruction from the skies appeared to become a reality. As a direct result of these attacks, Britain had established what amounted to a strategic bombing unit in France, known as the Independent Force, to conduct reprisal raids against the German homeland. The concept of strategic bombing whose mission was made independent of support to surface forces was born. This action laid down the seeds of a new service. Royal Air Force, independent of the Royal Army and Royal Navy was established in 1918.

6. WWI ended in 1918. During the war, all subsequent roles of air power had either been established or attempted, and the doctrines of command of air and support to surface forces had been firmly established. For the surface forces, roles such as close air support, transport support, reconnaissance, interdiction, artillery spotting, anti-submarine warfare, convoy escort, search and rescue and maritime strikes became vital contributors to the existing land and maritime strategies. Historian Lee Kennett aptly summed the progress made by air power during WWI when he wrote, "While the role of air weapon in the Great War was a modest one, the role of the Great War in the rise of air power was anything but modest".

The Inter War Years

7. WWI had glamorized air warfare and in the public eye combat pilots became the modern substitute of the knights in shining armour with their acts of gallantry, chivalry and dare devil exploits. This hero-worship of aviators was to continue during the inter-war years Newspapers and newsreels were filled with the exploits of Charles Lindbergh, Amy Johnson, Jimmy Doolittle, Amelia Earhart and many others like them. Aviation enjoyed a high public profile, which exerted a powerful psychological force. It also led to a continuous improvement in aircraft performance in all fields, making them much more effective war fighting platforms.

8. Giulio Dohet, an Italian military officer was one of the earliest advocates of air power. He had taken part in the air action in the Libyan campaign in Tripoli in 1911-12. An ardent supporter of strategic bombing concept and the military superiority of air power over other forms of warfare, he served in WWI organizing Italy's bombing campaign. For publicly criticizing the Italian high command for being responsible for Italy's aerial weaknesses, he was court-martialed and jailed. He was released, when his theories were proven correct by the defeat of the Italians by the Austrian Air Force at Caporetto. He was later recalled and promoted to Brigadier General's rank in 1921. In 1922 he was appointed head of Italy's aviation programme by Benito Mussolini. His book, 'Command of the air' was first published in 1921 and a revised version came out in 1927. It was regarded as a classic by early airpower theorists and had a major impact in shaping and development of air power

especially in USA and Britain. He argued that command of air should be the first objective during war and having achieved it, subsequent bombing of industrial and population centers would be so disruptive and destructive that the enemy would be forced to sue for peace. He maintained that control of the air followed by strategic bombing could win a war independent of land and sea power. Douhet is regarded as the father of air power.

9. While Douhet's postulates have had a profound effect on air power development in the 20th century, it has also come under a fair degree of criticism for overstating the impact of air power especially his assumption that air power alone could lead to en capitulation during war.

10. The next air power advocate to emerge during and after WWI was General Trenchard, the first commander of RAF. Trenchard believed in the offensive role of air power and was convinced that the primary mission of air power was to decimate the enemy through aerial bombardment. He strongly advocated the need to devote maximum resources to air development, for the main danger in future would come from the air. He argued that by denying the enemy the capability to conduct strategic bombing campaign against oneself and by conducting one against him, air power would lead to enemy's capitulation. He was convinced that unless the control of air was established, armies and navies would become powerless and that the days of big ships were past; they could no longer operate in the face of air power. As the chief of staff of the world's first independent air force, General Trenchard's thinking was to have a major impact on RAF's force composition and performance during WWII.

11. The third key air power advocate to emerge during the post WWI era was an American, Billy Mitchell. He is the most famous and controversial figure in American air power history. The son of a wealthy Wisconsin senator, he enlisted as a private during the Spanish American War and quickly gained a commission due to the intervention of his father. He had an outstanding war record and after challenging tours of Philippines and Alaska, Mitchell was assigned to the Army General Staff, at the time its youngest member. He became interested in aviation and its possibilities. In 1916 at the age of 38, he took private flying lessons. Arriving at France in 1917 as a part of the American contingent, he quickly took charge and began preparations for American air units that were to follow. By the end of WWI, Billy Mitchell was the top US airman. He returned to USA in 1919 and immediately became a very strong advocate of air power. Mitchell was greatly influenced by Douhet's theories. He was appointed the deputy chief of the Air Service. In this capacity his relations with superiors continued to sour as he began to attack both the war and Navy Departments for being insufficiently farsighted regarding air power. When Mitchell suggested that US air power could better defend the nation's coasts from attacks by warships than US sea power, a controversy developed as to whether an airplane could sink a battle ship. Live tests were conducted in June/July 1921 and Sept 1921. Mitchell's bombers sank three captured German vessels and an obsolete USS Alabama in the first trial and sent two more obsolete US vessels to the bottom in the next one.

12. The success of the bombing trials encouraged the advocates of air power to press for a separate air arm but the Army General Staff remained convinced that air power on its own could not win a war and at best it had an important but supporting role. Mitchell

became increasingly critical of his superiors and began to go public on his criticism of the high command. His actions could no longer be tolerated and in December 1925 he was found guilty before a court martial of violating the 96th article of war and was suspended from duty for five years. Mitchell resigned in 1926.

13. In conformity with Douhet and Trenchard's theories, Mitchell postulated the potency of air power in any future conflict and that air power would be the most decisive element in any future conflict. He too advocated that strategic bombing could on its own defeat the enemy.

14. Douhet, Trenchard and Mitchell were passionate advocates of air power, perhaps too passionate and all three seems to have overstated their case. While a majority of their theories and prophecies have come true, their claim that air power alone could win a war has yet to be proven. They seriously failed to visualize the defensive warfare against air threat in the form of fighter aircraft and round defenses, which could and did reduce the impact of air power especially in the strategic bombing role. They also grossly underestimated the continued requirement of naval and land forces and the people's will to resist aerial bombardment.

The Second World War : Blitzkrieg

15. The next major milestone in the history of air power was the Second World War. The study of air campaign during WWII has to begin with the German Blitzkrieg.

16. Tanks and aeroplanes were the two new elements of warfare that had been introduced during WWI. During the inter war years, the British, French and other European powers “had failed to grasp the inherent speed and range of the air weapon that had made the time and space factor which prevailed in WWI outdated and irrelevant. By contrast, the Germans' innovative combination of aircraft, fast armour, infantry and modern communication in the form of blitzkrieg demonstrated a battle winning understanding of what amounted to a revolution in military affairs. These concepts were first tested and improved upon during the Spanish War of 1936. When the Germans finally unleashed the coordinated attacks by its Panzer (tank) divisions supported by the infantry with the Luftwaffe dominating the skies during WWII in what now the world knows as 'blitzkrieg' operations, it overran Poland and the rest of western continental Europe. According to the historians, at the eve of WWII, French aircraft and tanks were technically superior to their German counterparts yet France was steamrolled into submission by the fury of the German blitzkrieg In the blitzkrieg operations, Luftwaffe demonstrated the doctrines of control of air and support to surface forces with such brutal efficiency that it stunned its opponents into submission. Blitzkrieg was a perfect example of air power acting in unison in support of the ground forces.

17. While the contribution of Luftwaffe in the defeat and submission of Western European nations was significant, it had been developed more as a tactical air force to be used in support of the surface forces. The three primary missions of Luftwaffe were 'to combat enemy air forces' (win command of the air), 'intervene in ground or naval actions' (close air support) and 'combat the sources of the enemy's strength and disrupt his logistics

supplies to the front line (interdiction).Conspicuously absent was the mission of strategic bombing which Douhet, Trenchard and Mitchell had so strongly advocated as the primary task of air power. General Max Wever, the German Air Force Commander who was unfortunately killed in an aircraft accident in 1936 was aware of this shortcoming and development of four engine heavy bombers was on the drawing board. However after his death, this project was abandoned as the German high command believed that the available twin-engine bombers could be used both in the tactical and strategic role. While this assumption did not affect Germany's war aims in its campaign against the neighbouring states, when Hitler decided to take the war westward over the North Sea and eastward into the Soviet heartland, he had no weapon to match his political objectives. Lack of long-range heavy bombers that could conduct sustained strategic bombing operations against UK and USSR was a serious shortcoming that was to cost Germany dearly.

Battle of Britain

18. Having subdued Western Europe, Hitler turned his attention to Britain. Operation 'Sea-lion', which envisaged landing of troops in England through amphibious operations was planned. For the amphibious operation to succeed, control of air over England had to be established by Luftwaffe. This set the scene for the Battle of Britain which witnessed sustained and massive offensive counter air operations by Luftwaffe in abid to subdue and neutralize Britain's RAF. RAF's fighter bases, air defence network, command and control centres, logistic dumps were attacked on ground by German bombers while German fighters engaged British fighters over England in a do or die battle. Despite the lack of heavy bombers, by September 1940, Luftwaffe had the measure of RAF and was beginning to win the battle for command of the air. According to professor Mason, RAF's fighter command had lost approximately one-third of its flight commanders and role-fifth of its squadron commanders. The survivors were flying up to four sorties a day and there were no reserve squadrons fit to replace the battered ones. The lone raid of Berlin by RAF bomber command during the battle so infuriated Hitler that a switch from counter air operations against RAF to attacks on London's civilian population was ordered. This switch relieved the direct pressure on RAF Fighter Command and it was able to regroup and inflict such heavy casualties on the German bombers that eventually Hitler had to call off the air campaign. Inability of luftwaffe to win the air superiority battle over England led to the abandonment of operation Sea lion while Hitler turned his attention to USSR. The British nation paid a very heavy price in terms of civilian casualties during the attacks on London but the survival of RAF resulted in the even trial victory for Britain in repulsing the German, assault. Historians agree that the decision by Goering, the German Air Commander to switch German bomber attacks from fighter command to London on 7 September 1946 was the turning point in the Battle of Britain.

19. Three keys lessons emerged from the Battle. First, winning the control of air is an essential prerequisite to any modern land/sea offensive. Second, luftwaffe's rack of heavy long-range bombers, which could conduct sustained strategic bombing offensive, was an important factor in Germany's inability to win the Battle. And finally the campaign disproved the assertion of Douhet and Mitchell that heavy aerial bombardment of civilian centers would result in rapid loss of morale and would lead to the nation's capitulation. The early air power visionaries had seriously underestimated the will, determination and resolve of human beings to resist subjugation by force.

African Campaign

20. The African campaign by the Americans is an important landmark in the context of air power because one of the lessons that came out of it had a profound effect on the development of air power as an independent service.

21. During the African campaign, American Air Corps had distributed its considerable assets to the various Army formations operating there. The German air assets in Africa by contrast were all under the command of Luftwaffe. While the American air assets in Africa were superior to the ones deployed by luftwaffe both in quality and quantity, the latter by virtue of being under one command was able to concentrate superior numbers on individual American air formations and caused substantial damage. Although the allies eventually prevailed due to a host of other factors, the performance of American Air Corps was not compatible with its potential. On the instructions of General Eisenhower a committee was formed to conduct a thorough analysis of the air campaign. One of the principle findings of the committee was that deployment of American air assets in penny packets had resulted in their less than optimum utility. The principle of 'unity of command' had been violated. Since then, unity of command is considered as one of the air power doctrines. The findings of the committee eventually led to the independence of US Air Corps and USAF was established in 1947 with very few exceptions all new air forces that came into being after WWII have been created as independent services.

Strategic Bombing Campaign of German

22. Under the influence of General Trenchard, RAF had developed a sizeable bomber force for conducting strategic bombing on its adversaries. After surviving the Battle of Britain onslaught, this force was unleashed to attack Germany. The campaign commenced with large formations conducting daylight bombing missions but heavy casualties primarily due to Luftwaffe fighters reached a level where the high degree of attrition could no longer be sustained. Besides the heavy losses, the accuracy of the bombing campaign during actual combat was far lower than what had been achieved during peacetime trials. Daylight bombing was not having the desired results RAF then switched to night bombing raids only While night raids did lower the attrition rate to a manageable level, as Luftwaffe did not possess an adequate night fighter, it resulted in even lower bombing accuracy. The effect of strategic bombing campaign reduced further.

23. Trenchard had made two faulty assumptions in his advocacy of offensive operation through strategic bombing. He had erroneously believed that his bombers were armed and protected well enough to run the gauntlet of enemy fighters relatively unscathed and therefore did not need fighter escorts. Britain had not invested in long-range fighters, which could escort the bombers and protect them for enemy interceptors. Trenchard and his staff also made the mistake of basing their calculation of bombing accuracy on peacetime trials. During actual combat with enemy fighters lurking around and very heavy anti-aircraft ground fire, bombing accuracy was nowhere close to the peace time: results. Much more bombers were needed to take out a target than had been anticipated. When daylight bombing attrition reached an unacceptable level, and because RAF had failed to develop long-range fighters capable of escorting the bombers up to their targets, it had no option but to discontinue day bombing sorties and resort to night bombing.

24. The Americans entered the fray later but they were able to deploy far larger assets than Britain. The Americans were also strong advocates of strategic bombing and they too commenced their operation with massive daylight raids over Germany. RAF's experience was repeated and the American attrition rate was nearly double of what had been anticipated. Unlike RAF however, the Americans did not abandon their daylight raids as they correctly assessed that night bombing would further lower the effectiveness of the campaign due to loss in accuracy, and will jeopardize the mission. The Americans were fortunate in that they had developed long-range fighters in the shape of P-51 Mustangs that could escort their bombers right upto their targets. Mustangs were deployed in the escort role with the bomber formations. This move brought a dramatic reduction in the attrition rate. The P-51s being superior to any of the contemporary German fighters began to take a heavy toll of German interceptors. P-51s managed to establish air superiority around their bombers over the German hinterland.

25. The strategic bombing campaign oyer Germany was a long drawn affair. While it did not result in quick capitulation of Germany, nor could it be solely credited with bringing about the defeat of Germany on its own, most critics agree that it played a very vital role in the eventual success of the allied victory in Europe.

The Pacific War

26. The Pacific War began with the Japanese attack on Pearl Harbour on December 7, 1941. As early as in 1924, Mitchell following a trip to Japan had submitted a report where he foretold of Japanese expansionist ambitions in the Pacific and presented what he considered would be the start of a Pacific War. According to Mitchell the Pacific War would start with a Japanese air and sea attack upon Pearl Harbour in Hawaii with an accompanying aerial attack on the Philippines, at 7:30 AM and 10:40 AM respectively. In actual event, the attack on Pearl Harbour occurred at 7:55 AM and at Philippines at 12:45 PM on December 7, 1941. Mitchell was off by only 25 minutes for Hawaii arid less than 2 hours for the Philippines.

27. Pacific War was primarily a naval/air campaign with air power playing a decisive role. Air power deployed in the Pacific was both sea-based (carrier task forces) and land-based. It was a battle between the two opposing carrier groups attempting to wrest sea control and command of the air from each other. Eventually USA prevailed and the dropping of two nuclear bombs over Hiroshima and Nagasaki ultimately sealed the fate of Japan Douhet and HG Wells's prophesy of subjugation of the enemy through massive destruction of his civilian population and infrastructure through massive aerial bombardment appeared to become a reality. The bombing marked the dawn of the nuclear age, which has brought about its own dynamics, very different to all previous military strategies. Mercifully the world has not witnessed another use of nuclear bombs in all the subsequent conflicts since then but nuclear strategy has had a very profound effect on the way nations have approached conflicts when one or both the antagonists were in possession of nuclear weapons. Nuclear warfare is a completely new form of warfare and while it is linked to air power, it must be and is being treated differently than all forms of conventional warfare.

28. The impact of air power on naval warfare was comprehensively demonstrated in the Pacific War. To the credit of naval forces, rather than oppose the new medium of warfare, navy almost universally has absorbed it as one of its integral parts, just as it had adopted the submarine forces. Now a modern navy operates in all the three dimensions: Surface, sub surface and above the surface.

29. Another interesting comment on the conduct of the Pacific War was that this was the first and perhaps only occasion to date when land forces operated in support of air power. Land forces in amphibious assaults were used to capture Pacific islands from the enemy where air bases were set up for attack on Japanese mainland in what is also referred to as the leapfrog strategy.

Role of Air Power During WWII

30. The role of air power during the Second World War can be summed up in two quotes, one by Winston Churchill and the other by Professor Tony Mason. While speaking at the Massachusetts Institute of Technology in 1949, Churchill had commented: "For good or ill, air mastery is today the supreme expression of military power. And fleets and armies, however necessary and important, must accept subordinate rank. This is a memorable milestone in the march of man." Professor Tony Mason in his book Air Power-A Centennial Appraisal, states. " Air power had been peripheral between 1914 and 1918. In the Second World War it dominated most theatres and in at least two was decisive."

The Korean Conflict

31. Flush from its victory in WWII, American forces, this time under the auspices of UNO were soon involved in the Korean peninsular. In 1950 when Communist forces in Korea militarily overran the entire Korean peninsular, American forces as a major part of UN forces decided to intervene.

32. Inchon landing led by Mc Arthur marked the counter offensive by the UN forces following its successful landing at Inchon. UN forces pushed back the North Koreans to the 38th parallel before a truce was declared. US air power was crucial to the success of the Inchon landing and the subsequent counter offensive. This phase of the war clearly demonstrated the crucial role air power could play in support of its surface forces.

33. Once truce was declared on the 38th parallel, an uneasy ceasefire on the ground took effect. At that stage the American air strategists proposed that the war could be successfully prosecuted by an air interdiction campaign against the North Korean forces. Operation Strangle was formally launched.

34. Operation Strangle aimed at strangling the communist forces of their provisions and supplies through a sustained campaign of air interdiction behind the enemy lines. This, it was hoped, would prepare the way for the allied invasion of North Korea itself. The operation began in earnest but despite its best efforts, it failed to achieve its military objectives. Three factors can be identified for the failure of the campaign. First, UN air power was operating under political constraints: they were not allowed to attack the enemy

air bases which were operating from within mainland China for fear of further escalation into WWIII North Korean and Chinese air power operating from Chinese mainland did not permit a free run to the interdicting forces. UN forces were not able to establish total command of the air & resultantly, the overall effectiveness of the interdiction mission reduced. Second, the technology available in 1950s was not advanced enough in terms of accuracy and lethality to inflict the kind of damage on the enemy that would paralyze its logistics support. And finally the manpower-intensive supply lines of the Chinese proved too resilient to interdiction. Coupled with the fact that with a truce in place and the front not being active, the total logistics needs of North Korean forces was comparatively much lesser Interdiction campaign did slow down the North Korean supplies but failed to halt them.

35. The air power statistics used in the Korean conflict were formidable. The allied forces alone flew more than a million sorties; over 476,00 tons of explosives were dropped and more than 2000 aircraft were lost in the four years. Yet the aspiration that superior air power by itself would be sufficient to win a conflict was wide off the mark.

The Vietnam War

36. In the Vietnam War, over one million fixed-wing and 37 million helicopter sorties were flown; 3700 fixed-wing and 4900 helicopters were lost in the campaign. New concepts of close support using both ground and airborne forward air controllers were-successfully developed. The conflict also witnessed widespread use of Surface to Air Missiles (SAM) and its counter through tactics, Electronic Countermeasures (ECM), & anti-radiation missiles. Precision-guided munitions were developed and deployed during the conflict with devastating effect but their introduction had come about at a fairly late stage, when the American public had appeared to lose the will to fight 'someone else's battle'. Air supremacy was established despite the restrictions due to political reasons of not attacking North Vietnamese aircraft on their bases. Yet airpower failed to determine the outcome of the war. American forces eventually withdrew from the conflict without achieving their military or political aim.

37. Unsuitable terrain, lack of public support for the campaign by the Americans, a very resilient enemy, excessive political interference and general backwardness of the enemy (no worth while counter value targets) are some of the major factors that have been put forward for the failure of airpower to deliver victory. The oft-quoted assertion that since 1939, no state has lost a war while it maintained air superiority was once again disproved. As one USAF analyst has very aptly surmised. "Difficult to fathom is the air chiefs' lingering conviction that their doctrine was right throughout Vietnam and that it is right for the future. For the Air Force, the guerrilla struggle during most of the Vietnam war was an acknowledged anomaly that may well reappear. Bombing doctrine remains geared to a fast paced conventional war, and the conviction that such doctrine is appropriate for any kind of war permeates the service."

The Arab Israeli Wars/1967-1973

38. If the Korean and Vietnam Wars had brought out the inadequacies of air power, the Arab / Israeli Wars of 1967 and 1973 again demonstrated its dominance in a conventional war. In both these conflicts, air power played a major role. In 1967, having won the command of the air on the very first day through a pre-emptive offensive counter air operations, Israel Air Force (IAF) brought to bear such effective bombardment on the Arab land forces that it became relatively simple for the Israeli Army to defeat them. Even in 1973, airpower was dominant. IAF's inability to win the command of the air initially cost them dearly but in later stages through substantial technical and logistical support of USA, IAF succeeded in neutralizing the Arab Air Defence Network. From then onward, IAF's support to their land forces helped turn a likely defeat into victory. By the time cease-fire was declared, Israel had gained the upper hand in the conflict.

39. Air power has been the chosen security instrument of Israel. Superior technology, better training, a topography and climate ideal for exploitation of air power and an air power doctrine in complete harmony with the strategic environment are some of the key factors that have given IAF a decisive edge over its Arab adversaries. To this list, one must also add the unqualified and unstinted support of USA that Israel has enjoyed since its very inception. Massive financial and technical support of USA has ensured the superiority of IAF over its neighbours. This support is not restricted to peace time only. During the 1973 War, besides logistics support, Israel benefited immensely from the satellite intelligence gathering of US spy satellites. This single factor had tilted the balance in favor of Israel.

Indo-Pak/Iraq - Iran Wars

40. Pakistan and India fought two wars in 1965 and 1971 with both the conflicts ending within three weeks. By contrast Iran-Iraq War lasted for nearly a decade, While air power was applied in all these conflicts, the historical verdict is that the rote of air power was peripheral and it did not effectively influence the outcome of the conflicts. In the 1965s Pakistan-India conflict, Pakistan Air Force did enjoy the upper hand in air combat and had created a degree of favourable air situation over the battlefront, but neither side could establish total air superiority. Air power was largely restricted to ground support and the air war came to an early halt because of shortage of spares and weapons as a result of the imposition of international embargo. In 1971, India did achieve air supremacy in the Eastern Wing against an adversary whom it outnumbered by a ratio of over to 12 to 1 and it took three days to achieve what a more efficient air force could have achieved in a single day. Given the disparity between Indian and Pakistani forces in East Pakistan and the near hopeless political environment being faced by the latter, military defeat for them was inevitable the contribution of Indian air power in the sector notwithstanding.

41. Iran-Iraq fought each other to a stalemate in 1980s. Initially Iran had a technological edge over Iraq with F-14s, and F4s in its inventory. Iran did use its air assets to attack oil facilities and other counter value targets in Iraq but in due course, cut off from US sources of weapons and spare parts, the effectiveness of Iranian Air Force diminished rapidly. Iraqi Air Force too did not possess sufficient offensive strike aircraft to make much impact. Iran-Iraq war was primarily fought by their ground forces. Air power had little influence in the final outcome of the war.

42. The one obvious lesson that comes out very clearly from these conflicts is that nations who are heavily dependent on others for their air power inventory can rarely take full advance of the potential of their air-assets. Heavy dependence on other nations for key defeeds invariably leads to a loss of freedom and sovereignty during the conduct of war.

Bekka Valley Campaign

43. Essentially a one-day campaign, Bekka Valley operation was planned by Israel to take out all the air defence units in the Valley in a single coordinated air assault. The presence of Syrian SA-6 units in the east of Bekka valley was constraining IAF's contribution when Israeli Defence Forces (IDF) had launched operation Peace in Galilee in 1982. These units had to be taken out.

44. IAF painstakingly plotted the position of every SA-6 unit in the valley. On 9th October 1982 Israeli long-range artillery and surface-to-surface missiles engaged the Syrian missile batteries. IAF aircraft followed up with aerial attacks using free fall bombs and anti-radiation missiles. When Syrian Air Force rose to defend the air defence complex, IAF's F-15 and F-16 fighters equipped with the most modern air-to-air missiles, airborne radars and electronic warfare package massacred them. This was the most one-sided air victory in the history of air power. In terms of the evolution of air power, Bekka Valley campaign was a generation ahead. This campaign is relevant because it was a harbinger of how the next air battle would be fought. The Gulf War of 1990/91 was to demonstrate the same philosophy on a much larger scale.

The Gulf War

45. Iraqi invasion of Kuwait on 2nd August marked the beginning of the Gulf War that ended with a ceasefire on 28 February 1991. The actual lighting took place for only 43 days from 17 January 1991. Upto 24 February, the war was prosecuted almost exclusively from air in the ground offensive that lasted from 24th to 28th February the Coalition Forces encountered little resistance and Iraqi army was expelled from Kuwait. All this was achieved at a paltry cost of only 340 coalition combat deaths and 776 injuries. According to the then American Defence Secretary Dick Cheney the Iraqi forces collapsed as rapidly as they did because of the air campaign that was mounted against them. This has been the common theme explaining the overwhelming and speedy Coalition success. As Professor R A Mason has very rightly observed, 'The Gulf War marked the apotheosis of twentieth century air power."

46. The phenomenal success of air power has given rise to a number of illusions, the most widespread being that air power alone had eventually forced the Iraqis to vacate Kuwait. While there is little doubt that air power was fundamental to the ultimate Coalition victory, it was the ground campaign that finally led to Iraq's capitulation in Kuwait.

47. Dr James A Mowbray has correctly concluded that 'Technology helped to win the fastest lowest casualty, almost devastatingly destructive one-sided war in recorded history. Air Force capabilities had come of age.' Col Warden, the architect of Desert Storm air campaign has elaborated the technological advancement made by air power further by

saying, ‘To have a 90 percent probability of putting one bomb on a target of the size of a normal room in WWII it needed 9000 bombs or over 1000 B-17 sorties-which meant putting 10,000 men at risk over the target. A F-117 class aircraft will achieve the same probability in a single sortie’. Between the Second World War and the Gulf War, bombing accuracy had registered a 1000 percent increase.

48. In the Gulf War, air power demonstrated its ability to strike at the strategic heart of a country with maximum precision and minimum collateral damage and casualty. It proved beyond any shadow of doubt that air power has become an integral component of modern warfare.

SUMMARY

49. Robin Higham has aptly summed up that "the history of air power has been confused by the bragging of its prophets and the derisions of its enemies. Too often vision has outrun reality and resulted in disappointment and reaction. As newcomers forced to plead from a position of weakness, airmen carried arguments to their logical extremes and talked about what air power was going to be able to do, and their listeners tended to target that these were prognostication, accepting them as imminent realities”. He further concludes that Air Power already has the capacity to determine the outcome of conflict. But not necessarily all conflicts.

50. The progress of air power so far has brought out that Douhet's vision of destroying an enemy's will to resist by air attack alone remains a vision, and that the attainment of air superiority alone has not yet brought a country to its knees. After 100 years there is still no incontrovertible evidence that strategic bombing has been decisive in breaking the determination of any opponent to carry on fighting. Even in Desert Storm, strategic air attacks on Iraq by itself did not lead to its withdrawal from Kuwait. A ground offensive was needed to achieve the Coalition's military and political aims.

51. The equation between modern air power and the other components of military force has been very eloquently expressed by CoI Warden where he 'likened the relationship between armies, navies and air forces in war to a solo instrument in a concerto, where the composer having decided upon his objective selects the appropriate instrument which, translating the metaphor, becomes the key force in the music and in war. The instrument will vary from concerto to concerto; on some occasions it will be a soloist, on others it will harmonize, on others it will fall silent. Orchestration, not subordination or integration is the sine qua non of modern warfare'.

TASK-2

AIR POWER THEORISTS

Giulio Douhet

1. **Background**. Born into a military family in Italy in 1869 Giulio Douhet served as a professional artillery officer. He was never trained as a pilot but was appointed as the commander of Italy's first aviation battalion before World War I. Douhet was a prolific writer and had successfully marketed several plays and poems before the war.

2. **A Continental Theorist**. During World War I, he was critical of the Italian army high command that he was court-martialed and imprisoned for one year. However, the Battle of Caporetto began and demonstrated that Douhet had been correct; he was later forgiven. Soon after the war, Benito Mussolini came to power and Douhet was given a place of honour, but he left the service and passed his remaining years in writing and speaking out for airpower. He brought forth his Command of the Air in 1921 as an official publication. American scholars were made aware of the publication soon after its release through partial translations and word of mouth, even though a published English version did not appear until 1942 Douhet died in 1930.

3. **Modus Operandi**. Douhet was a talented writer and propagated his ideas mostly by the written word. He was an innovator and had the quality of a gadfly about him. He was reported to be a cranky individual and not very tolerant of fools. During World War I, as noted, his impolitic criticism of his military and civilian superiors landed him in jail.

4. **Assumptions**. By most accounts, Douhet was extremely dedicated to logical thought process perhaps excessively so. But even the most logical processes can result in disaster if they are founded upon false or faulty assumptions. Among his most prominent misconceptions were the following statements:

   a. Airpower is inherently offensive; the bomber will always get through.

   b. All wars will be total wars.

   c. Civilian morale is unstable.

   d. The hegemony of the defensive form of ground warfare is permanent.

5. **Thesis**. Douhet argued that an early air attack one the enemy's vital centers could win a humane victory, while surface forces could contain the enemy. It is a stretch of the imagination for the modern reader to imagine that bombing cities could be considered a humane way of war. Yet it is more understandable if one re-examines the context:- in which Douhet was writing and speaking-in the presence of the recent memory of the blood and gore of the long agony in the trenches and the absence of the knowledge of Hamburg, Dresden, Tokyo, and Hiroshima. Too, the notion that the world would ever return to the kind of limited wars-of the eighteenth century-seemed quaint in the 1920s and 1930s. Thus, the

idea of increased violence to be endured through only a much shorter period was not as far-fetched as--many authors now believe. In the words of Douhet:

> "Mercifully, the decision will be quick in this kind of war, since the decisive blows will be directed at civilians, that element of the countries at war least able to sustain them. These future wars may yet prove to be more humane than wars in the past in spite of all, because they may in the long run shed less blood."

6. **Targeting**. More ink has been spilled and passion expended over the proper selection of targets than over any other airpower subject. Dwight D. Eisenhower's decision to go after the French rail yards instead of Gennan synthetic oil plants before Overlord provides just one case in point. Douhet himself made the following remark:

> All this sounds very simple; but as a matter of fact the selection of objectives, the grouping of [attack] zones, and determining the order in which they are to be destroyed is the most difficult and delicate task in aerial warfare, constituting what may be defined as aerial strategy.

7. **Air Superiority**. Douhet argued that the first step in war-gaining command of the air – is achieved best by attacking the enemy's airpower on the ground, at the airfields, and in the factories. In his mind, this is so because of the vastness of space: A bomber was but a tiny speck there, and the chances of a defensive fighter discovering it, climbing up to catch it, and still having gas enough to fight the intruder were almost zero. This conclusion fostered the notion that airpower is inherently offensive. It could fly over all enemy defences without defeating them and still go directly to the heart of enemy power.

8. **Air Exploitation** Once command of the air is won, the next step is to exploit that advantage immediately to punish the civilians. This way, civilians will coerce their own government to come to terms to end their suffering. In fact, Douhet argued that the mere act of gaining command might be enough. Enemy vulnerability would be so great that their leaders would soon likely recognize it and capitulate. If not, attacks on the cities and other vital targets would so depress the people that they would force the leadership to give way. This development would happen so rapidly that the total suffering would be less than it would be in the trenches-a major objective and selling point for his theory.

9. **Organization for War**. As noted earlier, Douhet argued that the humane short war could not be brought about under traditional military organizations. Armies and navies were certain to employ airpower as an auxiliary to the infantryman and the battleship. According to Douhet, to bring about victory over the enemy before the collapse of one's own civilian morale would require organizing air power under a separate air force. Only- in that way could air leaders employ air Power as an independent force to achieve victory without any need for tactical victories on the sea or in the trenches.

10. **Role of Other Armed Forces**. Since the time of the French Revolution at the latest, humanity has generally recoiled at the horrors of war. For most people, the next best thing to peace is a short war. Usually, those who fire the first shot, be they Confederates or

the Wehrmacht, make a short-war assumption. In light of Douhet's argument that independent airpower would achieve the objective in a trice without surface struggles, anything not invested in airpower could be no more than a necessary evil. He asserted that the other armed forces were only to stand on the defensive until the air force offensive had been quickly decisive.

11. **Force Structure**. Economy of force principles therefore would be applied to armies and navies to concentrate the maximum combat power in the main attack. Douhet recognized that he was writing from an Italian perspective. Italy was essentially an island with water on three sides and the Alps to the north. Additionally, the country was so poor that it could not afford a complete array of armed forces to act against conceivable contingencies. He did allow that other nations, like the United States, had the resources to field more than just a strategic air force and might have reason to do so.

12. **Technology**. Douhet was highly assertive regarding his notion that aircraft devoted to the support of armies and navies were worse than a pure waste. He believed they detract from the main effort, which must be the battle for command of the air. In addition, aircraft concentrated in the Independent Air force were not to be of the small fighters or attack variety. Only one type of airplane was to be required, the battle plane;. This' airplane must have moderate speed, long range, and heavy armor for self-protection. If escort protection were required, battle planes could be made a part of the strike package, even though these planes could be armed only with self-defence weapons. Everything not put into bombing battle planes was a diversion that would weaken the main effort and reduce the probability of success. The battle plane bombers would have to have a combination of high explosive and incendiary and gas bombs to have a synergistic effect.[16]

Hugh Trenchard

13. **Background**. Born in 1873 Hugh Trenchard was well along in his military career when he learned to fly in 1913. He fought much of World War I as head of the Royal Flying Corps in France and at that point was firm in his vision of aviation as an auxiliary to the Army.

14. **British Empire Theorist**. At first, he opposed the creation of an independent air force and the idea of strategic bombing. He was stout in his commitment to the prefer ability of offensive operations for air forces-and suffered substantial losses because of it. Trenchard nonetheless wound up in command of the Independent Air Force (IAF) in France in 1918. It was created in reaction to the German bombing of London and was charged to undertake retaliatory bombing of targets in Germany. The war ended before Trenchard's force could conduct much strategic bombing; therefore, most of its effort was in support of the armies. When Trenchard returned to the United Kingdom, he was appointed chief of the air staff of the Royal Air Force (RAF). He soon became an advocate of strategic bombing and of colonial control through the use of airpower instead of ground power. He remained in his post through the first decade of the RAF's existence and was beleaguered by both the army and navy because they were generally determined to undo the creation of the RAF in 1918. He lived on for a long time after he retired in 1929, dying in 1956. "Billy" Mitchell had a considerable acquaintance with Trenchard, who had many personal contacts among the USAAF senior officers even into World War II.

15. **Modus Operandi**. A taciturn person with poor writing and speaking skills, Trenchard achieved his objectives mainly through internal communications without resorting to much dash and posturing. He was a conditioning factor for many years and an influence on the founding of many of the RAF's ideas and institutions. His ideas were at the center of the RAF doctrine manuals and the staff college. However, for the first several years, the major occupation for Trenchard and his staff was defending the RAF against army and navy attempts to have it abolished.

16. **Assumptions**. On the surface Trenchard's assumptions seem to have much in common with the following assertions of Douhet.

a. The bomber will always get through; it does not need escort.

b. Civilian morale is fragile but the British [morale] is tougher than the German and the moral effect of bombing is much more devastating than the physical effect.

c. The offensive is the stronger form of air war.

d. Night navigation target acquisition, and bombing accuracy are manageable problems.

e. Air superiority is a prerequisite for all other military operations.

17. **Thesis**. Trenchard's core idea was that victory could be achieved by bombing enemy vital centers and thus breaking his will. He was a little vague from time to time on what those centers were, but Trenchard seemed to suggest that civilian morale could be undermined by attacking vital industrial and communications targets and that the resulting loss of will would cause the civilians to pressure their movement into making terms. Trenchard argued early on that the RAF could do more to maintain order in colonial areas much more cheaply than the other services. His theory of air control asserted that relatively light air attacks supported by armored car ground units could achieve the same end with far fewer financial resources and people than the number the army would need.

18. **Targeting**. For Trenchard, as with Douhet, the timing of operations for air superiority took precedence. However, scholars should not project RAF city bombing against morale in World War II backward to Trenchard's time in office to make his ideas identical to Douhet's. Trenchard's targeting scheme against morale was vague, but he insisted on following international law, limiting collateral damage, selecting targets in urban areas for their military significance, and attacking vital centers in the infrastructure and production systems.

19. **Air Superiority**. As noted, air superiority was a prerequisite for all other operations. Having been disappointed with airfield attack in World War I, Trenchard believed that at least part of the struggle would take place with an air battle. He asserted most strongly throughout his career that engagements over land or sea would commence with a clash of air forces for control of the air. Also, these forces would strongly tend to be determinants of the final outcome because the future course of events depended heavily on the outcome of the first collision.

20. **Air Exploitation**. Both Trenchard and Douhet aimed at the collapse of civilian morale, but Trenchard wanted to achieve it indirectly through destruction of infrastructure targets and the like, while Douhet wanted to attack the people directly. Trenchard no doubt favored independent operations but made a greater allowance than Douhet did for cooperation with other services in operations against the enemy's fielded forces.

21. **Organization for War**. Originally the Royal Flying Corps (RFC) commander in France, Trenchard was opposed to the creation of a single air arm and to strategic bombing, though perhaps not as adamantly as often supposed. His position developed because he believed that the British Expeditionary Force was a key perhaps the key-to the British role in the war. He also held that the priority for the RFC had to remain the support of the ground forces. Once the war was over, though, Trenchard became ever more firmly committed to a separate air force, strategic bombing, and defending the RAF from the depredations of the army and the navy, both of which were trying to reverse the decision. The rationale that Trenchard's staff used most powerfully was the RAF's supposed mission to gain and maintain air superiority over land and sea. The unified control of airpower was essential to that, and ultimately it would extend to the control of the floating airdromes. As in America, there had been suggestions to place all the services under a ministry of defense, but these suggestions came to naught during Trenchard's day. Britain proceeded with the idea of a separate air ministry and a separate air force, but without a formal organization above to control all three services.

22. **Role of Other Armed Forces**. Air Chief Marshal Trenchard was well indoctrinated in ground warfare, having been an army officer himself. While World War I was still being fought, he was firm in his commitment to ground support and allowed only that "excess" aircraft could be dedicated to independent operations. After the war, though, Trenchard increasingly argued that the role of the British army and Navy was secondary and the role of the RAF and strategic attack was primary. First, by 1921 he was asserting that the RAF should be seen now as the primary instrument of defense for the British Isles and declaring that such a role would best be accomplished through an air offensive. Second, he wanted to reduce the functions of the two older services in such matters as colonial control (as noted), and coastal defense of the home islands. Third, he sought to reduce the many overseas bases and to turn their functions increasingly over to the RAF. The air arm, Trenchard insisted, could accomplish these functions more economically and effectively than the army and navy. In Trenchard's day, the defense of the British bastion at Singapore was a central part of the debate.

23. **Force Structure**. After World War I, Trenchard gave a very high priority to bomber units, and he found only a modicum of opposition to his ideas from either inside the RAF or outside. However, he always saw a role for fighters. Early in his tenure, plans were made for a substantial metropolitan air force known as the Air Defence of Great Britain. However, the threat seemed to diminish in the mid-1920s, and the scheme was never implemented. In part, that outcome was also due to the inability to detect inbound raids. Nonetheless, the planning that had been done proved beneficial after radar was conceived, making an air defense more feasible. As we have seen, some scholars argue that the British lost an enormous technological lead during the tenure of Trenchard. Yet blame for the decline cannot all be laid at Trenchard's door, for these were austere times; and, before 1929

conditions were even more difficult for Great Britain than they were for the United States. Too, it was a new service and there was no immediate foreign threat. Thus, not only would investments have been theoretically desirable in the earlier phases of research and development, but also in such longer- term factors as officer education and building a base infrastructure. Some investments were made in the latter areas during the Trenchard tenure, and when the crisis came, the officer corps of the RAF enjoyed more professional development than many of those leading the Luftwaffe. In addition, though the building of the wartime infrastructure to support the USAAF presence in England would be a hectic procedure, it would have been even more so without the start that Trenchard made.

24. **Technology**. As noted, scholars have argued that the British squandered a huge lead in aviation technology after 1918. This conclusion cannot be laid exclusively at Trenchard's door, for all the services were held to very tight budgets until after the rise of Hitler. The largest bomb in the inventory as late as 1939 was a 500-pounder (Mitchell's people used several 2,000-pounders to sink the Osifriesland in 1921). For all of Trenchard's former emphasis on bombers Bomber Command was not on the line until 1936; and when war came in 1939, all of its aircraft were two-engine types of unimpressive performance. In the United States the four-engine B-17 first flew in 1935 and was on the line from 1937 forward. By 1939 the four-engine B-24 Liberator also was fresh out of the factories; the RAF did not get its first four-engine airplane into Bomber Command until 1942. These planes showcased all-metal construction, retracting landing gear, superior radial engines, and closed cockpits. At the same time, the German and British (and Italian and Russian) air forces were still flying the old biplanes. Of course, the biggest advance was in radar, and that, too, came just in time. The short of it is that one simply cannot blame Trenchard for failing to foresee it.

25. **Influence on the RAF**. Trenchard's influence on the country's military service was enormous. He laid down its initial institutions and doctrine. His 10-year tenure came during a period of theoretical flux and was said to have had an enormous impact on most of his officers. Trenchard's ideas on colonial control held great appeal for Britain's politicians in that austere period because of their promised economy. His ideas were most successful in Mesopotamia, where indeed control was maintained at low cost. Nonetheless, in some other areas, these ideas flopped. Air Chief Marshal Trenchard was largely responsible for making the RAF a strategic attack force with a decided preference for the offensive that survived even the Battle of Britain. However, his ideas were modified somewhat in their application, and one would have to stretch it to make him blameworthy for the largely unsuccessful attempt to break German civilian morale with direct attacks on workers and their homes by bombing down Hamburg and Dresden.

William Mitchell

26. **Background**. William “Billy” Mitchell was born in France in 1879 and spent the first three years of his life there.[1] He came from a wealthy and prominent Wisconsin family. His grandfather had been a railroad mogul, and his father, a US senator of the Democratic Party, was an ardent anti-imperialist. Mitchell attended private schools and had an unremarkable academic record. He was enrolled in the ancestor unit of George Washington University for three years, but did not graduate.

27. **New World Theorist**. When the Spanish-American War broke out, he left school and his father engineered a second lieutenant's commission for him in the volunteers. Mitchell did not get to Cuba until some months after the fighting was over. He did some telegraph layout work in Cuba, and later went to the Philippines at a time when the guerrilla war was resurrected and lasted longer than anticipated. In those years, he had remained in the signal Corps. Later, he went to Alaska for a couple of years of survey work in support of laying telegraph lines, and then got involved in the actual construction.

28. Billy Mitchell was an athletic soul. But he was not always as independent as one might think-sometimes he had to be subsidized by his mother. He was at Fort Leavenworth, Kansas, for a while to go through the School of the Line and then the Staff College. He also taught Signal Corps subjects while he was there. His boss in those days was George O. Squier, the Army's first PhD recipient and later a general and chief of the Signal Corps. Mitchell was appointed to the General Staff at a young age, while still a captain, and was the only Signal Corps officer so assigned.

29. Mitchell had occasional reasons to investigate and write up aviation subjects, but displayed no-particular interest in flying at that time. He made major just before the United States entered World War I. His flight training near Norfolk in 1916 amounted to a mere 30-odd hours, and he wound up paying for it himself. He did not receive his junior military aviator wings until September 1917. This timing may have led to his assignment as an aeronautical observer in Europe, beginning just a few weeks before our declaration of war.

30. Mitchell was in Europe when the United States entered the war, and he wound up commanding the combat aviation at the front. He returned home after the war to become assistant chief of the Air Service, first for Gen Charles Menoher and later for Gen Mason Patrick. He led an Air Service provisional brigade in the bombing tests against various naval vessels and sank an ex-German battleship with a two-thousand-pound bomb-at anchor, close to shore, and unprotected with antiaircraft artillery. The isolationist mood of the 1920s made it impolitic to suggest that the United States would ever again be involved in overseas wars. A sea borne attack against the continental United States was not much of a possibility then, but that was the only threat that could be publicly addressed by either the Air Service or the Navy. Thus, Mitchell's strategic bombing ideas were discussed much less openly, and the airpower in coastal defence became the major issue. He deliberately provoked a court-martial in 1925, was convicted of insubordination, and left the Army early in 1926. He lived on his farm in Virginia for the rest of his life, became involved in the presidential campaign of 1932, and was disappointed that President Franklin Delano Roosevelt did not choose him as assistant secretary of war for air. Mitchell died in February 1936.

31. **Modus Operandi**. Mitchell was a showboater, one who was not at all averse to going outside channels. He used public relations extensively to try to advance his cause and published frequently in national media while on active duty. Mitchell wrote several books, some of which were published before he resigned. He used a sensationalist approach, which the Navy and soldiers oftentimes considered as firing from the hip. He frequently used immoderate language and seldom paused to qualify it. He was a social lion and behaved rather like a feudal baron as he travelled about his Air Service domains. From my point of view, he was sometimes too quick to reveal his hand to adversaries. Gen

Jimmy Doolittle told me that he and perhaps the majority of senior Air Service and Air Corps officers came away with the opinion that Mitchell's methods more so than his ideas had done more harm than good to the service.

32. **Assumptions**. The assumptions underlying Billy Mitchell's concepts of airpower in its strategic attack role seem strikingly similar to those of both Douhet and Trenchard. It is well established that he had the opportunity to learn the views of both well before his court-martial in 1925. It seems equally likely that the whole set of ideas had multiple sources for all three-as had been the case with Alfred Mahan and his theories of sea power. Mitchell's assumptions included the following:

a. The coming of aviation was revolutionary.

b. Command of the air is a prime requirement.

c. Airpower is inherently offensive; the bomber will always get through.

d. Antiaircraft artillery is ineffective.

e. Airpower could defend the continental United States more economically than the Navy, and the latter's form of warfare is obsolescent.

f. Airmen are a special and elite breed of people, and they alone can understand the proper employment of airpower.

g. Future wars will be total; the ascendancy of the ground defensive will persist; everybody is a combatant.

h. Civilian morale is fragile.

33. **Thesis**. Airpower, organized into a separate, equal (to Army and Navy), and autonomous air force under a unified department of defence, could serve as the most effective and economical means of defending the continental United States. If the matter ever came to fighting an overseas enemy, airpower could decisively attack the enemy's vital centres without first defeating his armies and navies. Attacks on such vital targets would render war so decisive and quick that the total suffering would be less than otherwise, therefore, such bombing would be more humane than conventional trench warfare.[10] Airpower is best generated by nations with populations that are air-minded; the United States has great potential for airpower but needs to develop it. Airpower is best controlled by an airman in a centralized way to facilitate its offensive use.

34. **Targeting.** Whether for motives of public relations, humanity, military efficiency, or some combination, Mitchell almost always stood squarely opposed to targeting civilians directly and generally advocated breaking their morale through the destruction of other vital centres like industry, infrastructure, or even agriculture. Mitchell's intellectual heirs at the Air Corps Tactical School refined and systematized his ideas, using the north eastern industrial triangle of the United States as the model for the development of the precision-bombing

theory and doctrine. From a very early date, General Mitchell endorsed the idea of a separate air force, centralized command of airpower, and the creation of a department of defence. In public, at first, he did not dwell all that much on strategic targets, as we know them today. He was more concerned with tactical functions, concentrating especially on maritime targeting. All the same, in lecturing at the Army War College in 1922, Mitchell discussed targeting thusly:

> "At first it must be assumed that the hostile [to the United States] air forces will operate from airplane carriers to shore bases from Bermuda and that, as soon as possible, large concentrations of Red and Crimson (British) offensive aviation will be located in the Ontario Peninsula. From this Peninsula, a great percentage of aircraft factories, munitions factories, industrial centres, and automobile factories will be within a radius of action of long distance aerial bombardment. Practically all the main arteries of communication between the East and West pass within easy bombing distance of the Ontario Peninsula, near the South shore of Lake Erie, in the vicinity of Sandusky, Ohio."

35. **Air Superiority**. Mitchell was consistent in asserting that air superiority was a prerequisite for other military operations. In the general sense, he agreed with both Douhet and Trenchard in this. However, Douhet envisioned achieving command of the air through quick blows at the onset of hostilities against the enemy air forces while they were still on the ground. On the other hand, Mitchell argued that this advantage would be achieved largely through an air battle, but attacks on enemy airpower on the ground were also in his repertoire. He expressed much the same opinion in 1921:

a. The principal mission of Aeronautics is to destroy the aeronautical force of the enemy and, after this to attack his formations, both tactical and strategical, on the ground or on the water.

b. The secondary employment of Aeronautics pertains to their use as an auxiliary to troops on the ground for enhancing their effect against the hostile troops.

c. Pursuit Aviation is the kind designed to take and hold the offensive in the air against all hostile aircraft, and it is with this branch of Aviation that air supremacy is sought and obtained.

d. Mitchell disclaimed the effectiveness of AAA. His doctrinal descendants at the Air Corps Tactical School in the 1930s may have downplayed the achievement of air superiority in part through a great air battle, and many say that this led to a neglect of both pursuit and attack aviation in favor of strategic bombing.

36. **Air Exploitation**. According to General Mitchell, once air superiority was established, it could be exploited at will in all sorts of operations against vital centres. Sometimes vaguely described, these vital centres usually were seen as industrial, infrastructure, and agricultural values, the loss of which would lead to the collapse of civilian morale. As noted earlier, Mitchell's most prominent arguments in the 1920s focused on the use of airpower in lieu of naval power in the coastal defence mission. It came to a crisis in

the latter half of 1925 with Mitchell's court-martial and his later resignation. Meanwhile, President Calvin Coolidge convened the Morrow. Board to consider the problem of aviation. For the most part, the board concluded that the ideas of Mitchell were not well founded and that the threat to American security was remote. It rejected most of Mitchell's ideas, though it did recommend a substantial build-up of airpower in the US services. The country seemed to accept the board's conclusions, and the Air Corps Act of 1926 reflected many of them.

37. For whatever reason, in Mitchell's day the idea of attacking civilians with airpower was not much discussed in public. The Douhetan idea of direct attack on civilian morale was diminished further at the Air Corps Tactical School in the 1930s by the increased emphasis on industrial and infrastructure vital centres that would undermine enemy capability to resist. Also, as time passed (especially after Hitler and the Japanese went on their rampages), the coastal defence issue waned, and defense planners paid increased attention to the offensive use of long-range airpower in overseas operations.

38. **Organization for War**. As he steamed back from World War I aboard the SS Aquitania, Mitchell treated Lt Cmdr Jerome Hunsaker of the US Navy to his vision of airpower and the future security of the United States. Then and for the remainder of his days, Mitchell argued for a separate and equal, independent air force and for a unified department of defense. He asserted that only an airman could have the vision of the proper role of airpower and, therefore, all military aviation should fall under the direct control of such an airman. Even though the RAF itself was but a year old, Mitchell was using it as a proper model for the United States-and many Navy airmen were using it as a bogey to scare their own mossbacks into fighting for naval aviation. Only four months after the RAF's founding, an American naval officer was complaining to the US Navy's General Board that the RAF had been a disaster.

39. **Role of Other Armed Forces**. At the onset of the decade of the 1920s, Mitchell asserted that the air force would have to be primary and the. Navy, especially, would have to be secondary at best. After the famous naval bombing tests of July 1921, Mitchell became increasingly strident in claiming that surface vessels could not survive air attacks. Therefore, they could not be effective in the coastal defense mission. Of course, the Air Service worked for the chief of staff of the Army-and that tended to dampen the criticisms of the airmen a bit-but the General Staff came in for some substantial heat of its own. From the beginning, Mitchell saw a place for independent missions for air forces well beyond the battlefield. But in his mind they took on an ever-increasing higher priority as time wore on-with a relative diminishment of the role of the ground army. Increasingly, he argued that enemy armies and navies had never been the ultimate objectives; the final goal always had been to change the will of the enemy, and through airpower this finally could be done without defeating his surface forces.

40. **Force Structure**. At first, Mitchell advocated a preponderance of pursuit, but then increasingly emphasized the need for more bomber units. In the early 1920s, pursuit was the premier part of the force, though there were also a bomber and an attack group. Doubtless there was an increasing emphasis on bomber organization and technological development, but the work with pursuit and attack aircraft never disappeared altogether either on the line or in the curriculum of the Air Corps Tactical School.

41. **Technology**. In contrast to Douhet, Mitchell believed no single type of airplane was adequate; pursuits for command of the air were a paramount requirement, and at least in the early 1920s, Mitchell stipulated a need for both attack and reconnaissance aircraft. The "Mitchellites" of the Air Corps Tactical School (and much of the rest of the air arm of the 1930s) were persuaded that technology had arrived to validate Mitchell's theories. The high-altitude, four-engine bomber (predating radar) would be so difficult for a slow-climbing fighter to intercept before the latter had to turn back for want of gas, that it seemed ever more possible that the bomber would always get through. The combination of such strike force security in daylight with the new Norden bombsights seemed to promise adequacy in both target finding and hitting to enable decisive damage in a time so short that it would be economical and humane. According to Mitchell, the bombs would include high explosives, incendiaries, and gas. Mitchell had placed some emphasis on big bombs-and even on aerial torpedoes and radio-controlled guided missiles.

42. **Influence on the United States**. General Mitchell's economic appeal helped to commit the United States partially to inexpensive (they thought) security through airpower. According to his most prominent biographers, Mitchell, like Mahan, was more the articulator and catalyst than the originator of new ideas. The array of ideas he propounded was widely shared within the small corporate body of the Air Service, and his flamboyant style brought those notions to public attention, even though he was merely giving voice to the ideas of others.

John Warden

43. **Background**. John Warden was born in Texas in 1943. He was appointed to the Air Force Academy from Pennsylvania and graduated in the class of 1965. As noted, Carl Builder has asserted that the Air Force remains afflicted with pilot elitism, and insofar as that ever was true, the 1965 Air Force Academy still epitomized that feature of the culture. This is not to say that Colonel Warden himself was or is an elitist. In my opinion, he seems to be much more concerned with airpower than with flying airplanes.

44. **Theorist or Throwback?**

a. Warden did go directly to pilot school, after which he conducted a combat tour in OV-10s with the First Air Cavalry Division in Vietnam. Later he flew a tour in F-4Ds. Warden was thus much more experienced in the trenches of airpower than any of the other three theorists we have considered. Douhet was not rated, and Mitchell and Trenchard got their wings so late in their careers that neither of them had significant service experience at the squadron level.

b. Warden earned a master's degree in political science from Texas Tech University, graduated from the National War College, and was an F-15 wing commander at Bitburg, Germany. To some extent, we are comparing apples and oranges, but on paper Warden seems also to have more extensive formal education than any of the three classical theorists. He even travelled more widely than all, save perhaps Mitchell.

c. While Colonel Warden was a student at the National War College, he wrote a thesis on air operations planning at the theatre level of war. Subsequently published by National Defense University Press, The Air Campaign: Planning for Combat has been printed in many copies. Warden wrote the book before the fall of the Berlin Wall and the USSR and focused it on a European war. Several of Warden's writings after the Persian Gulf War have refined his views considerably, but Warden's main notions were at the very least implied in his book long before such a war was contemplated or even possible. Readers cannot find nearly as much emphasis on information, air, and weapons technology in The Air Campaign as they can in his subsequent writing and speaking.

d. Warden served in the rank of colonel in command of his wing in Germany. He remained in that grade when he returned to the Pentagon to head CHECKMATE, an office serving under the Air Force deputy chief of staff for plans and operations and concerned with long-range planning. Warden was serving in that capacity at the onset of the Gulf War.

e. At the beginning of the war, the Air Staff theoretically had no business getting involved in operational or campaign planning. The orthodox procedure was for area commanders in chief (CINC) to make plans for possible combat operations. The usual arrangement was for one of the numbered air force commanders to be designated in advance as the air component commander for each CINC. It was recommended, but was not made mandatory, that a CINC appoints an individual as the joint force air component commander (JF ACC). This person would be responsible for planning and Executing air campaigns in that theater. The JFACC would develop and maintain a set of contingency plans, modify or create a new one to fit the situation when a campaign was in the offing, and seek the CINC's approval of the scheme. After the approval, the JFACC would execute the plan.[6]

f. As it happened at the time of the Iraqi invasion of Kuwait, Gen Norman Schwarzkopf was the CINC of US Central Command headquartered at MacDill AFB, Florida. He sent the commander of Ninth Air Force, Lt Gen Charles Homer, ahead to Saudi Arabia to serve as the temporary, on-scene commander as well as the JFACC. In those early days, Homer and his staff had their hands full with deployment and bed down issues for all the services inbound to the whole theater, not to mention defensive preparations in case the Iraqis decided to invade further south. The US Central Command did have a contingency plan for war in the area, but it was an imperfect one as shown in an exercise shortly before the crisis. Therefore, General Schwarzkopf called the Air Force chief of staff for assistance in developing an offensive air plan. As the chief was out of town at the time of the call, the vice chief of staff, Gen John M. Loh, received the call and promised to help. He sent the task down the chain of command to Warden's CHECKMATE office, which had no formal responsibility for that work.

g. Warden and his people already had given the subject some thought. But it was largely fortuitous that they were tasked to assist with the planning. CHECKMATE quickly generated an initial offensive operational strategic plan, which authorities in the United States approved after some changes. Warden and his assistants then carried their briefing to the theatre, and after the initial delivery to General Horner, the assistants were retained in-theatre while General Homer sent the chief of CHECKMATE back to Washington. In the ensuing weeks, the plan was supplemented with many defensive and tactical features, but Warden's people were able to retain the essence of the original offensive scheme within the larger evolving plan.

h. After the Gulf War, Colonel Warden was transferred to Maxwell Air Force Base, where he became commandant of the Air Command and Staff College (ACSC). He stirred up that institution greatly, reorienting its study to focus on the operational strategy level of war and air planning at that level. Colonel Warden was highly active in bringing new educational technology to the school, and he frequently lectured there and at many other places on the art of air planning. He moved strongly to cause his students to adopt serious personal professional reading programs and to build their own professional libraries. Warden retired from the USAF in 1995 with the Air Force chief of staff presiding over the ceremony. He has continued to live in Alabama.

45. **Modus Operandi**. Warden is a hard-working, serious man. He has projected his ideas through both the spoken word in lectures and briefings and the written word in his book and articles. Warden has enormous self-assurance, and though I am not aware of any tendency on his part to kill the bearer of news he does not want to hear, I doubt that he is easily swayed from his ideas. It is clear enough that he has generated some opposition within the Air Force. He was the first commandant of ACSC in many years to retire in the rank of colonel. Opposition leveled at him by Central Command Air Force (CENTAF) heavyweights is well enough documented in the Reynolds and Mann books cited earlier.

46. **Assumptions**. As with the classical theorists, John Warden based his ideas on a set of assumptions. They include the following notions:

a. Human behavior is complex and unpredictable.

b. Material effects of military action are more predictable.

c. Air superiority is prerequisite for victory or even survival.

d. The offensive is by far the stronger form of air war. .

e. Victory is and always has been achieved in the mind of the enemy commander-everything must be directed toward that end.

f. Americans are even more sensitive to friendly and even enemy casualties than ever before.

47. **Thesis**. The core ideas of John Warden are that the art of air campaign planning is vital and that once air superiority is assured, airpower can be used either in support of the other arms, or can be supported by the other arms, and sometimes can function independently to achieve decisive effects. Technology has corrected the deficiencies of the Mitchell/Air Corps Tactical School theories so that the vital centres are vulnerable at acceptable costs to the attacker. That technology also has made parallel attack (as opposed to sequential ones) more possible than ever, and that is highly desirable. The centres of gravity vary from case to case. They may be arranged in five rings. At the centre are leadership targets, then means of production, infrastructure, population, and fielded forces in the outer perimeter. Almost all states and other political entities have the five rings, and they always appear with leadership at the centre. In general, it is preferable to attack the rings from the centre, then move outwards.

48. **Targeting**. According to Warden, because of the unpredictability of human behaviour and the predictability of material damage, the capability of the enemy should be targeted as the first priority. Clearly, he is even more concerned with avoiding both friendly and enemy civilian casualties than Mitchell and Trenchard were, and he is certainly no adherent of any Douhetan notion of attacking civilian morale directly. Warden believed that targeting the enemy's physical capability (as opposed to his psychological objectives) should be done with the full realization that military objectives must clearly serve the political objectives. Fewer centres of gravity (COG) exist in the middle than on the periphery; but they tend to be much more decisive than those on the outer rings. However, attacking COG in the outer rings can yield more immediate impact than an attack on the ones at the centre. Consequently, close air support can sometimes take priority over interdiction and strategic attack in a tactical emergency on the ground. Targeting the COG in any ring simultaneously is more effective than sequential targeting; targeting the objectives in all the rings in parallel, rather than sequentially, tends to be even more decisive than attacking only one ring or starting with the outer ring and proceeding inward through each ring in turn.

49. **Air Superiority.** As with the classical theorists, command of the air remains Warden's first priority for all operations in the air or on the surface, though it sometimes may be achieved in parallel attacks rather than sequential. In The Air Campaign Warden admits that sometimes only local or temporary air superiority may be possible-and sufficient. As with Douhet, Warden believed that the least efficient place for achieving air dominance was in the air. Sometimes an air attack can serve more than one role. For example, the destruction of finished petroleum supplies can advance an air superiority campaign as it aids the interdiction effort. (German tanks in World War II ran out of fuel on the Ardennes battlefield.) In a tactical emergency on the ground, powerful incentives can divert all other sorties to close air support right at the front. Sometimes diversion could be disastrous because it might release the enemy air force from defending its bases to missions that could bring about the total downfall of our forces, and even make the situation on the ground a greater emergency than it would be otherwise.

50. **Air Exploitation**. John Warden, like most preceding airmen, argues that air interdiction by any other name is still preferable to close air support, because it allows more targets to be killed at less cost. The exception occurs when CAS is an emergency requirement. But the choice can be highly painful for the CINC here as well. I have written elsewhere that John Warden's position on air reserves is something new, but on reconsideration, I think it is more a restatement of an airman's view common all the way back to 1922 at the very least. In the early 1920s, Billy Mitchell himself was lecturing on the need for centralized control of tactical airpower by an airman at the theatre level. He maintained that the precise purpose of such control was to avoid dissipating tactical airpower's effect in penny packets. His worry was that were it parcelled out to the ground commanders, it would be impossible to pry tactical airpower away from some of them to meet emergencies at other parts of the front or in the interdiction or air superiority campaigns. The same thought stimulated Warden's notions in The Air Campaign where he envisions the preservation of air reserves and argues the idea as a radical one.

51. **Organization for War**. Colonel Warden so concentrates his work at the campaign level that he does not have much to say about national organization. The creation of an autonomous air force and a department of defence had become dead issues 14 years before he went to the academy. He does assert that sometimes airpower should be applied in support of the land and sea forces, sometimes it should be supported by them, and sometimes it can be decisive if applied independently. He explicitly asserts that single-service operations, even against other kinds of forces, have been and will continue to be effective sometimes. That assertion leads him to suggest that joint ness does not mean equal portions of the action for all services. Certainly, Warden adheres to the traditional ideal that airpower should be organized under centralized command, by an airman at the theatre level. The airman should report only to the CINC.

52. **Role of Other Armed Forces**. John Warden is less vitriolic on the subject of the roles of the other armed forces than were the other classical theorists. To him, the other armed forces can function in either a supporting or a supported role depending on the circumstances. Warden sees occasions when they conceivably will be irrelevant because airpower alone can win some campaigns. Still at all times, however, air superiority will be necessary to ensure victory. He cites history as "proof" that nobody has ever won without air superiority, and sidesteps the question of Vietnam by saying, "Indeed, no nation enjoying air superiority has ever lost a war by the force of enemy arms."

53. **Force Structure**. Warden is orthodox in noting that a theatre force is usually deployed in phases, with the forces intended for air defence in the first phase. Also orthodox is his notion that the nature of the units sent will vary in accordance with what is available and the constraints and opportunities peculiar to that theatre. One of the constraints operative in the Gulf War is distance. There is an inverse relationship between the distance and the variety and volume of forces that a nation can deploy quickly. However, Colonel Warden repeatedly suggests in The Air Campaign, and even more so in subsequent writings, that simultaneous operations against all the varieties of target sets can offer significant benefits. So, where the lift and tanking is available, or the distance is short, the tendency would lean toward sending the greatest variety and number of forces as early as possible, always with the understanding that the priority goes to achieving and

maintaining air superiority. Like almost all preceding airmen, Warden's preference for the offensive is based largely on the idea of denying the enemy the ability to react. That denial depends not only on the size and character of the forces sent to battle but also on the ability to do so early in the campaign.

54. **Technology**. Warden shows a special fondness for high-tech solutions. Basic to his appeal for parallel attack is the assumption that the coming of precision-guided munitions (PGM) and stealth make possible the fulfilment of many of the older theorists' claims that the destruction of a given target required a far smaller strike force than heretofore, and with stealth no supporting aircraft is needed. At least for the time being, the bombers with stealth can get through with acceptable losses. Now bombers with PGM can get results as fast as Douhet had dreamed. A target can be taken out with far, far fewer bombs than in earlier eras. PGM makes strategic attack all the more feasible, and even makes parallel attack possible in many cases. It grants a modification of the principle of mass, for it allows sending far fewer shooters to a given target and permits the attack of many more targets at the same time, thus saturating defenses and yielding synergistic effects-concentration in time.

55. **Impact on the Gulf War**. Warden's followers insist that he provided the campaign plan with its strategic dimension. On the one hand, they contend that had he not stirred the pot with a plan out of the Air Staff, the result would have been purely an auxiliary effort in support of the Army. They argue that the auxiliary effort would have won, but only with many more casualties than was the case. Even further, Warden's supporters acknowledge there was not much of a defensive element in his original plan. On the other hand, detractors suggest there was no way of knowing then that Saddam Hussein would be inept and let us do a six-month build up without launching a ground assault that required other kinds of airpower in defense.

56. **Impact on the USAF**. Carl Builder contended that the Air Force has lost its doctrinal roots. If so, John Warden has at least stirred things up to stimulate a re-discussion of the institution's purpose. There is not a consensus behind Warden's set of ideas, though many of his ideas are shared as company property handed down from Mitchell and his followers. It is not too much to say that most of his ideas were common to the officer corps of the interwar period and since. However, if 'The Air Campaign did no more than synthesize old ideas into a single, compact, and highly readable form, it would have much in common with The Influence of Sea Power on History, 1660-1783. Nothing new appeared in that book, but it had an enormous influence. Mahan synthesized old ideas into a compact and readable set of notions that had long been the basis for the success of Britain's Royal Navy and British sea power in general. His work burst upon the scene at a particularly propitious time and is still a mighty influence. Mahan prepared his book for the US Naval War College, where he served on the faculty while that institution was in its infancy. In time it would grow to be one of the pillars of American sea power.

TASK-3

AVIATION IN FIRST WORLD WAR (WW-1)

Introduction

1. World War I was the first war in which aircraft were deployed on a large scale. Tethered observation balloons had already been employed in several wars, and would be used extensively for artillery spotting. Germany employed Zeppelins for reconnaissance over the North Sea and strategic bombing raids over England. Aeroplanes were just coming into military use at the outset of the war. Initially, they were used mostly for reconnaissance. Pilots and engineers learned from experience, leading to the development of many specialized types, including fighters, bombers, and ground-attack aeroplanes. Ace fighter pilots were portrayed as modern knights, and many became popular heroes. While the impact of aircraft on the course of war was limited, many of the lessons learned would be applied in future wars.

Pre-War Development

2. About 10 years after the Wright brothers made the first powered flight, there was still much to be improved upon. Because of limitations of the engine power of the time, the effective payload of aircraft was extremely limited. They were made mostly of hardwood (braced with steel wires) and linen fabric doped with flammable liquid to give them the stiffness required to form a wing surface. Aside from these primitive materials, the rudimentary aviation engineering of the time meant most aircraft were structurally fragile by later standards, and not infrequently broke up in flight especially when performing violent combat manoeuvres such as pulling up from steep dives.

3. In 1911, Captain Bertram Dickson, the first British military officer to fly and the first to engage on an aerial reconnaissance mission in a fixed-wing aircraft during army manoeuvres in 1910, predicted, in a submission to the UK Technical Sub-Committee for Imperial Defence, the military use of aircraft and the ensuing development and escalation of aerial combat: "In case of a European war, between two countries, both sides would be equipped with large corps of aeroplanes, each trying to obtain information on the other... the efforts which each would exert in order to hinder or prevent the enemy from obtaining information... would lead to the inevitable result of a war in the air, for the supremacy of the air, by armed aeroplanes against each other. This fight for the supremacy of the air in future wars will be of the greatest importance...".

4. The first operational use of fixed-wing aircraft in war took place on 23 October 1911 in the Italo-Turkish War, when Captain Carlo Piazza made history's first wartime reconnaissance flight near Benghazi in a Blériot XI. The first aerial bombardment followed shortly thereafter, on 1 November, when Second Lieutenant Giolio Gavotti dropped four bombs on two oases held by the Turks. The first aerial photography flight took place later in March 1912, also flown by Captain Piazza.

The early years of war

5. Front page of the New York Times Mid-Week Pictorial, January 1st 1917. Caption reads: "A German Fighting Monoplane Flying Very Near the Ground Photographed from Directly Underneath." The aircraft is of the Taube type, either a Rumpler Taube or a copy from one of the other manufacturers involved in Taube production. From the very start, there was some debate over the uses (or usefulness) of aircraft in warfare. Many senior officers, in particular, remained skeptical.

6. In Germany the great successes of the early Zeppelin airships had largely overshadowed the importance of heavier-than-air aircraft. Out of a paper strength of about 230 aircraft belonging to the army in August 1914 only 180 or so were of any use.[4] The French military aviation exercises of 1911, 1912, and 1913 had pioneered cooperation with the cavalry (reconnaissance) and artillery (spotting), but the momentum was if anything slacking.

7. Great Britain had "started late" and initially relied largely on the French aircraft industry, especially for aircraft engines. The initial British contribution to the total allied airwar effort in August 1914 (of about 184 aircraft) was three squadrons with about 30 serviceable machines. The American army and navy air services were hopelessly behind; even in 1917, when the United States entered the war, they were to be almost totally dependent on the French and British aircraft industries for combat aircraft.

8. The initial campaigns of 1914 proved that cavalry could no longer provide the reconnaissance expected by their generals, in the face of the greatly increased firepower of Twentieth century armies. It was quickly realised, on the other hand, that aircraft could at least locate the enemy, even if early air reconnaissance was hampered by the newness of the techniques involved. Early scepticism and low expectations quickly turned to unrealistic demands beyond the capabilities of the primitive aircraft available.

9. Even so, air reconnaissance played a critical role in the "war of movement" of 1914, especially in helping the Allies halt the German invasion of France. On 22 August 1914, British Captain L.E.O. Charlton and Lieutenant V.H.N. Wadham reported German General Alexander von Kluck's army was preparing to surround the BEF, contradicting all other intelligence. The British High Command listened to the report and started a withdrawal toward Mons, saving the lives of 100,000 soldiers. Later, during the First Battle of Marne, observation planes discovered weak points and exposed flanks in the German lines, allowing the allies to take advantage of them. The Germans' great air "coup" of 1914 (at least according to contemporary propaganda) was at the Battle of Tannenberg in East Prussia where an unexpected Russian attack was reported by Lts. Canter and Mertens, resulting in the Russians' being forced to withdraw.

Early "Western Front" Reconnaissance Duties

10. Late in 1914 the lines between the Germans invading France and the Allies stretched from the North Sea to the Alps. The initial "war of movement" largely ceased, and

the front became static. Three main functions of short range reconnaissance squadrons had emerged by March 1915.

a. The first was photographic reconnaissance – building up a complete mosaic map of the enemy trench system. The first air cameras used glass plates ("Kodak" cellulose film had been invented, but did not have sufficient resolution).

b. Artillery "spotting" enabled the ranging of artillery on targets invisible to the gunners. Radio telephony was not yet practical from an airplane, so communication was a problem. By March 1915, a two seater on "artillery observation" duties was typically equipped with a primitive radio transmitter transmitting the dots and dashes of a Morse key, but had no receiver. The artillery battery signaled to the aircraft by laying strips of white cloth on the ground in prearranged patterns. These duties were shared with the observation balloon, tethered to the ground. Balloonists could communicate directly with their batteries by field telephone, but were obviously far less flexible in locating targets and reporting the fall of shot.

c. "Contact patrol" work attempted to follow the course of a battle by communicating with advancing infantry while flying over the battlefield. The technology of the period did not permit radio contact, and methods of signaling were necessarily crude, and included dropping messages from the aircraft. Soldiers were naturally reluctant to reveal their positions to aircraft, as it was difficult for them to distinguish between friend and foe.

Early bombing efforts

11. Typical 1914 aircraft could carry only very small bomb loads – the bombs themselves, and their stowage, were still very elementary, and effective bomb sights were still to be developed. Nonetheless the beginnings of strategic and tactical bombing date from the earliest days of the war. Notable are the raids by the RNAS on the German airship sheds at Düsseldorf, Cologne and Friedrichhafen in September, October and November 1914, as well as the formation of the Brieftauben Abteilung Ostende (or "Ostend carrier pigeon detachment", cover name for the first German strategic bombing unit), which mounted the first token raid over the English Channel in December.

The dawn of air combat

12. As Dickson had predicted, initially air combat was extremely rare, and definitely subordinate to reconnaissance. There are even numerous stories of the crew of rival reconnaissance aircraft exchanging nothing more belligerent than smiles and waves.[11] This soon progressed to throwing bricks, grenades, and other objects, even rope, which they hoped would tangle the enemy aircraft's propeller. The first aircraft brought down by another was an Austrian reconnaissance rammed on 8 September 1914, by Russian pilot Pyotr Nesterov in Galicia in the Eastern Front (both planes crashed as the result of the attack killing all occupants). Eventually pilots began firing handheld firearms at enemy aircraft. On October 5, 1914, French pilot Louis Quenault opened fire on a German aircraft with a machine gun. Quenault reported history's first air-to-air kill. The era of air combat proper began as more and more aircraft were fitted with machine guns.

1915: The Fokker Scourge

13. The first purpose-designed fighter aircraft included the British Vickers F.B.5 – machine gun armament was also fitted to several French types, such as the Morane-Saulnier L and N. Initially the German Air Service lagged behind the Allies in this respect, but this was soon to change dramatically. In July 1915 the Fokker E.I became operational – this was the first type of aircraft to enter service with a "synchronisation gear" (often referred to mistakenly as an "interrupter gear"), which enabled a machine gun to fire through the arc of the propeller without striking its blades. This constituted an important advantage over other contemporary fighter aircraft. This aircraft and its immediate successors – also commonly known as the *Eindecker* (German for "Monoplane") – for the first time supplied an effective equivalent to Allied fighters.

14. The very first successful engagement involving a synchronized-gun-armed aircraft occurred on July 1, 1915, just to the east of Lunéville, France when *Leutnant* Kurt Wintgens, one of the pilots selected by Fokker to demonstrate the small series of five Eindecker prototype aircraft, forced down a French Morane-Saulnier Type L "Parasol" two seat observation monoplane behind Allied lines with his Fokker M.5K/MG Eindecker production prototype aircraft, carrying the IdFlieg military serial number "E.5/15". Some 200 shots from Wintgens' aircraft had hit the Gnôme Lambda rotary engine of the Morane Parasol, forcing it to land safely in Allied territory.

15. By late 1915 the Germans had achieved air superiority, making Allied access to vital intelligence derived from continual aerial reconnaissance more dangerous to acquire. In particular the essential defencelessness of Allied reconnaissance types was exposed. The first German "ace" pilots – notably Max Immelmann – had begun their careers. The number of actual Allied casualties involved was for various reasons very small compared with the intensive air fighting of 1917–18. The deployment of the Eindeckers was less than overwhelming – the new type was issued in ones and twos to existing reconnaissance squadrons – and it was to be nearly a year before the Germans were to follow the British in establishing specialist fighter squadrons. The Eindecker was also, in spite of its advanced armament, by no means an outstanding aircraft, being closely based on a pre-war French racer.

16. Nonetheless, the morale impact of the fact that the Germans were fighting back in the air, and effectively too, created a major scandal in the British parliament and press. The ascendency of the Eindecker also contributed to the surprise the Germans were able to achieve at the start of the Battle of Verdun – the French reconnaissance aircraft failed to provide their usual cover of the German positions.

17. Fortunately for the Allies, two new British fighters were already in production that were a match for the Fokker—the F.E.2b and the D.H.2. These were both "pushers" and could fire forwards without gun synchronisation. The F.E.2b reached the front in September 1915, and the D.H.2 in the following February. On the French front, the tiny Nieuport 11, a tractor biplane with a forward firing gun mounted outside the arc of the propeller (on the top wing) also proved more than a match for the German fighter when it entered service in January 1916. With these new types the Allies re-established air superiority in time for the Battle of the Somme, and the "Fokker Scourge" was over.

18. The Fokker E-III, Airco DH-2, and Nieuport 11 would be the very first in a long line of single seat fighter aircraft used by both sides during the war. Very quickly it became clear the primary role of fighters would be attacking enemy two-seaters, which were becoming increasingly important as sources of reconnaissance and artillery observation, while also escorting and defending friendly two-seaters from enemy fighters. Fighters were also used to attack enemy observation balloons, strafe enemy ground targets, and defend friendly airspace from enemy bombers.

1916: Battle of the Somme

19. In the aftermath of the Fokker Scourge the need for a larger, better equipped RFC became obvious, and the process of raising many new squadrons was started. In the short term creating new units was easier than producing aircraft to equip them, and training pilots to man them. When the Battle of the Somme started in July 1916 most ordinary RFC squadrons were still equipped with the BE.2c – the same aircraft that had proved such an easy target for the Fokker Eindecker. New types such as the Sopwith 1½ Strutter had to be transferred from production intended for the RNAS. Even more seriously, replacement pilots were being sent to France with pitifully few flying hours.

20. Nonetheless, air superiority and an "offensive" attitude facilitated the greatly increased involvement of the RFC in the battle itself, in what was known at the time as "trench strafing" – in modern terms close support. For the rest of the war this became a regular routine, with both the attacking and defending infantry in a land battle being constantly liable to attack by machine guns and light bombs from the air. At this time, counter fire from the ground was far less effective than it became later, when the necessary techniques of deflection shooting had been mastered.

21. Allied air superiority was maintained during the battle, and the increased effectiveness of Allied air activity proved disturbing to the German High Command. A complete reorganisation of the German Luftstreitkräfte followed. This reorganisation eventually produced the German strategic bombing squadrons that were to produce such consternation in England in 1917 and 1918, and the specialist close support squadrons (Schlachtstaffeln) that gave the British infantry such trouble at Cambrai and during the German Spring offensive of 1918. Its most famous and dramatic effect, however, involved the raising of specialist fighter squadrons or Jagdstaffeln. By the end of 1916 these units, equipped with the new Albatros fighters, had reestablished German air superiority, in spite of being formed a full year after similar units had become part of the RFC and the French Aéronautique Militaire.

1917: Bloody April

22. The first half of 1917 marked a period of German air superiority. These were successful months for the jagdstaffeln and the much larger RFC suffered significantly higher casualties than their opponents. While new Allied fighters such as the Sopwith Pup, Sopwith Triplane, and SPAD S.VII were coming into service, at this stage their numbers were small. On the other hand, the jagdstaffeln were equipped with the new Albatros D.III, which was, in spite of some structural difficulties, "the best fighting scout on the Western Front" at the time. Meanwhile, most RFC two-seater squadrons still flew the BE.2e, a very minor improvement on the BE.2c.

23. This culminated in the rout of April 1917, known as "Bloody April". The RFC suffered particularly severe losses, although Trenchard's policy of "offensive patrol", placing most of their flying on the German side of the lines, was maintained. During the last half of 1917, the British Sopwith Camel and S.E.5a and the French SPAD S.XIII became available in numbers. The ordinary two seater squadrons in the RFC received the R.E.8 or the F.K.8, not outstanding warplanes, but far less vulnerable than the BE.2e they replaced. The F.E.2d at last received a worthy replacement in the Bristol F.2b. On the other hand the latest Albatros, the D.V proved to be a disappointment, as was the Pfalz D.III. The exotic Fokker Dr.I was plagued, like the Albatros, with structural problems. By the end of the year the air superiority pendulum had swung once more in the Allies' favour.

Up to 1918: the final year of war

24. The final year of the war (1918) saw increasing shortages of supplies on the side of the Central Powers. Captured Allied aircraft were scrounged for every available material, even to the point of draining the lubricants from damaged engines just to keep one more German aircraft flyable. Manfred von Richthofen, the famed Red Baron credited with 80 victories, was killed in April, probably by an Australian anti-aircraft machinegunner (although Royal Air Force pilot Captain Arthur Roy Brown was officially credited), and the leadership of Jagdgeschwader 1 eventually passed to Hermann Göring.

25. Germany introduced the Fokker D.VII, both loved and loathed to the point that the surrender of all surviving examples was specifically ordered by the victorious Allies. This year also saw the United States increasingly involved. While American volunteers had been flying in Allied squadrons since the early years of the war, not until 1918 did all-American squadrons begin patrolling the skies above the trenches. At first, the Americans were largely supplied with second-rate weapons and obsolete aircraft, such as the Nieuport 28. As American numbers grew, equipment improved, including the SPAD S.XIII, one of the best French aircraft in the war.

Impact

26. By the war's end, the impact of air missions on the ground war was in retrospect mainly tactical – strategic bombing, in particular, was still very rudimentary indeed. This was partly due to its restricted funding and use, as it was, after all, a new technology. On the other hand the effect of artillery, which had perhaps the greatest effect of any military arm in this war, was very much affected by the availability of aerial photography and aerial "spotting". By 1917 weather bad enough to restrict flying was considered as "putting the gunner's eyes out". Some, such as then-Brigadier General William "Billy" Mitchell, commander of all American air combat units in France, claimed "the only damage that has come to [Germany] has been through the air". Mitchell was famously controversial in his view that the future of war was not on the ground or at sea, but in the air.

Anti-aircraft weaponry

27. Though aircraft still functioned as vehicles of observation, increasingly it was used as a weapon in itself. Dog fights erupted in the skies over the front lines – aircraft went down in flames and heroes were born. From this air-to-air combat, the need grew for better aircraft and gun armament. Aside from machineguns, air-to-air rockets were also used, such as the Le Prieur rocket against balloons and airships. Recoilless rifles and auto-cannons were also attempted but they pushed early fighters to unsafe limits while bringing negligible returns. Another innovation was air-to-air bombing if a fighter had been fortunate enough to climb higher than an airship. The Ranken dart was designed just for this opportunity. This need for improvement was not limited to air-to-air combat. On the ground, methods developed before the wars were being used to deter enemy aircraft from observation and bombing. Anti-aircraft artillery rounds were fired into the air and exploded into clouds of smoke and fragmentation, called archie by the British.

28. Anti-aircraft artillery defenses were increasingly used around observation balloons, which became frequent targets of enemy fighters equipped with special incendiary bullets. Because balloons were so flammable, due to the hydrogen used to inflate them, observers were given parachutes, enabling them to jump to safety. Ironically, only a few aircrew had this option, due in part to a mistaken belief they inhibited aggressiveness, and in part to early aircraft being unable to lift their significant weight.

Bombing and reconnaissance

29. As the stalemate developed on the ground, with both sides unable to advance even a few hundred yards without a major battle and thousands of casualties, aircraft became greatly valued for their role gathering intelligence on enemy positions and bombing the enemy's supplies behind the trench lines. Large aircraft with a pilot and an observer were used to scout enemy positions and bomb their supply bases. Because they were large and slow, these aircraft made easy targets for enemy fighter aircraft. As a result, both sides used fighter aircraft to both attack the enemy's two-seat aircraft and protect their own while carrying out their missions.

30. While the two-seat bombers and reconnaissance aircraft were slow and vulnerable, they were not defenseless. Two-seaters had the advantage of both forward- and rearward-firing guns. Typically, the pilot controlled fixed guns behind the propeller, similar to guns in a fighter aircraft, while the observer controlled one with which he could cover the arc behind the aircraft. A tactic used by enemy fighter aircraft to avoid fire from the rear gunner was to attack from slightly below the rear of two-seaters, as the tail gunner was unable to fire below the aircraft. However, two-seaters could counter this tactic by going into a dive at high speeds, aided by their heavy weight. Pursuing a diving two-seater was hazardous for a fighter pilot, as it would place the fighter directly in the rear gunner's line of fire; several high scoring aces of the war were shot down by "lowly" two-seaters, including Raoul Lufbery and Robert Little.

Strategic bombing

31. The first ever aerial bombardment of civilians was during World War I. On 19 January 1915, two German Zeppelins dropped 24 50-kilogram (110 lb) high-explosive bombs and ineffective three-kilogram incendiaries on Great Yarmouth, Sheringham, King's Lynn, and the surrounding villages. In all, four people were killed, sixteen injured, and monetary damage was estimated at £7,740, although the public and media reaction were out of proportion to the death toll.

32. There were a further nineteen raids in 1915, in which 37 tons of bombs were dropped, killing 181 people and injuring 455. Raids continued in 1916. London was accidentally bombed in May, and, in July, the Kaiser allowed directed raids against urban centres. There were 23 airship raids in 1916 in which 125 tons of ordnance were dropped, killing 293 people and injuring 691. Gradually British air defenses improved. In 1917 and 1918 there were only eleven Zeppelin raids against England, and the final raid occurred on 5 August 1918, which resulted in the death of KK Peter Strasser, commander of the German Naval Airship Department. By the end of the war, 51 raids had been undertaken, in which 5,806 bombs were dropped, killing 557 people and injuring 1,358.

33. The Zeppelin raids were complemented by the Gotha G bombers from 1917, which were the first heavier than air bombers to be used for strategic bombing. It has been argued that the raids were effective far beyond material damage in diverting and hampering wartime production, and diverting twelve squadrons and over 10,000 men to air defenses. Calculations performed on the number of dead to the weight of bombs dropped had a profound effect on attitudes of the British government and population in the interwar years, who believed that “The bomber will always get through”.

Observation balloons

34. Manned observation balloons floating high above the trenches were used as stationary reconnaissance points on the front lines, reporting enemy troop positions and directing artillery fire. Balloons commonly had a crew of two equipped with parachutes: upon an enemy air attack on the flammable balloon, the crew would parachute to safety. Recognized for their value as observer platforms, observation balloons were important targets of enemy aircraft. To defend against air attack, they were heavily protected by large concentrations of antiaircraft guns and patrolled by friendly aircraft. Blimps and balloons helped contribute to the stalemate of the trench warfare of World War I, and contributed to air to air combat for air superiority because of their significant reconnaissance value. To encourage pilots to attack enemy balloons, both sides counted downing an enemy balloon as an “air-to-air” kill, with the same value as shooting down an enemy aircraft. Some pilots, known as balloon busters, became particularly distinguished by their prowess at shooting down enemy balloons. Perhaps the best known of these was American ace Frank Luke: 14 of his 18 kills were enemy balloons.

TASK- 4

AIR POWER IN WW-II

PACIFIC WAR

Introduction

1. Japan initiated the war in the Pacific on 07 December 1941, with a dramatic and shocking display of air power resulting to a fatal blow to the US naval strength in the Pacific. The Pacific theatre was the largest of any in history, fought between Japan and the Allied, mainly with the United States of America from 1941 to 1945. In this Great War, airpower was linked closely with sea power and emphasis was given on aircraft carrier and naval aviation to a great extent. Unlike the previous wars, the outcome was decided largely by fighting in the air. Air power not only contributed to amphibious or land operations but also attained the strategic effect by exerting direct pressure on the enemy's capability and will to wage war. Therefore, the Pacific War offers a great scope for the airpower enthusiastics to understand its contributions and the lessons concerning air power.

Background

2. Japan had profited from WW I, but during 1920s, her economy was relatively stagnant. By 1929, she faced grave financial and social crisis as she was lacking the raw materials for her rapid industrialization. As such, Japan planned a concept of a "New Order" in to a "Greater East Asia Co-Prosperity Sphere" where not only China but Southeast Asia and some part of Australasia to brought under her control. Subsequently, Japan went for a radical solution by invading the mineral rich Manchuria in 1931. This aggression became a great concern to the world specially USA because of her interest in China.

3. In 1937, Japan launched an all out assault against China rising further tension with USA. To resist Japan, USA took measures to weaken their economy by freezing all Japanese assets in USA and imposed an almost total embargo. By July 1941, Japanese industrial survival was at stake due to the crisis of raw materials specially oil. Japan regarded this policy as an unfriendly act and was looking for some way out of this crisis. Only option left with Japan was to withdraw completely from China as demanded by USA or expand towards South West to secure new sources of oil and raw materials. Eventually Japan chose the second option and regarded the US Pacific fleet positioned at Pearl Harbour to be the greatest obstacle for their southward venture. As such, Japan attacked Pearl Harbour marking the beginning of the Pacific War.

Japanese Objectives and Strategy

4. Japanese objective was to establish their domination in the region by establishing a defensive perimeter quickly. They estimated that they could seize Southeast Asia and thereby overcome the effect of sanctions imposed upon them. Keeping the objectives in mind, Japan took extreme offensive strategy depending on the use of airpower.

Allied Objectives and Strategy

5. Before attack on Pearl Harbour, Allied had no significant strategy against Japan. To counter the Japanese aggression, Allied objective was to disrupt the sea supply line to Japan and to launch an all-out offensive against them to make sure that they accept an unconditional surrender. Keeping these objectives in mind, the Allied primarily pursued an offensive air strategy to take the war to the Japanese mainland and carry out strategic bombing against Japan's industrial bases. Therefore, except for the initial period of the war the Allied primarily pursued an offensive air strategy.

Japanese Air Campaigns

6. In accordance with their objectives, Japanese Army was given the primary responsibility for invading Luzon (Philippines), Malaya, Sumatra and Burma while Japanese Navy was tasked to attack on Pearl Harbour and to launch operations in the southern Philippines, northern New Guinea and out to the Gilbert Islands. The Japanese began their campaign on 07 December 1941 by attacking US base at Pearl Harbour. At the same time, they attacked and captured Philippines and Malaya.

7. Following their initial successes, the Japanese planners decided for an expansion beyond the planned perimeter which led them to encounter with the USA in the Coral Sea and Midway.

Attack on Pearl Harbour

8. **Background**. The Pacific Fleet at Pearl Harbor was the hub of the US Navy's power with the latest and most powerful battleships. Thus, Pearl Harbour became an ideal target for Japanese attack. The attack on Pearl Harbour was only possible by the reach of the airpower. The attack was fixed to begin at 08 a.m. Honolulu time, 07 1941.

9. **Air Operations**

a. **1st Wave**. Before dawn on 07 December 1941, the Japanese Task Force of six carriers accompanied by two battleships carrying 432 aircraft reached a position 230 miles due north of Pearl Harbour. The attack was planned in two waves. The first wave of 183 aircraft was launched from the carriers just before 06 a.m. The wave comprised of bombers and fighters. Their targets were the airfields, Battle ships and airborne fighters. The Americans were caught by total surprise. Japanese aircraft appeared on the US radarscope on Oahu's north coast. Ironically, it was misinterpreted as an expected incoming flight of B-17s from the mainland.

b. **1st Wave** After 45 minutes, a second wave of 171 aircraft followed the first strike. Escorted by 36 fighters, 81 dive bombers attacked ships again, while 54 level bombers attacked the army air bases. The second wave met anti aircraft fire and some aircrafts got airborne and gave little resistance. Within 02 hours, the Japanese crippled 18 battle ships, destroyed 285 aircraft and killed or injured about 3581 American personnel. On the other hand, Japan lost only 29 aircraft, 06 submarines and about 100 lives.

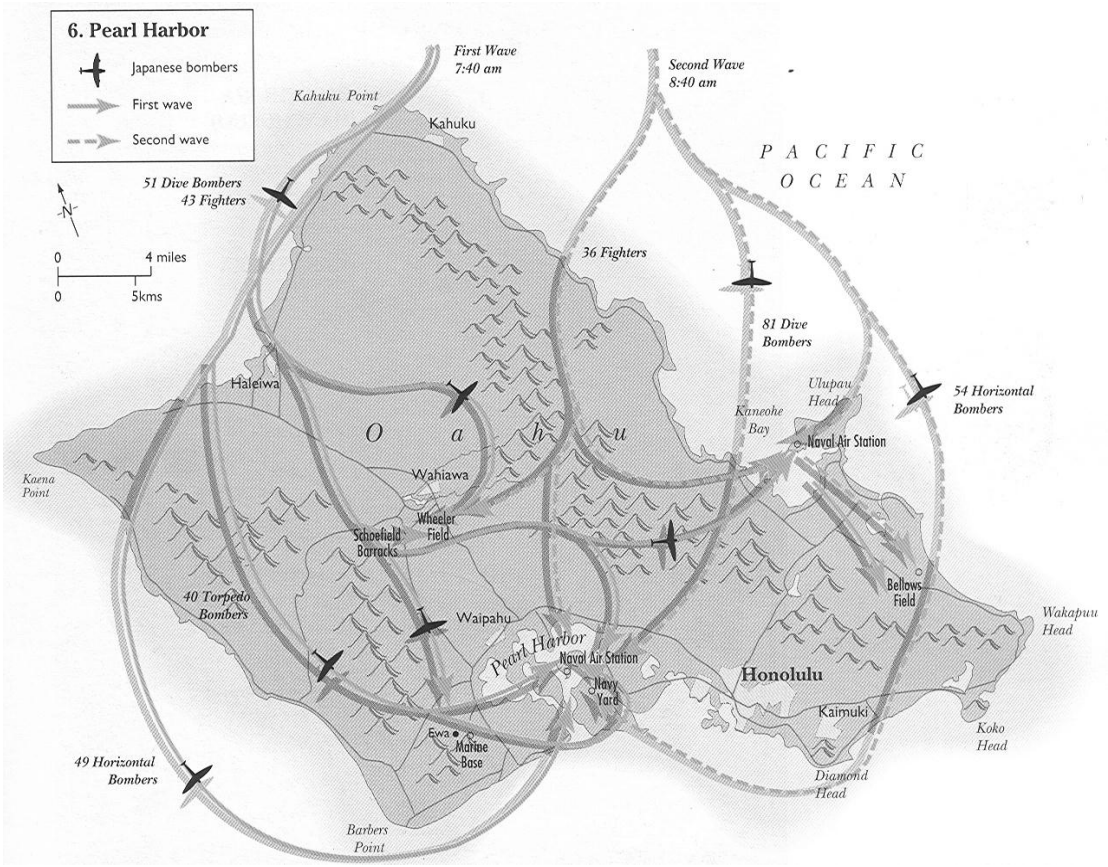

Fig: Attack on Pearl Harbour.

Attack on the Philippines

10. **Background**. The Japanese Southern Expeditionary forces planned their attacks on Malay Peninsula, Philippines, Singapore and South Pacific Islands to have a stronghold in the region. That would also provide them an opening of new source of industrial raw materials. More so, Allied strongest military concentration was present in the Philippines which Japanese wanted to eliminate at the onset.

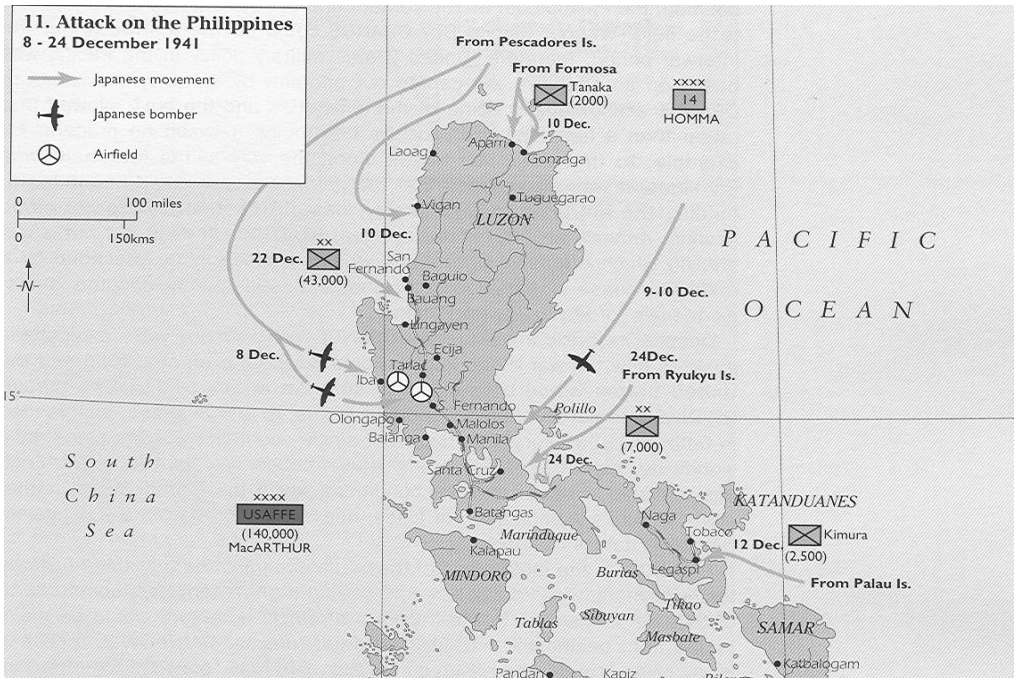

Fig: Japanese Attack on the Philippines.

11. **Air Operation.** Operation against Philippines began on 08 December 1941. To neutralize the US air power in the Philippines, successive airfield attacks were carried out from Japanese bomber bases in Formosa. The first wave of attack comprising 144 bombers escorted by 108 Zeros crippled the US air element on ground and in the air. The air battle on the first day ended with destruction of half of the USFEAF's strength. Succeeding attacks by the Zeros reduced the US control of the air and the Japanese took control of Manila on 02 January 1942.

Battle of Coral Sea

12. **Background**. The success in Pearl Harbour and the Philippines came in half the time and with far few looses that had been expected. This left the Japan's leaders in a dilemma about what to do next. Japan eventually decided to extend her perimeter southeast, cutting the sea lanes between Australia and America. The first step of the operation was to capture Port Moresby, a key Allied base on the South coast of New Guinea.

13. **Air Operation**

a. Japanese campaign began on 03 May 42 with the invasion of Tulagi which was occupied without opposition. By 04 May 42, the Japanese assembled a formidable naval force in Rabaul and set course for Port Moresby with two carriers; ZUIKAKU and SHOKAKU. Admiral Nimitz, Commander of US Navy Pacific theatre, was aware of the Japanese advance by the use of code-breakers. To meet the advancing Japanese, he sent a task force including the carriers LEXINGTON and YORKTOWN to the Coral Sea under the command of Rear Admiral Fletcher.

b. For 03 days carriers on both sides evaded detection in spite of the attempts by the search plane. On the morning of 07 May 1942, a Japanese search pilot reported sighting a US carrier and cruiser. Dozens of bombers were launched from SHOKAKU and ZUIKAKU but they found the small destroyer and an oiler which were sunk. Thirty minutes later, aircraft from the LEXINGTON sighted the carrier SHOHO. All out aerial attack with 93 aircraft were launched from LEXINGTON and YORKTOWN and SHOHO was sunk. For the first time in history, a Japanese carrier had been sunk.

c. On the next day both sides launched reconnaissance sorties in search of the enemy. At 0722 hours the Americans spotted the Japanese Carrier Strike Force. At the same time, the Japanese aircrafts also picked-up the American carriers. Admiral Fletcher ordered an all-out strike by deploying 82 aircraft. SHOKAKU was seriously damaged and she left the battle while ZUIKAKU escaped into weather. On the other hand, Japanese sent 69 aircraft to attack the US fleets. The YORKTOWN was damaged forcing her back to Pearl Harbour. The LEXINGTON sustained torpedoes and bomb hits. Ultimately she became the first American carrier to be sunk also.

Battle of Midway

14. **Background**. Admiral Yamamoto, Commander-in-Chief of the Combined Fleet advocated luring the US carrier fleet into action and destroying it in a final devastating battle as a prelude to a bargaining peace. He planned a major offensive with 165 ships to attack Midway; a tiny island located 1135 miles West-northwest of Pearl Harbour. First a diversionary attack was planned on the Aleutian Islands in the northern Pacific to bring the US Navy in to battle and then attack Midway using four carriers.

15. **Air Operations**

a. Admiral Yamamoto sent 02 light carriers to the Aleutians Islands, 1,200 miles north of Midway, to serve as a distraction. Then his main carrier force, consisting of 04 large carriers, advanced to capture Midway. Admiral Nimitz again could read the Japanese intentions with the help of code breakers and positioned 03 carriers north of Midway.

b. On 03 June 1942, US patrol aircraft sighted the Japanese invasion force, and aircraft from Midway attacked them without much effect. At 0530 hrs on 04 June, a Midway-based plane again spotted the Japanese Carrier Force. Shortly afterward, the Japanese carriers launched a large strike with 108 aircraft against Midway. The US carriers had closed within striking distance of the Japanese force and launched their aircraft. Midway's own bombers took off to hit the Japanese carriers while fighters took off to defend the island. But they were no match for Zeros and 17 out of 25 US fighters were shot down. Unfortunately for the Japanese, their raid did little serious damage as most of the US bombers had already left Midway for attacking the Japanese Carrier Force. These US bombers were badly shot up by the Japanese Carrier Force and they could not hit a single Japanese ship.

c. But the attack by the Midway's US bombers convinced Nagumo of the need for a second strike on the island. However, that meant the aircraft ready with torpedoes, had to be rearmed with bombs. When the task was half done, a Japanese search plane reported spotting the US carriers nearby. Nagumo again ordered the aircraft to be rearmed with torpedoes. But he decided to wait so that the aircraft returning from Midway could recover and fighters could be refuelled for escorting the attacking force. For Nagumo, this decision of delay proved fatal.

d. US aircraft launched earlier failed to sight Japanese carriers as Nagumo changed course causing many of the aircraft to ditch or divert to Midway. When they found the carriers, attacks were carried out by torpedo bombers but Zeros shoot down 35 out of 41 aircraft, and not a single Japanese ship was hit. But they provided the perfect decoy as the Zeros were drawn down to low level allowing the dive bombers from ENTERPRISE and YORKTOWN to attack from high level. They found the carriers when it was crowded with aircraft rearmed and ready for next launch. In 10 minutes, US dive bombers had turned the tide of the Pacific war, leaving three Japanese carriers AKAGI, KAGA and SORYU sunk. Only HIRYU escaped and launched two strikes with 40 aircraft which hit YORKTOWN and was finally sunk. Subsequently, HIRYU itself was hit by dive bombers from the ENTERPRISE and sunk. The invasion of Midway was abandoned, thus halting Japanese expansion across Asia Pacific.

The Allied Air Offensive

16. In the battles of Coral Sea and Midway, the Allied foiled the Japanese advance. They then quickly went into offensive and set out for a two-pronged advance to take the war on the Japanese mainland. One was through the Southwest Pacific via the north coast of New Guinea to the Philippines led by General Mac Arthur and the other across the Central Pacific through the Marshalls to Okinawa led by Admiral Nimitz. Both pronged of offensive required tremendous air support and it was the advance from Southwest Pacific that needed island hopping. After the Allied captured Marianas and Okinawa, concentrated long-range bombing offensive got underway. The Allied offensive ended in dropping two atom bombs over Japan resulting Japanese unconditional surrender. However, the first initiative by the Allied was the raid over mainland Japan carried out by Col James Doolittle on 18 Feb 42.

Doolittle Raid

17. **The Raid**. Col James Doolittle conducted the raids with sixteen B-25 aircraft from US carrier HORNET about 700 NM from Japan. The aircraft were armed with 500 lb demolition and incendiary bombs. Their targets were military and industrial facilities over Tokyo, Nagoya, Osaka and Kobe. Overall, fifteen aircraft could reach Japanese homeland and drop their bombs. However, while recovering, 15 of the aircraft had to be abandoned over China while only one could land at Soviet Union.

The Advance in the Central Pacific

18. **Objectives**. Allied considered that, a move through the Central Pacific would offer many advantages. It would be shorter and would outflank the Japanese in New Guinea. The Central Pacific islands were isolated and smaller in size requiring a limited force to defend. Moreover, capturing the islands would make the logistic supply to the southern Japanese forces difficult.

19. **Operations**. The campaign of Central Pacific took place in Micronesia, an area of the Pacific which contained over tiny 1000 islands dispersed in 4 main groups namely the Gilbert Islands, the Marshall Islands, the Caroline Islands and the Marianas. Nimitz decided to make the best use of air and sea power in the Central Pacific Campaign. The Allied forces objective was to capture Saipan and Guam of Mariana Islands from where Japan will come within the range of B-29 aircrafts.

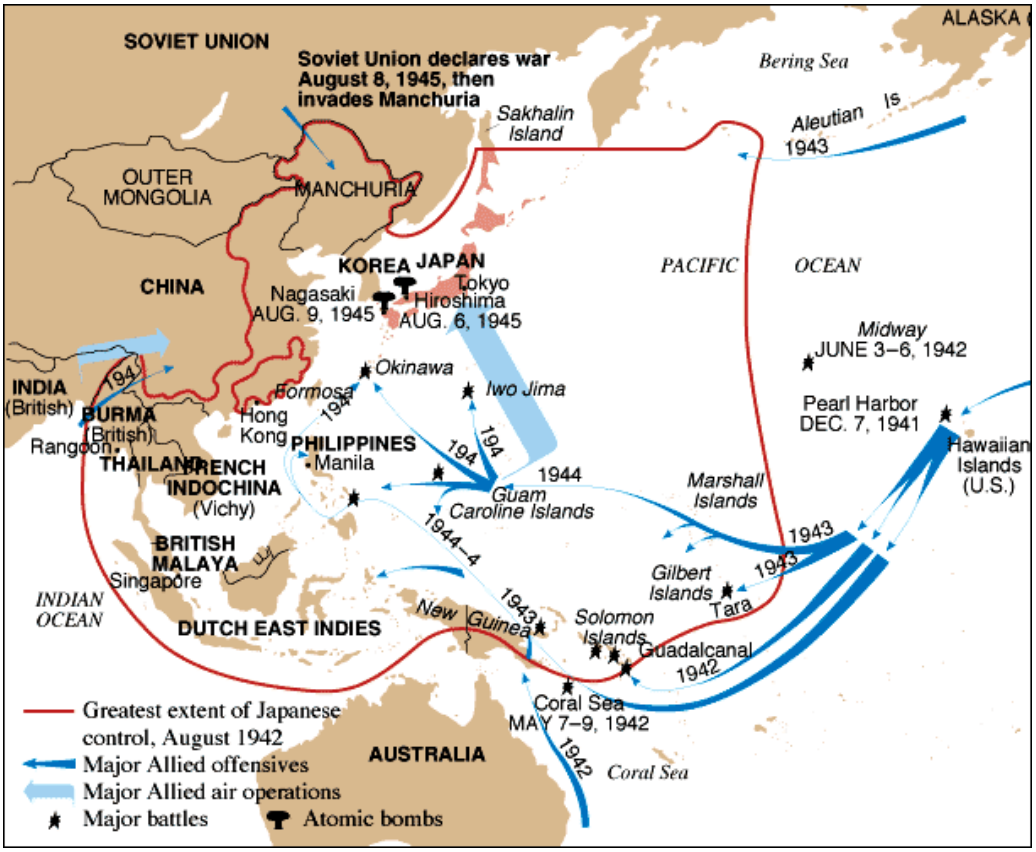

Fig: Allied Lines of Advance 1942-1945

20. **Capture of Tarawa**. Tarawa is located at the Gilbert Islands. It was necessary to capture these islands as a first step towards Tokyo because they were important Japanese sea-bases in the Central Pacific. On 20 Nov 1943 heavy air bombardment struck the Gilbert Islands. The heavily defended Tarawa was captured on 23 Nov 1943 at the cost of 3000 US Marines.

21. **Fall of Marshalls**. Taking lessons from the Gilbert operations, the US navy and marines fought the battles at the Marshall Islands. On 29 Jan 1944, the Americans bypassed the outer ring of the Marshall Islands to strike at Kwajalein at its centre. Two American divisions were committed, with heavy and accurate naval gunfire and air support. On 17 Feb 1944, heavy bombardment by Allied forces followed by amphibious landing resulted in destroying 250 Japanese aircraft against 25 aircraft from Allied. The line of communication to Rabaul was cut successfully and the operation ended on 22 Feb 1944.

22. **Capture of The Great Marianas**. The Allied objective was to establish airbases in Marianas. This would bring the Japanese home islands within the range of B–29 bombers. Moreover, the Allied wanted to lure the combined fleet out of its improvised base in North-eastern Borneo. On the other hand, Japanese objectives were to protect Saipan, which was her naval command & control centre, and destroy the Allied invasion fleet. Japanese fleet consisted of 473 aircraft and the Allied fleet had 891 aircraft. The Allied pilots were well experienced but Japan had all young pilots after the loss in Midway. The battle started with the Japanese strike comprising 326 aircraft attacking in four waves. The US radar detected the Japanese aircraft and each wave was intercepted, resulting to the loss of 240 Japanese aircraft compared to only 21 of Allied. Japanese aircraft were shot down so rapidly and in such a number that the engagement is known as ‘Great Mariana Turkey Shot’. The Japanese high command believing their raid to be a success launched another 49 aircraft as reinforcement. Most of these aircraft were also shot down.

23. While the Japanese were retreating, the Allied launched a strike of 226 aircraft which sank the carrier HIYO and two oilers. But 99 Allied aircraft were lost during the operation and while recovery due to shortage of fuel. Allied secured Saipan and Guam on 09 and 24 July 1944 respectively and Japan main land came within the range of B-29 aircraft. Immediately after the fall of Marianas, the US started her strategic air offensive against Japan. Later, Nimitz also took the control of Iwo Jima in February 1945.

Advance from South West Pacific

24. **Objective**. One of the main objectives of attacking from south west was to break the "Bismarck Barrier" and to recapture Philippines. General Mac Arthur, commander of the Southwest Pacific area, came to the conclusion that his operation had to have air superiority for their successful army assault. His air component commander Lt Gen Kenney played a key role in leading Mac Arthur to this conclusion. Mac Arthur along with Kenney started offensive from New Guinea. His plan was to capture New Guinea, the Philippines and then Okinawa for an air offensive attack on Japan.

25. **Air Operations at Guadalcanal**. The Allied offensive was launched on 07 Aug 1942 to capture the island of Guadalcanal to seize the air bases from where they could launch air operations. Kenney identified the problems of the Fifth Air Force, out of 517 Allied aircraft, just 150 were operational. Only with carefully prepared B-17s were sent to Rabaul for gaining control of the air. He always favoured the idea that, the best and the cheapest place to destroy the enemy was on ground. The Japanese were caught by surprise when the airfield attacks claimed 120 out of 150 aircraft at Rabaul. Thereafter, the Allied force bypassed the Japanese strong hold of Rabaul and reached Admiralty Islands on February 1944.

26. On the other hand the ground troops proceeded to Buna of New Guinea from Port Moresby in Jan 1943. They continued with their offensive through Lae, Madang and finally reached Admiralty Islands on Feb 1944. Subsequently Kenney planned to neutralise the strong Japanese concentrations at Wewak but the airfield was beyond the range of his fighters. To bring it with in the fighters ROA, he secretly built Henderson airfield, while two fake airfields were also constructed close to the Japanese positions using ground troops. This eventually diverted Japanese attacks. When the Japanese detected the real airfield, it was too late to prevent the US surprise attack by 200 bombers that destroyed over 200 Japanese aircraft on ground. The Americans reached the tip of the New Guinea on 30 Jul 1944 and on 15 Sep they landed on the small weakly defended Indonesian Island of Morotai. The Americans were now in a position to conduct future operations towards Philippines.

27. **Recapturing Philippines**. The objective of recapturing Philippines was to prevent Japan from obtaining the resources of Dutch East Indies and Malay. Allied targets were Japanese aircraft, airfields and shipping in the Philippines. The operation started with the airfield attacks on Luzon. Japanese correctly assessed the Leyte Gulf operation as their last opportunity. They knew loosing this battle means surrender; as such they engaged all their available forces to counter the Allied advance. Mac Arthur's troops landed on Leyte Gulf on 20 Oct 1944 at the cost of over 44,000 Allied casualties. Poor reconnaissance and lack of land-based air support caused the Japanese defeat. Later, the Allied forces landed at south of Manila on 31 Jan 1945 without facing any strong obstacles.

28. **Capture of Okinawa**. The objective was to establish complete sea blockade and to have a forward base for the final assault on Japan. The great Mariana turkey shot depleted the Japanese trained aircrew. As such, they began to use land-based aircraft as humanly guided missiles known as “Kamikaze”. They also used ‘Ohka’ piloted bomb for suicidal attacks. All these caused unprecedented Allied casualties including loss of 763 aircraft and 36 warships. By the end of May 1945, the Japanese counter offensive ability became very weak including Kamikaze. On 21 Jun 45 the Allied captured Okinawa.

Strategic Air Offensive

29. **The B-29 Campaign**. The Strategic air offensive against Japan by B-29 began on 14 June 1945. At first the new 20th Bomber Command was based in China. Later on all the bombers were shifted to Marianas to bring the entire Japan within the B-29s range. Initially the B-29s were used to attack the Japanese cities with incendiary bombs which achieved devastating effect in killing hundreds of thousands of Japanese as well as in destroying major Japanese cities. B-29s also flew hundreds of mine laying sorties, planting more than 12,000 mines - which were estimated to have sunk 123 ships. Japanese did not give due importance to air defence. Their obsolete radars were ineffective to oppose the B-29 bombing campaign. Due to sustained strategic air offensive, the economic situation of Japan deteriorated and the production of aircraft was reduced. After four month of saturation bombing, Japan had hardly any target left worth attacking except Hiroshima and Nagasaki.

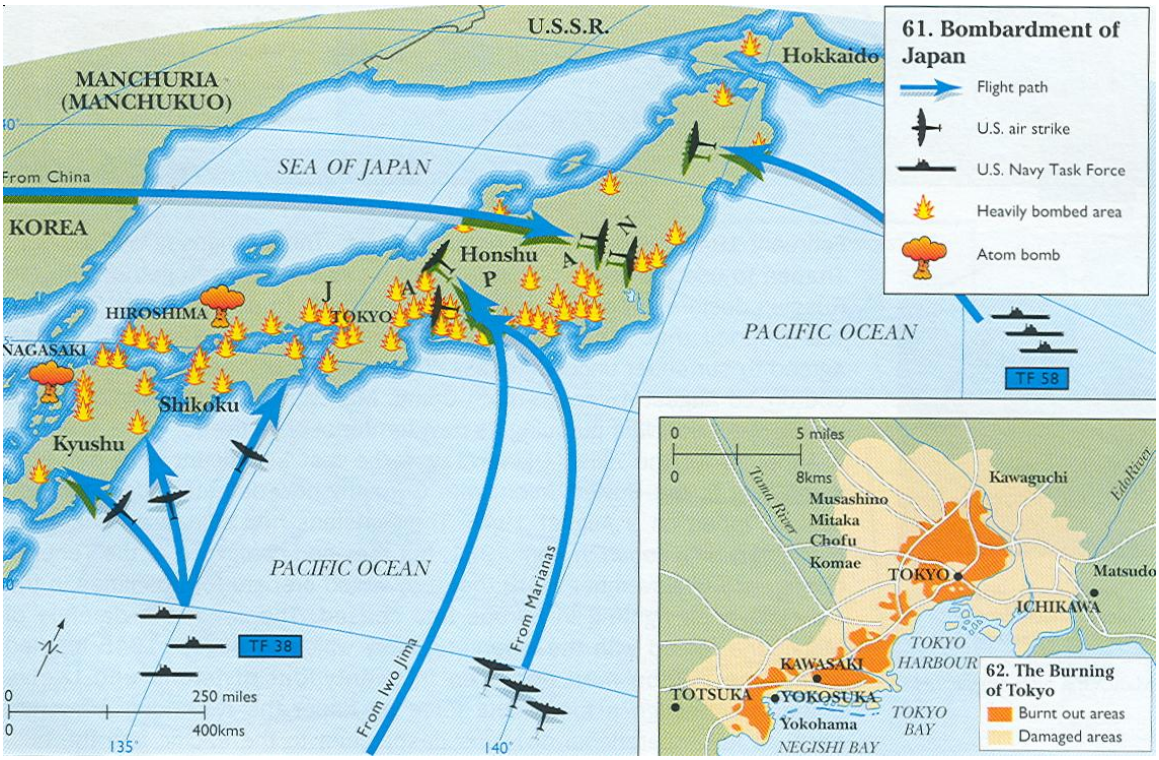

Fig: Strategic Air Offensive against Japan.

30. **The Atom Bomb Attack**. The Potsdam Declaration of 25 Jul 45 had warned the Japanese Government that if they did not surrender, Japan would face ‘prompt and utter destruction’. In replay the then Japanese Prime Minister Admiral Suzuki stated that Japan would ignore the declaration. This answer convinced and compelled US president Truman to use atomic bomb to make the Japanese Government surrender despite the ethical and humanitarian problem. Subsequently the Strategic Air Command in the Pacific was ordered

to launch the atomic strike anytime after 03 Aug 45. On the morning of 06 Aug 45, a B-29 aircraft from Tinian Island dropped the first atom bomb on Hiroshima. On 09 Aug 45, the second one was dropped on Nagasaki. Ultimately, on 15 Aug 45, Japan announced its unconditional surrender ending the Second World War.

BATTLE OF BRITAIN

Introduction

31. The Battle of Britain was the first major campaign fought in the air. This battle turned out to be a classic air battle in which victory was achieved mainly by defensive actions. As such, air campaign planners of today will quote this campaign as a positive example of good defensive posture.

32. During Second World War, Hitler intended to establish his authority on Europe. By 1940, only the British stood in his way. Therefore, Hitler decided to attack Britain immediately after the fall of France. As England was separated from continental Europe by the English Channel, a massive amphibious landing across the sea was essential for the German forces to achieve their aim[i]. The invasion plan was developed, and its code name was “Operation Sea Lion”. However, before the land invasion could take place, the Germans rightly assessed the necessity to gain control of the air by Luftwaffe.

33. On 10 July 1940, Hitler ordered the Luftwaffe to destroy the RAF in the shortest possible time. As the RAF faced a numerically superior Luftwaffe, she was forced to adopt a defensive posture. The air campaign over the skies of Britain lasted about thirteen weeks, from July to October 1940. Britain’s victory in this defensive battle not only changed the course of World War II, but left many lessons to be learnt.

Background of the Battle

34. In 1919, after the First World War, the Treaty of Versailles was signed between the victorious Allies and the Germans. This treaty imposed numerous restrictions on the size and capability of the German Armed Forces, and was seen by the Germans as a humiliation of their defeat. Morale of the German people was at its lowest ebb during the period following the war. However, this soon changed when Adolph Hitler came to power. Having experienced both triumph and defeat in World War One (WW I) as a soldier in German Army, Hitler promised his people that he would restore everything that was taken away from Germans, despite the conditions of the treaty. He reorganised and built up the military, and set about conquering the whole of Northern Europe. The World War II commenced on 01 September 1939 when Hitler's army invaded Poland. The sheer audacity of Hitler took everyone by surprise. One by one, countries fell to the German Army; Czechoslovakia, Denmark, Norway, Luxembourg, Holland, Belgium and finally France.

35. By June 1940, only the British stood in the way of German domination of Northern Europe. In Britain, whatever precious time was spent putting as many new fighters and trained pilots into service as possible; to guard against the attack everyone knew was coming. By the beginning of July 1940, the RAF had built up its operational strength to 600-700 fighters while the Luftwaffe had total 2250 bombers and fighters[ii]. The stage was set. In the skies above South East England, the future of Britain was about to be decided. As the British Prime Minister, Sir Winston Churchill put it; "What General Weygrand called the Battle of France is over, the Battle of Britain is about to begin".

German Strategy

36. On 30 June 1940, Reich-Marshal Goering signed an operational directive for the air war against England. Luftwaffe estimated that it would take four days to defeat Fighter Command, followed by another four weeks to eliminate the RAF. The strategy of the Germans for "Operation Sea Lion" was as follows:

a. To neutralize the RAF in the air and on the ground to gain control of the air;

b. To interdict the British supply lines by attacking ships and ports;

c. To cross the Channel and invade Britain.

British Strategy

37. After the World War I, the british developed a carefully planned integrated air defence system to defend the homeland from the adverseries. While this put her in good stead to mount an effective defence against the Germans, the RAF was nevertheless numerically inferior to the Luftwaffe. Thus, the British strategy in the Battle of Britain was:

a. To fight a defensive battle by means of an integrated AD defence network.

b. To protect the war potential.

c. To ensure aircraft production is higher than attrition.

Phases of the Battle

38. The Battle of Britain was fought in four phases as described below:

a. **Phase 1 – The Battle for the Control of the Channel (10 Jul 1940 - 12 Aug 1940)**. The Germans launched their offensive attacks to test the RAF during this phase. Most of the attacks concentrated on shipping in the English Channel. The idea was to bring the Fighter Command for battle over sea. This phase of the battle also saw the Germans probing British defences, and conducting reconnaissance flights over various airfields. During this phase, RAF lost 96 aircraft whereas Luftwaffe lost 207.

b. **Phase 2 – The Battle for the Air Superiority (12 Aug 1940- 06 Sep1940)**. After the first phase, Goering thought that the British early warning system had been destroyed. As such, Luftwaffe began the next phase of the battle on 13 August by launching massive raids on the airfields of 11 Group. The aim was to destroy the RAF, either in the air or on the ground. To keep up the pressure, Germans began night raids to stop the defenders repairing damage overnight. Just when the Luftwaffe was beginning to overcome the RAF with the destruction of her airfields, the RAF was given a much needed break to recover as the Germans decided to change its strategy from attacking airfields to cities. During this phase, RAF lost 295 fighters and 171 badly damaged whereas the Luftwaffe lost 380 aircraft.

c. **Phase 3 - The Battle to Break Britain's Morale or The Blitz (07 Sep 1940 05 Oct 1940)**. The third phase of the battle came to be known as the Blitz. On one night-raid, Luftwaffe aircraft bombed London by mistake. In retaliation, the British bombed Berlin. This enraged Hitler. Because it seemed that the attacks on airfields were not destroying enough RAF fighters, he ordered a change of targets by attacking cities, industries and other strategic targets instead. This gave the British defences the much needed respite to re-group and re-build. During this phase, RAF lost 216 aircraft and on the other hand, Luftwaffe lost 181 fighters and 194 bombers.

d. **Phase 4 – The Night Raids (06 Oct 1940 - 31 Oct 1940)**. As the long, hot summer ran into October, the German daylight bomber losses became too heavy. Realising the task to be difficult and the toll becoming too high at daytime, the Germans planned to attack the cities at night. The damage they caused to Britain's cities was enormous, including 42,000 civilian casualties. However, as the RAF pilots became familiar with the raiders' course of action towards London and other cities and their operational experience increased, the success in night interceptions also improved. As such, the RAF began to counter the Luftwaffe's nightly raids.

39. By late October, the weather began to worsen and the German losses accumulated. Soon, the Germans realised that the RAF could not be defeated. As such, they postponed 'Op Sea-Lion' indefinitely and concentrated on 'Op Barbarosa', the invasion of Russia. This marked the end of the Battle of Britain.

Major Tactics That Evolved During the Battle

40. While carrying all these offensive and defensive operations during the Battle of Britain, many new tactics were evolved by both the air forces. Some important tactics are discussed below:

a. **Big Wing**. Big Wing was a tactic developed by Squadron Leader Bader of 12 Group. He suggested that the aircraft of five or more fighter squadrons be flown together to engage the enemy en-masse.

b. **Jabo (Jagd bomber)**. The tactic was developed by the Germans to carry out nuisance raids during the day. Modified Me 109 fighters, loaded with 250 lbs bombs, were made to cover as much area as possible before a full-fledged night operation to stretch the RAF fighter pilots during the day. The aim was to tire the RAF pilots before the night attacks.

c. **High Level Bombing**. Luftwaffe changed their tactics of bombing from medium level to high level to minimize attrition. RAF fighters faced much difficulty intercepting these bombers at higher altitude because of less reaction time to climb. However, this Germans had to trade off accuracy as a result of this tactic.

Effective Use of Intelligence Means

41. Like any other campaigns, intelligence played a key role in Battle of Britain. The British possessed a superior intelligence service. The code name for the British effort to crack the German military Enigma cipher machines was called Ultra. It was one of the most closely guarded secrets of the War. It was conducted at a country estate called Bletchley Park. With the help of the Polish intelligence, the British began working on the Enigma code machines that the German military used for radio communications. The RAF intelligence agency was responsible for covering two specific aspects of Luftwaffe; firstly, the German ORBAT and Organization and secondly, immediate intelligence on Luftwaffe operation. British intelligence could easily extract information from R/T conversation of Luftwaffe and knew exactly where they were heading for and at what number. This information helped Fighter Command to plan the scramble in time.

42. In contrast, the German intelligence was ineffective. Although there were eight Luftwaffe intelligence agencies, they were fractured as a result of rivalries. By 1940, there were few or no German agents operating in Britain. As a result, the Luftwaffe did not possess recent knowledge of the workings of the RAF's air defences, particularly on the critical command and control system that ACM Dowding developed before the war. Thus, more often than not, the Luftwaffe was caught by surprise. For example, for the period of 12 – 19 Aug, German intelligence claimed that RAF lost 644 aircraft but actual figure was 141 aircraft. Even on those occasions when intelligence was fairly accurate, the Luftwaffe higher command would choose to ignore it if it does not conform to what they would like to believe. This severely hampered the Luftwaffe's ability to prosecute an effective air campaign against the RAF, particularly a well-entrenched defensive force.

Technological Innovations

43. Battle of Britain is the first air campaign where the offensive and defensive counter air operation concepts were shaped by the development of new technologies. Both British and Germans exploited the electromagnetic spectrum to a great extent to deceive each other. The British built an invisible electronic wall as part of their defence, and the Germans tried to break it. Churchill termed this electronic spectrum as "The Wizard War". Significant electronic warfare (EW) measures included:

a. **Knickebein**. Knickebein was a blind bombing aid of Germany. A steerable beam was projected over the target. The pilot then flew along the beam using the audio tones to stay on the centreline until a second intersecting beam was heard and this indicated that the aircraft was now over the target. The British countered this by sending a false signal called masking beacons.

b. **Triangulation Method**. The German pilots used to tune to BBC radio stations to find their fix course by calculating relative bearings from to two or three BBC radio stations by triangulation method. Discovering this, British ordered all stations to use same frequency for transmission to confuse German pilots.

c. **Airborne Cigar**. The Airborne Cigar was a jamming device used by RAF. This equipment could interfere with enemy RT Channel in the 20 – 30 MHZ and 48 – 52 MHZ at a range of 50 miles.

d. **DUPPEL**. DUPPEL was a German ECCM method. Strips of silver paper were dropped to confuse the British radars, which is similar to present day chaff.

e. **Radio Paris**. Another radio station used for military purpose was Radio Paris. This was transmitted by the Germans in occupied France, and it offered round-the-clock program of songs interspersed with Nazi propaganda. The Radio Paris transmission was through highly directional antenna aimed at the city to be bombed. The German pilots would thus be directed to London or Liverpool simply by listening to French songs transmitted by Radio Paris. The British took long time to detect the system. When they did, they came up with a counter measure called "BROMIDE". This consisted re-transmitting of Radio Paris programme on the same frequency using Omni-directional antenna. With this ECM German bombers got disoriented and flew haphazardly over Britain bombing at random.

f. **Radar**. In the 30s, the Air Ministry engaged scientists to look for means to 'see' the enemy before they arrive at the coast. One such scientist, Robert Watson-Watt, suggested the possibility of using radio signals that were bounced back from aircraft to detect their presence. Hugh Dowding, who was then Air member for Research and Development, was enthusiastic for the idea. On 26th Feb 1935, a full test was arranged, and this gave birth to what we know today as 'radar'. After further developments and refinements, a network of radar stations was built along the English coast in 1939. Known as Chain Home (CH), the system consisted of transmitting and receiving towers 250 to 350 feet high. Operating in the frequency band of 22 to 30 MHz, the system had a range of about 120 miles. To complement these tall towers, a more complicated Chain Home Low (CHL) system was also installed. This provided the RAF with low-level detection of 5000 feet and below.

g. **IFF/High Frequency Direction Finding System**. In order to have an effective air defence system, one must not only be able to detect enemy aircraft but also be able to accurately assess the position of friendly aircraft. Hence, the idea of an IFF system was born. This soon evolved into the High Frequency Direction Finding system (HFDFS), also known by its codename as 'Pip-squeak'. All British fighters had a TR9D transmitter receiver installed in this system. The unit had two channels; one for voice communication with the Sector command station and the other for the IFF system. By transmitting on this second channel at regular intervals, the Sector command station could automatically track the movement of the friendly aircraft.

h. **Computers**. The Battle of Britain also saw the use of computers for quick calculation of the compass course on which to send fighters for accurate interception, as well as breaking of Enigma coded messages. The use of computers for these purposes cannot be over-stated. Without these machines, the timeliness of response to the threats presented to Fighter Command would not have been there. As such, one can argue that they helped the RAF to achieve economy of force when engaging the enemy, and concentrate her forces at decisive points of the battle. This was extremely crucial for the RAF, since they were numerically inferior to the Luftwaffe.

TASK- 5
AIR POWER IN THE KOREAN WAR

Introduction

1. The Korean War was the first conflict after WW II that marked the beginning of the cold war episode. It began in early hours of 25 June 1950, when North Korean troops crossed the 38th parallel and invaded South Korea. In an immediate response, United Nation (UN) Security Council adopted a resolution proclaiming North Korean Army (NKA) attack a breach of world peace. The UN asked its member states to assist South Korea in repelling aggression. On the call by UN, 18 countries under the banner of UN engaged themselves against North Korea in the Korean peninsula in one of the furious wars of the history. At a later stage Chinese Communist Forces (CCF) joined North Korean forces. Though limited in resources and objectives, the Korean War blindly involved several million men in a hard and bitter struggle. It began as a 'police action' by the UN and developed in to a war of great magnitude. Finally, it ended in a stalemate manner, which gave no joy to either side.

2. Air Power had a major role in the Korean War where the United States Air Force (USAF) had the leading role. Emerging as an independent force only three years back, USAF had an objective to prove that air power alone would be able to bring a decisive result in the Korean War. The Air war in Korea ranks as a major air campaign and embraced the entire range of air operations. During the three years of fighting, victory or defeat often depended on the availability and application of Air power. There was a great disparity in the strength of Air power of the two sides, both in numbers and modernity. On one side were the Air Forces of North Korea and China. The other side was the United Nations Air Force (UNAF) mostly comprising USAF and some aircraft of Britain and Australia.

3 Air power had both success and failures in Korean War. Many ground commanders of UNF admitted that close air support in Korea was so important that without it Army would not be able to stay in Korea. Thousands of interdiction missions flown by UNAF in the initial months were valueless. North Korean Air Force hardly had any available air assets to challenge the UNAF. Whatever they had were destroyed either on ground or in the air within the first month of the war. It was Chinese Communist Air Force (CCAF) which emerged with MiG – 15 and challenged the air supremacy of UNF. Many air battles took place: both sides had gain and loss. There was also a threat of using nuclear weapon by USA which took the Korean War into verge of 3rd WW.Finally, a massive offensive air op named as 'Dam Burst' brought the North Korea in to the negotiation table. An armistice was signed in 1953 amongst the UN, the USA, China and North Korea. South Korea refused to sign the armistice, which left the two Koreas separated till to date.

Background

4. Korea was divided in half along the 38th parallel, between the Soviet Union and the USA at the end of the WW II. In 1947, Soviet troops withdrew, followed soon after by the American forces. The people of Korea were left on their own. Governments were formed in each half– communist in the north, democrats in the south.

5. The withdrawal of American and Russian troops created a military void resulting in increased number of border incidents. The situation became worse every day. Finally, on 25 June 1950, the North Korea launched an attack on South Korea with the ultimate motive of unifying Korea under a socialist banner.

Strategy

6. In Korean War, the grand strategy of UNF was influenced by the USA. On the other hand, China and Russia influenced the grand strategy of North Korea.

7. **Grand Strategy**.

a. **UNF Strategy**. The UNF's strategy was 'rolling back of communism and liberating North Korea. When the Chinese entered the war, the previous strategy was abandoned and a new strategy of 'containing communist expansion' was adopted.

b. **Communist Strategy**. Conquest of South Korea was the only grand strategy of North Korea as well as CCF.

8. **Air Strategy**.

a. **UNF Strategy**.

(1) Gaining control of the air by destroying enemy air bases, supporting facilities and aircraft in the air and on the ground, was the primary campaign objective.

(2) Providing close support to surface forces operations.

(3) Destruction of resources of raw material and factories which were considered to be the North Korean war making potential such as the chemical plants, oil refinery, munitions factory, hydro-electric system etc.

(4) Isolating the battle fields by destroying North Korean road and railway lines, bridges, communications and supply centres.

(5) Destruction of irrigation dams which were vital for North Korean irrigation system and thereby production of rice.

b. **Communist Strategy**. North Korea lost their small air force within 1st month of the war leaving no room for the effective employment of air power. However, Chinese developed a huge Air Force with soviet aircraft which had following air strategy during the war:

(1) Establish control of the air over a substantial part of North Korea by attacking enemy aircraft in the air and not attacking the UNFon ground.

(2) Deny the UNF Strategy of precision daylight bombing over an important part of North Korea close to YaluRiver.

War on the Ground

9. **North Korean Thrust**. The NKA invaded South Korea in the early hours of 25 Jun 50 and Seoul fell on 28 Jun 50. The first UN troops landed in Korea on 30 Jun 50. The NKA advance was halted in the South Easterly tip of the peninsula around the port of Pusan.

10. **UN Drive to Yalu River**. Having been adequately reinforced, the UNF broke out from the Pusan perimeter in conjunction with a massive amphibious landing at Inchon on 15 Sep 50. With pressure mounting both from the front and the rear, the NKA fell back in disarray. Seoul was recaptured on 26 Sep 50. At this stage China entered the war.

11. **The Chinese Thrust to South**. The Chinese struck on 26 Nov 50. The UNF were taken completely by surprise. They were pushed back with heavy losses. By the end of the year, the Chinese had reached below 38th parallel. On 01 Jan 5l, the Chinese army launched a concerted attack and occupied Seoul on 24 Jan 51.

12. **The War of Attrition**. With fresh reinforcements, the UNF wrested the initiative and went on the offensive. Seoul was retaken on 15 Mar 51, changing hands for the fourth time in less than 9 months. The Chinese launched a counter attack in Apr-May 51 and UN troops in Jun 51. The front stabilized at north of 38th parallel. A cease-fire proposal was made in the UN on 23 Jun 51 and the negotiations started on 08 Jul 51. Subsequently the fighting continued on a reduced scale and the negotiations haggled for 25 months before the armistice was signed on 27 July 1953.

Phases of The Air Battle

13. Though the ground battle in Korea had four phases, the air battle had six distinct phases. First four phases were in commensuration the phases of the ground battle. When the ground battle came into a stalemate during June, 1951 the air war continued and ultimately proved to be decisive on 6th phase. The phases of the air battle are described below:

a. **Phase I**. During phase-I, the UNF were very much concerned about the defence of the Pusan perimeter. So, the main focus was on the close air support to help the ground troops. At the same time control of the air over friendly areas was accomplished by the UNAF. As soon as the defence of the perimeter hardened, an increasing amount of resources were diverted to interdiction attacks on the North Korean supply lines. It was vital in halting the NKA advance towards Pusan.

b. **Phase II**. Phase II of the air operation developed with the advancement of UN ground troops to the Yalu. It continued destroying the enemy aircraft in the air and on the ground including the hostile air bases and supporting facilities. MIG-15 of CCAF appeared for the first time in this phase over North Korea on 01 November 1950. While fighting the MiG in the air, the strategic destruction of enemy sources of raw material, factories and the associated transportation system was precluded.

c. **Phase III**. Phase III of the air battle is related to the CCF advance to the South. During the early weeks of phase three of the war the main emphasis of the Fifth Air Force and of Bomber Command reverted to the close support role as in the early days of the war. The strategic objective of this phase was to halt the Communist advance and to force the beginning of armistices talks.

d. **Phase IV**. With the delegations meeting for negotiation, the necessity for close air support declined with the gradual arrival of the stalemate war on the ground. In June 1951, the UNAF initiated an all-out strategic air interdiction campaign with the object of isolating and paralysing the communist armies in the field and so forcing an early end of armistice talks. Concurrently, a determined attack was launched at the Communist airfield-building programme in North Korea. In response, operations from beyond the Yalu were stepped up. It was thus in the air to air fighting that the new strength of CCF began to be felt. There were many dogfights between MIGs and F-86 during this phase. Both sides suffered attrition. Many B-29s were shot down. Finally this phase could not make the communist signing the truce.

e. **Phase V**. As the interdiction campaign could not bring the desired result, the UNAF switched to attacking on strategic targets. The phase opened on 23 June 1952. Among the strategic targets were hydro-electric systems at Suiho, factories, barracks and airfields of Pyongyang, oil refinery at Aozi and many other industrial plants. It appears that the UNAF failed to determine the right Centre of Gravity for the adversary.

f. **Phase VI**. Even after these massive strikes there was no indication that the communists were abandoning their stand to sign the truce. So, a series of strikes was initiated against the North Korean irrigation dam which supplied 75% of water for rice production. Five of total 20 irrigation dams were attacked between 13 and 16 May 53, which impaired the efficiency of the irrigation system. In addition it achieved spectacular tactical success since the main road and rail communication running north from the capital were cut by the floods. At last the agreement was signed by North Korea.

Emergence of New Weapon Platform

14. **Helicopter**. One of the remarkable innovations during the Korean War was the immergence of Helicopter as a battle ally. During the WW II, the advances made in the development of the helicopter were experimental. It was in the Korean War only the full potential of the helicopter was exposed and exploited. The helicopter was used extensively for the reconnaissance, liaison purposes and conveying of commanders. More over the helicopter was used to transport ammunition, equipment and to air lift troops to the front line. The other plus factor being the evacuation of casualties and has been responsible for saving many lives. The rescue by sling hoist was developed during this war. The UN Air Forces helicopter fleet included SIKORSKY H-5 and H-19.

15. **Jet Fighter Aircraft**. Though Jet aircraft made their first appearance in WW II, it was Korean War where jet aircraft made its significant presence with first jet to jet air combat. The swept wing MiG-15s and F-86 sabres dominated the peninsula's skies during the war. The other jet aircraft were F-80 Shooting Star, F-82 Twin Mustang and F-84 Thunder jet.

Conclusion

16. After three years of hard fighting with the confines of Korea the combatants ended what they had started on 25 Jun 50. Both sides had tremendous loss of man, material and equipment. The cost was completely out of proportion to any benefits that may have been gained by either side. Economic and social damage to the Korean peninsula was incalculable, three years of bombing left hardly a modern building standing in the north.

17. At the beginning of the war the UNF rather US strategy was to roll back communism from the whole of Korean peninsula. But with the intervention of Chinese that was confined to the containment of communism only. Initially UNAF made a list of 18 strategic targets and continued intense bombing on those. But the amazing repair capability of the North Koreans made the air effort insignificant. In many events due to lack of unity of command the air efforts were wasted. Two unique facets of the air war in Korea were the emergence of the helicopter and the jet aircraft.

18. The air campaign in Korea was fought relentlessly around the clock until the last moment. It was air power which saved the day for the UNF. In spite of the limitations imposed on its use the air power played a very significant and decisive role in Korean War. However, it was clear that air power alone by itself could not end the fighting. In last two years, the Korean War was essentially an air war. Thus within five years of the end of the WW II, the air war in Korea reaffirmed that only air power has the fire power and flexibility to cope with the complexities of a modern war.

TASK-6

ARAB ISRAEL WAR

SIX DAYS WAR: 1967

Historical Background

1. The reasons for the 67 war are deeply rooted in history of Palestine since 721 BC. The Muslims and the Jews both had claims to the Palestine's Jerusalem as holy ground for both the community. The claim continued without any solution, rather it turned into clash and physical conflict between these two communities. The Jews drew attention and blessings of other Jews of the developed countries. The UN intervened the matter and maintained a peacekeeping force since 1957. The neighbouring Arab countries supported the Muslim Palestine to restore their land. Jews expansion continued and the number of Jews grew to a great extent. To counter the growing Zionist threat, the Arab league was formed in 1945. The Arab countries refused to acknowledge the Jewish state "Israel" in Palestine.

2. The conflicting claims of Palestine ultimately turned in to armed conflicts. By 1956, the Arabs and Israelis had fought two wars. The defeat in both the wars in 1948 and 1956 badly damaged the Arabs pride and grew avenge to their minds. They established good relation with the Soviet Union as the Israelis were backed by the western countries. Palestine became a land of business opportunity for the super powers. The defeat in 1948 and Arab League's failure to act effectively for a common goal grew resentment among the Arabs. The so-called leadership problem appeared to be solved by the emergence of Egyptian leader Gamal Abdul Nasser in 1952. His charismatic leadership fuelled the Arab hope to fight for Palestine against Israel. In 1956 Egypt fought another war with Israel and lost that too.

3. The Palestine Liberation Organisation (PLO) was established in 1958 for the cause of the Palestine. The Arab countries especially the Egypt and Jordan supported the Palestine Fedayeen (guerrillas). PLO had blessings of the Arab countries special of Egypt and Jordan. They used to attack the Israeli troops and civilians from the shelter in Egyptian controlled Gaza Strip or Jordanian controlled West Bank. Syrians also increased their support for PLO. The violent incidents increased along the Syrian-Israeli border. The Israelis responded to the PLO raids with hard-hitting retaliatory raids against neighbouring Syria, Lebanon and Jordan. This vicious circle of raids and counter raids continued with increased intensity. As a follow up, a minor border incident turned into a major tank battle on 7 April 67. The incident involved both the air forces and Israelis shot down six Syrian aircraft. Tension between the Israelis and Syrians reached to the breaking point. Although Syria had a defence agreement with Egypt, it followed a moderate course. President Nasser faced criticism from the Arab countries and especially from Syria and Jordan for not taking any military action against Israel. This criticism provoked President Nasser to take rapid and some visible actions. Nasser openly declared to destroy Israel. Nasser actually did not have any workable plan for a war with Israel. He was gambling to recover his tarnished image to the Arab world. He did not want to attack Israel first to avoid the international criticism. He rather intended to provoke Israel for an aggression, so that he could have a retaliatory blow and destroy Israel thereafter.

4. On 18 May, Nasser asked the UN Secretary General to withdraw the UN peacekeeping force from Sinai desert. Egypt, Syria and Jordan massed their army to the Israeli border and on 22 May Egypt blocked the Strait of Tiran, a vital shipping corridor for Israel with links to the red sea and major sources of petroleum. That was the final step of provoking Israel. Israel considered it as an act of aggression. Israel was further alarmed when Egypt and Jordan signed a treaty on 30 May and placed two armies under a joint commander. Nasser was quite successful in provoking Israel. He even declared war on radio. The situation appeared perilous to the Israelis. They believed that their option is narrowing. With these frictions and fears on 03 June, the Israeli cabinet voted for immediate war against Egypt. But Egypt never could imagine what could be the result of the first blow from Israeli side.

Objective

5. The Arab forces objective was to destroy the Israel. On the other hand, Israel wanted to destroy Egypt's air power to make a military balance for their survival.

Air Strategy

6. The Israelis planned to employ air power to destroy the EAF on ground and bring a military balance on her favour. Subsequently it also planned to attack Syria and Jordan to gain total air superiority.

The Israeli Air Operation

7. **Attack on Egyptian Air Field**. Israelis attained all the elements of surprise and exploiting that, they shocked the Egyptian Air Force. They grounded the Air Force by a massive air attack. Israel started its air attack over Egyptian airfield with Mirage, Super Myste're, Fouga, Vautour and Ouragan aircraft. The first wave consisted of four fighter aircraft and they attacked the runway first . The Israelis used "concrete dibber" (similar Durandal) to destroy the runway. They also used delay-fused bombs to disrupt and discourage the repair work. Simultaneously they attacked the parked aircraft with rocket and cannons. The first wave continued for ten minutes over the target. The second wave approached after 10 minutes and continued their weapon delivery for about ten minutes. There was always a wave for about ten minutes. This pattern continued for sixteen successive waves. Mirage, some Vautour and Super Mystere squadron had flown six sorties. By noon, the numerically superior Egyptian air force was destroyed on the ground. In barely three hours, the Egyptian lost 100 pilots and 300 aircraft.

8. **Attack on Syrian Airfield**. After grounding the Egyptian Air Force the Israelis attacked the Syrian Air Force at 1215 hours on the same day. Twenty-five minute pre-emptive air strikes destroyed the Syrian Air Force.

9. **Attack on Jordanian Airfield**. The Israelis continued its attack on Jordanian Air Force on the same day. Israeli aircraft destroyed 20 Hunters, six transports and two helicopters on the ground at Mafraq and Amman International airport.

10. **Attack on Iraqi Airfield**. Strikes againstthe Iraqi Air Force were limited to one airfield, known as H-3. In that attack the Israeli Mirages were flying at low level to avoid radar detection and they were bounced from above by Iraqi Hunters. In the dogfight, Israelis lost three Mirages and shot down one Iraqi Hunter.

Arabs Air Operation

11. **Egyptian Air Operation**. The Egyptian Air Forces' role was combat air patrol along the Israeli Sinai frontier. They were engaged for defensive role rather than the offensive role. On 05 June morning, the Egyptians were surprised by Israeli air attack. When the attack begun, Egyptian pilots and ground crew rushed to the aircraft but the Israelis destroyed most of these aircraft. They also destroyed the aircraft were taxiing or taking off.

12. Despite the suddenness of the attack eight Egyptian MiG-21s managed to airborne. They intercepted and shot down two Israeli fighter-bombers before being shot down by the Israelis. Twenty additional Egyptian fighters (12 MiG-21s and 8 MiG-19s) based at Hurghada were able to airborne, as their bases were not attacked. They flew towards north, towards the primary Egyptian bases near the Suez Canal. But on reaching, the MiGs found the bases are under attack. Subsequently the MiGs succumbed to Israeli fighters or crash-landed after running out of fuel before being able to provide any aid.

13. After the first day attack, the Egyptians still had 200 operational ac and a substantial number of pilots. Most of the intact ac were in Yemen or had been shifted to bases out of the range of the Israeli fighters. On day two: June 06, Egyptian MiGs conducted numerous ground attack missions. The most effective attack was on an Israeli supply point in the central Sinai. On day three, the Egyptian MiGs flew numerous close support sorties. Six MiGs strafed the Israeli Tal Ugda (division) in mid-afternoon as it was moving into position to seal off Ismalia Pass. On Day Four, Egyptian MiGs concentrated their efforts against an Israeli reconnaissance column approaching the Suez Canal. By mid-afternoon the Egyptians had flown 32 ground attack sorties against the Israeli formation. However may be the case, Egyptian's effort to close air support could not bring any fruitful result.

14. Egyptian anti-aircraft gun tried to repel the Israeli attacker, but the speed of the attack and suppression activities by the Israeli aircraft neutralized their meagre efforts. The Egyptian anti-aircraft fire had been lighter than expected. They could cause only little damage to the Israeli aircraft. The Egyptians fired a good number of SA-2 missiles but they could not shoot down any of the Israeli aircraft. These missiles were ineffective below 4000 ft as they would take long time to accelerate below that altitude. As the Israeli strike aircraft flew at very low altitude, these SA-2s did not pose any threat to Israeli aircraft.

15. **Jordanian Air Operation**. In response to the attack on Egypt, Jordan retaliated against Israel at around 11:00 am on 5 June 1967. Jordanian Hawker Hunter attacked on Israeli base at Netanya. Jordan claimed that the Hunters destroyed four Israeli ac, but Israeli officials admitted loss of only a single Noratias transport ac. In retaliation to that attack, the Israelis attacked Jordan and destroyed the Jordanian Air Force on ground. But to do that, Israel faced little obstruction from Jordanian Air Force. A PAF pilot later on the GpCapt of BAF led the first interception mission with a Jordanian wingman at around 1200 hours from Mafraq Air Base. In that mission the then Flt Lt SaifulAzam and his wingman shot one Israeli Myste're each. Destruction of Jordanian air force aircraft on ground did not stop the spirit of the Jordanian fighters. They drove through the desert to fight from a Iraqi Air Base H-3located about 40 miles inside Iraq's western border with Jordan, which was the only target airfield of Israel.

16. **Syrian Air Operation**. Half an hour later of Jordanian attack, 12 Syrian Mig-21s and Mig-17s attacked the Haifa oil refinery. They also attacked the Israeli airfield at Megiddo and destroyed few dummy ac. Two Mig-17s were shot down over the airfield and third over Tawafik. After this attack the Syrians virtually could not launch any attack against the Israelis, as they were totally wiped out by the Israelis.

17. **Iraqi Air Operation and Achievement of a Bengali PAF Pilot**. At dawn on June 6, an Iraqi Tu-16 bombed the Israeli town of Natanya, causing numerous casualties. However, Israeli antiaircraft gun shot it down when it flew over them. In retaliation to this attack, four flights of Israeli Mysteres bombed and strafed H-3, the Iraqi air base near Jordanian border. In addition, two flights of Mirages were sent against more distant Iraqi airfield. Here the Iraqi Hawker Hunter could catch the Israelis by giving them surprise.

18. Strikes against the Iraqi air base H-3faced high attrition by the Jordanian contingent. Though the attack was small, but in a single mission Israel had a considerable amount of loss. Furthermore, this particular combat remained as a milestone with the contribution of GpCaptSaifulAzam and the then Flt Lt of PAF. The Jordanian force led by the then Flt Lt SaifulAzam scrambled and waited at 25,000 ft with complete radio silence. Once the Mirages of Israel came over H-3 airfield, Flt Lt Saiful and his wingman engaged them. Flt Lt Saif shot one Mirage and a Vatour. The mission over H-3 had more success of Arabs by shooting down 3 Israeli aircraft but losing one aircraft flown by an Iraqi pilot. In the post war debrief, Col Eleizer Cohen IAF stated," The damage to H-3 was peripheral, and the losses- a killed pilot and navigator, two pilots captured and three aircraft downed- were heavier than at any other base."

19. **Lebanese Air Operation**. On June 6, Israel's northern neighbour, Lebanon, backed up its declaration of war by sending two Hawker Hunters into Israeli airspace north of the Sea of Galilee. The Hunters were immediately intercepted by the Israeli fighters, which shot down one ac.

Air Land Battle by Israeli Air Force

20. **The Sinai Front**. After destroying the Egyptian force in the first day, the IAF concentrated for Sinai battlefield. On the second day, Israeli air force flew close air support attacks and interdiction missions and destroyed the Egyptian forces in the open terrain on the Sinai. Because of the absence of air cover and poor communication, the Egyptian commander could not manoeuvre their units. The air support continued till the last day. Everywhere the Egyptians abandoned their vehicles to escape air attacks or because of they had run out of fuel. With the air cover, Israeli force pushed forward till the Suez Canal and accepted the cease-fire on 09 June.

21. **The Jordanian Front**. In the Jordanian front, numerically the Israeli and Jordanian forces were equal. But the Israelis got the upper edge by destroying the Jordanian Air Force on 05 June. They also knocked out the Iraqi armoured brigade in the Jordanian front with a devastating air strike. The West Bank had natural defensive terrain and many of Jordanian units proved themselves equal to the Israelis. But the Israelis broke the Jordanian resistance with more than 800 air strikes in three days.

22. **The Syrian Front**. Israeli air power played a major role, preventing any manoeuvring by Syrian units. During the two days offensive action against Syria, the Israeli

Air Force flew more sorties than West Bank and Sinai front. In the last two days of the war, Israeli Air Force destroyed the AAA and went for the artillery brigade of Syria. The Syrian fortification at Golan Height, which was built by 19 years of construction, was destroyed by Israel air force in two days. That effectively ended the war on 10 Jun 67. This exemplifies how proper use of air power can speed up operation and help to achieve the objective by the ground forces.

Conclusion

23. The Arab-Israel war 1967 was the shortest war in the history of the Middle East. With the aim of a military balance, Israel planned to destroy the Egyptian Air Force on ground and subsequently to other allied Arab nations. In doing that, Israel executed a well-rehearsed pre-emptive attack on Egyptian, Syrian and Jordanian air force on 05 Jun 67. On the other hand, the Arabs did not want to initiate the war to avoid political crisis. They wanted to provoke Israel by closing the Strait of Tiran and planned to absorb the first blow form Israel. The total air supremacy helped the Israeli army to penetrate the Arab defences. They captured all of Palestine, Egypt's vast Sinai Peninsula and Syrian's Golan Heights as well as the west Bank of Jordan.

24. With the superior command and control the Israeli Defence Force exploited the surprise, security, concentration of force, offensive action and quick response to achieve a complete victory. All though the six days war did not bring any immediate peace for the Israelis, but captured Sinai desert helped them to bargain for a strategic objective, i.e. the Arabs acceptance of Israel as a state. This short and decisive air war remained as a landmark in the history of air power. It was a great lesson for the Arab states and for the whole world.

THE AIR CAMPAIGN OVER BEKAA VALLEY

Introduction

25. The air campaign over Bekaa Valley was fought between 09 and 11 June 1982 between IAF and the Syrian forces. The Israelis conducted the air campaign using their electronic wits and tactics. The strategy and tactics used in this campaign were based on the concept of combining new technology with element of surprise. In this conflict, the Israelis utilized the entire range of electronic warfare (EW) equipment with an aim to silence the Syrian ground based air defence (GBAD) systems. This war introduced several new types of weapon platforms and support systems. The concept of 'real-time' warfare; use of Remotely Piloted Vehicle (RPV), electronic jamming etc were also exploited in this campaign.

Background

26. The Lebanese Civil War started in 1975 between the Christian and Muslim front[iii]. On 01 June 1976, Syrian military forces entered Lebanon[iv] to stop the Civil War.

27. Since moving into Lebanon in 1970, Palestine Liberation Organization (PLO) gained strength by manpower, weapon and international recognition to their cause. Israeli strategy to keep pressure on PLO as a preventive measure resulted into many incidents of provocative attacks and retaliation between them.

28. On 28 April 1981, the IAF shot down 2 Syrian Arab Air Force (SAAF) Mi-8 helicopters, which were supporting Syrian troops in Southern Lebanon. In response, Syria started deploying Surface-to-Air Missiles (SAMs) at BekaaValley.

29. The presence of Syrian forces in Lebanon and frequent incidents of PLO artillery attack on northern settlements led Israel to plan for a military offensive in Lebanon to drive out the PLO and Syrian troops.

30. On 03 June 1982, Palestinian gunman attempted to assassinate Israel's Ambassador to UK. In retaliation Israeli Defence Forces (IDF) attacked PLO targets in Lebanon on 04-05 June 1982. PLO responded with a massive artillery and mortar attack on the Israeli population of the Galilee. In response, on 06 June 1982, Israel launched a land offensive "Operation Peace for Galilee". In support of the operation, on 09 June 1982, Israel launched an air campaign against Syrian forces in BekaaValley.

Air Strategy

31. **Israeli Air Strategy**. Considering this background, the national objectives and military strategy, the IAF adopted following air strategy for the BekaaValley air campaign:

a. To destroy the Syrian SAM sites at BekaaValley in order to gain air superiority.

b. To neutralize any incoming air threat from Syria in order to maintain air superiority.

c. To destroy the PLO bases, infrastructure and artillery capability in South Lebanon.

d. To provide offensive air support to the surface forces during 'Operation Peace for Galilee.

32. **Syrian Air Strategy**. Syrians maintained an air strategy based on reliance on GBAD system consisting of SAMs and anti-aircraft artillery (AAA) guns to counter Israeli air threat. Syrians did not intend to engage in war with Israel unless attacked.

Planning And Preparation

33. **IAF Planning**. After experiencing heavy attrition to Arab SAMs in 1973 war, the IAF changed their doctrine by giving emphasis on defence suppression. Analysing the threat posed from presence of Syrians SAMs at Bekaa Valley – located at short aerial distance from Israeli border – IAF strategists signified the importance of pre-emptive surprise attack. They planned to conduct a fast operation under electronic environment with some special tactics. Key to the plan was gathering electronic intelligence. Therefore, priority was given on acquisition and up gradation of modern aircraft, weapons and EW platforms.

34. **SAAF Planning**. Analysing the lessons of initial Arab success in 1973 war, Syrians followed the same strategy and relied on effectiveness of SAMs for air defence (AD). The Syrians heavily invested to rebuild GBAD system by procuring modern SAMs, radars and AAA guns. Syrians also acquired new aircraft including MiG-21MFs, MiG-23s, MiG-25 and SA-342 Gazzelle helicopters.

Conduct of the Air Operations

35. **Counter Air Operation**

a. **SEAD**. The IAF conducted the attack on Syrian SAM sites in a well-planned and coordinated manner. Just prior to the air attack, a commando raid was carried out to neutralize a control centre. On 09 June 1982, at 1414 hours, the air attack began with a force package of 96 ac. The information from EW platforms were used by F-4E aircraft to attack the radar elements of SAM sites using Maverick and Shrike ARMs from standoff distance. The A-4s and Kfirs then attacked other elements of the SAM sites with LGBs and cluster-bombs. The attack lasted for approximately 10 minutes destroying 10 SAM sites. The long-range artillery and surface-to-surface ARMs were used simultaneously during the attack. At 1550 hours, second wave of 92 IAF aircraft attacked the remaining radar and SAM sites. A third wave of IAF aircraft attacked late in the afternoon. On that day, 17 out of 19 SAM batteries were fully destroyed and 2 were partially destroyed. The following day, the IAF destroyed the remaining two SAM batteries.

b. **Air Cover to Attack Force**. Few SAAF aircraft were on patrol mission when the IAF launched the SEAD operation. Syrians had great confidence on the effectiveness of the SAM system. So they called back all their aircraft in the air and relied on SAMs to counter the IAF air threat. Destruction of the SAM sites compelled the Syrians to send a force of MiG-21, MiG-23, MiG-25, and Su-22 aircraft to attack an IAF force of unknown strength and location. Using electronic jamming of radar and communication frequencies, IAF aircraft on air cover countered the Syrians fighters. The SAAF pilots were taken by surprise, as their training was extensively ground controlled interception (GCI) dependent. The IAF fighters used AIM-7F and AIM-9L AAM for beyond visual range (BVR) attack remaining at standoff distance. The AAMs eventually accounted for 93 per cent of all IAF kills. The air combat continued till a cease-fire came into effect at 1200 hours on 11 June 1982. The IAF claimed to have shot down 80 SAAF fighters without losing a single aircraft in the air battle. But SAAF claimed to have lost 85 aircraft in exchange for 21 IAF aircraft.

36. **Offensive Air Support**. The IAF fighters and attack helicopters provided support to the ground forces during the whole period of 'Operation Peace for Galilee'. The offensive actions enabled IAF to destroy 81 Syrian tanks using attack helicopters with TOW and fighters with LGBs. This prevented any possibility of reinforcement by Syrian ground forces in Lebanon.

37. **Air Transport Operations.** The IAF took control of Ansar airstrip near Beirut and used it for air transportation of men and materiel. Leaflets were also dropped from the air. The IAF used CH-53 helicopters for Para trooping under cover of smoke screen made by F-4E aircraft.

38. **Electronic Warfare**.

a. **EW Platforms used by IAF**. The IAF used following EW platforms in the Bekaa valley air campaign:

(1) Decoy Drones

(2) Ryan Teledyne 1241 (AQM-34L) Firebee air-launched drone fitted with electronic and optical sensors.

(3) Samson, an air-launched unpowered drone fitted with electronic sensors.

b. **RPVs**.

(1) Scout RPVs equipped with various electronic sensors, television and wide-angle film cameras capable of carrying out real-time transmission.

(2) Mastiff RPVs, having a pusher-propeller twin boom configuration carried imaging sensors and electronic sensors for special reconnaissance/surveillance and airborne data relay.

c. **Aircraft**.

(1) Modified Boeing 707 was used for jamming radar signals, fighter-control networks and navigation aids, and for minimizing self-jamming of own frequencies. The aircraft had side-looking radar that allowed detection of locations of SAM batteries and other systems, as well as enemy radar frequencies.

(2) The BekaaValley air campaign saw the first combat use of E-2C Hawkeye AWACS in the history of air power. It was capable of monitoring and controlling attack missions while remaining at standoff distance. It could monitor over 200 aircraft simultaneously, control up to 130 separate air-to-air engagements at ranges up to 250 miles and had a passive detection system that could pick up radar signals 500 miles away. This capability enabled the IAF to detect SAAF aircraft as they took off, allowing it to determine the number and direction of inbound hostile aircraft.

(3) CH-53 helicopters having standoff jamming capability were used in secondary EW role.

(4) F-15s were capable of sorting out engagements at shorter range. The IAF successfully used them as radar gap ‘fillers’ to assist the less radar capable F-16s.

d. **Electronic Self Protection Measures for Aircraft**. The IAF combat aircraft carried radar warning receivers (RWR), Chaffs and Flares and electronic countermeasures (ECM) pods (including the indigenously produced EL/L-8200 series pods) as electronic self-protection measures.

e. **Very High Frequency (VHF) Frequency Modulation (FM) Radio System**. The IAF used indigenously developed VHF FM radio system that changed radio frequencies across a 30 to 88 Megahertz band. The radio was designed with countermeasures against jamming.

f. **Deployment of Radar under Tethered Balloons**. The IAF also used Westinghouse low-altitude radars deployed under tethered balloons for surveillance.

39. **Conduct of EW by IAF**.

a. **Electronic Intelligence**. The information gathered through electronic intelligence prior to the air campaign allowed the IAF to ‘fingerprint’ the Syrian SAM sites at BekaaValley for electronic countermeasures.

b. **EW in SEAD**. The IAF began their SEAD operations in the BekaaValley with highly selective jamming by the Boeing 707 flying just off the coast of Lebanon. This severely degraded the EW radar and the communications of the Syrian integrated AD system. Then the decoy drones and RPVs were used to pinpoint the SAM sites and pass the information to the Boeing-707. After thorough scrutiny in the computer, depending on the distance of targets, decisions were taken either to use the surface system or air platform. Provided with real-time, accurate target locations, the IAF next turned to actual destruction of the SAM sites.

c. **EW in Defensive Counter Air Operations**. As the Syrian AD radars in BekaaValley were destroyed, the Syrians were compelled to use long-range radars positioned inside Syria. E-2C guided the IAF interceptors to hold at low level between Lebanese hills. Once the SAAF fighters came closer to a pre-determined 'engagement zone', Syrian radars and their communication frequencies were jammed by the Boeing-707. Then E-2C vectored the fighters into "blindside" attacks on the SAAF aircraft. The EW environment of the battle was very crucial to the IAF success.

40. **SAAF**. The SAAF seriously lacked in EW and jamming capabilities. The SAAF MiGs had nose and tail-threat warning receivers only.

Command, Control, Communication and Intelligence (C3I)

41. **IAF**. The IAF C3I system was a key contributing factor to the success of the air campaign. The various data links and communication networks of the command post provided the commanders a real-time picture of the air battle. Data and photographs from various EW platforms were also downlinked. The IAF also set up two-way voice communications between the command post and the pilots to enable the commanders the flexibility in taking and disseminating decisions quickly.

42. **SAAF**. Syrian command and control system were disrupted due to extensive jamming and destruction of associated radar and communication elements of SAM sites. It compelled the AD elements to act in isolation. The Syrians could not make correct assessment of the capability of the IAF.

Impact Of Technology

43. **IAF**. The IAF used following new technologies that brought decisive results:

a. The IAF extensively used RPVs in various roles during the campaign. Although USA used RPVs in Vietnam War, they could not gain significant success. The IAF used these low-cost aerial platforms to gain maximum effect.

b. The provision of real-time picture of the battlefield in the command post assisted the commanders in deciding the best tactics suitable for any particular situation.

c. The IAF equipment included latest computer controlled equipment such as Head-Up Display (HUD), RWR as well as laser devices for target designation and computer-aimed cannons.

d. The high performance ARMs and AAMs increased the standoff capability of IAF aircraft. AIM-9L AAM having "all-aspect capability" enabled the IAF interceptors to attack the SAAF fighters from head-on[v] or flank instead of manoeuvring to take position at the rear.

e. The Israeli research and development (R&D) capability acted as a force multiplier. For example, the IAF F-4 was modifies 600 times and the E-2C and Boeing-707 aircraft were specially modified to fit the unique requirements of IAF.

44. **SAAF**. Syrians lacked in capabilities in respect of indigenous technology. They mainly relied on procurement of various weapon platforms from the Soviet block. The modern weapon platforms included latest generation Soviet fighters and fighter-bombers and latest technology SAMs.

45. **Outcome of Technology**. In the BekaaValley air campaign, the IAF used western technology, while the SAAF used Soviet technology. The new technologies introduced in the campaign enabled IAF various tactical advantages like real-time targeting, BVR and all-aspect engagements, and choice of variety of weapons. With all these, IAF shaped the battlefield.

Conclusion

46. On 06 June 1982, the Israel launched ‘Operation Peace for Galilee’ with an aim to neutralize PLO’s forces in southern Lebanon and drive Syrian forces out of Lebanon. The IAF conducted extensive reconnaissance and surveillance prior to the campaign. Platforms like reconnaissance aircraft and RPVs were used to collect information on the Syrian SAMs and associated systems. On 09 June 1982, the IAF launched the BekaaValley air campaign with a complex, carefully planned, well-coordinated, and effectively executed attack. The SAAF efforts to prevent the air attack were countered by the IAF utilizing the electronic wits and tactics. This resulted into many air combats where large number of SAAF aircraft was shot down by the IAF. EW played a very vital and dominant role during the air campaign.

47. In the BekaaValley air campaign, it was proved that the use of electromagnetic spectrum could confer great advantage in war by adding new dimensions to the conventional warfare. Besides, the IAF also introduced a range of new technology aircraft and weapons, which influenced the nature of air warfare. The IAF took the best advantage of them to gain air superiority by correct application of air power adhering to the principles of war and tenets of air power. The air campaign over BekaaValley, although very limited in scope, area of operation, duration and the number of participants, takes a special place in the history of air power. Air power was applied in a decisive and innovative manner in this campaign.

TASK- 7

AIR ASPECT OF 1971 WAR

Introduction

1. The story of Indo-Pak relations has been a story of conflict. 1971 Indo-Pak war was a power projection by the two countries to add another episode in the history of bitter Indo-Pak relation. This conflict emanated from a number of problems. Interests and objectives of ideology, image of each other and power struggle between the two countries formed the base of 1971 Indo-Pak war. In the history, this war goes by the name of Indo-Pak war but the essence of the war lies in the underlying urge of the people of Bangladesh for freedom. Liberation war comes when all means of negotiation fails, when the oppressing party is pushed to the limit and the existence becomes questionable. Liberation war of Bangladesh was no exception to that. But what makes Liberation war for Bangladesh uniquely different from other liberation war is the level of preparation by the people of East Pakistan for confronting a well-trained and sophisticated force. It could easily be compared to David versus Goliath story until India came in the action. India's entry in the liberation war brought about a new dimension which was also characterized by the influence of super powers.

2. 1971 Indo-Pak War was just not a reaction to situational crisis in former East Pakistan. In fact, it was outburst of the rival sentiment due to strains in Indo-Pak relations developed after 1965 war. Kashmir Issue, Border violation, interference in internal affairs, strengthening of Sino-Pak axis were the major reasons for growing tensions between the two countries after 1965 war. All these factors converged to the East Pakistan issue. Liberation war in East Pakistan created the right stage to establish the political agendas both by India and Pakistan.

3. After the military crackdown by Pakistan, India was morally obligated to help the freedom Fighters of Bangladesh. Indian assistance to the Bangladeshi "Freedom Fighters" made Pakistan Army's proceedings extremely difficult. Having sensed a futile end to the military crackdown, Pakistan waged full scale attack in the western border of India to bring international attention to the dispute. Pakistan hoped that it would soon bring UN involvement which would bring East Pakistan under the rule of western elite. India did what it had to Mrs Indira Gandhi declared in a broadcast on 04 Dec 1971 "The war in Bangladesh has become a war on India. This has been imposed upon me, my government and the people of India a great responsibility. We have no other option but to put our country on a war footing."- The declaration marked the beginning of the war between the two rival nations. The war continued for two weeks after which a new independent country named Bangladesh was born.

4. Air war played a pivotal role in 1971 Indo-Pak war. The first blow was provided by the PAF's pre-emptive attack on 3rd Dec 1971 on different Indian Airfields in the western border. India swiftly responded by counter attack. The surrender by the PAK army was accelerated due to the air superiority by IAF in the eastern theatre which allowed the advancement of friendly land offensive without any resistance by enemy air force. The air war in the western theatre was intense, leaving a question about who won the air war. The air war in Indo-Pak war was characterized by the classic lessons of air power and the exploitation of its basic tenets were significant in the application and conduct of air operation by both IAF and PAF.

Background

5. The partition of the Indian Subcontinent in 1947 created two independent countries: India and Pakistan. The basis for such partition was religion. Most Muslim majority areas of undivided India went to the newly created Pakistan where as India was created on the basis of secularism. Pakistan was originally made up of two distinct and geographically unconnected parts termed West Pakistan and East Pakistan. West Pakistan was made up of a number of races including the Punjabis and others. East Pakistan, on the other hand, was much more homogeneous and had an overwhelming Bengali-speaking population.

6. Although the Eastern wing of Pakistan was more populous than the Western one, political power since independence rested with the Western elite. This caused considerable resentment in East Pakistan. The biased strategies and policies adopted by the western elites resulted in a disparity between the two wings of Pakistan, East Pakistan being the sufferer. Such disparity provoked the leaders of the East to embark upon the path of revolution. The confrontation started with the language movement in 1952 when Muhammad Ali Jinnah declared Urdu as the only state language. It was at the cost of blood to fight for the rights of mother tongue for the Bengalis in East Pakistan. In every sphere the Bengalis were neglected and their representation in the national level was meagre. Thus they did not have voice in the national decision making process and the confrontation became inevitable. In economic front, the divergence grew wider day-by-day. The people of East felt that they were being subjected to exploitations and internal colonialism and resented the fact that west was developing with money earned by the East. In 1960, the per capita income in West Pakistan was 32 % higher than that in the East, with a higher annual growth with such growing contrast, religion took a back seat and the Bengali nationhood surged under the charismatic leadership of Sheikh MujiburRahman. He forcefully articulated all these resentment by forming an opposition political party called the Awami-League and demanding more autonomy for East Pakistan within the Pakistani Federation. He manifested a 6 point demand in 1966 for provincial autonomy in matters other than foreign affairs and defence, which was refused by the rulers. In the Pakistani general elections held in 1970, Awami-League won the majority of seats, securing a complete majority in East Pakistan. In all fairness, Awami- League should have assumed the political power of the East Pakistan But West Pakistan's ruling elite were so dismayed by the turn of events that instead of allowing Bengalis to rule East Pakistan, they launched operation searchlight under the military leadership of General Tikka Khan on 25 March 1971 and massacred thousands of innocent Bengalis. The brutality displayed by the Pakistani army went past the Nazi extermination of Jews. The Bangladesh government was formed in exile on 17 April 1971 inMujibnagar, (a village in Meherpur subdivision) Kustia. The Bangladesh Defence Forces (BDF) was formed and Colonel M A G Osmani was appointed as the Commander-in- Chief. People from all walks of life joined the struggle for freedom. The defected airmen from PAF initially joined the BDF. Later on, the Kilo Flight (air arm of BDF) was formed on 28 September 1971 which marks the embryo of today’s BAF.

7. The genocide led by General Tikka Khan in the East Pakistan resulted exodus of more than 08 million refugees (more than half of them Hindus) to neighbouring India. West Bengal was the worst affected by the refugee problem. Repeated appeals by the Indian government failed to elicit any response from the international community and by April 1971, the then Indian Prime Minister, Mrs Indira Gandhi, decided that the only solution lay in helping Bengali freedom fighters, especially the MuktiBahini, to liberate East Pakistan, which had already been re-christened Bangladesh by its people.

8. Pakistan felt it could dissuade India from helping the MuktiBahini by being provocative. The Pakistan Air Force (PAF) in East Pakistan launched an air attack on 22 November against MuktiBahini camps located inside Indian Territory in the state of West Bengal. In the Western and Northern sectors too occasional clashes, some of them quite bloody, took place. Confident that another war would be as much of a stalemate as the 1965 Conflict, the Pakistanis got increasingly bold and finally on 3 December 1971 reacted with a massive coordinated air strike on several Indian Air Force stations in the West. At midnight, the Indian Prime Minister Mrs Indira Gandhi in a broadcast to the nation declared that India was at war with Pakistan. As her words came on in millions of Indian homes across the Subcontinent, the men at the front were already engaged in bitter combat.

Strategy

9. After the complete outbreak of the war, the political objectives of Pakistan and India could be summarized in the following manner:

a. **Pakistan's Political Objective**

(1) Turn West into main theatre of op.

(2) Deny any land territory to Indian forces in the East.

(3) Capture state of Jammu &Kashmir in a swift offensive.

(4) Ensure Indian troops are delayed so that its allies, China and US, could come to its aid.

b. **India's political Objective**

(1) Liberate as much territory as possible in the East to set up a provincial Bangladesh govt.

(2) Swift campaign of short duration as there was a chance of UN intervention.

(3) Ensure conditions in liberated portions of Bangladesh are conducive for the return of 08 million refugees.

Pakistan's Military Strategy

10. 1971 war was fought on the basis War Directive No.4, issued on 09 August 1969.This predicted that the main threat was from India, and that the secondary threat was from (Soviet-supported) Afghanistan; it would not expect any kind of substantial help from outside. The war with India would be intense and fought with great severity. This directive furthermore expected that normal communications between East and West Pakistan would be disrupted and that even if the war could start in the east, the major and decisive battles would be fought in the west. To compliment these directives, Pakistan's military strategy

was aptly inscribed with the dictum “West fights for East” i.e. if India chose to attack East Pakistan, there would be an immediate response in the West. Therefore, a token force structure was deployed in the Eastern Wing, which was later reinforced with two additional lightly equipped infantry divisions. This reinforcement was not, however, deployed to face the Indian threat but to suppress the mass upheaval of the east while adhering to the concept that the crucial battle for the defence of EastPakistanwouldbefoughtinthewest.

Pakistan’s Air Strategy

11. Based on the political & military objectives, the Air Objectives for PAF as spelled out were:

a. Maintain an offensive pressure on the IAF by conducting sustained offensive counter air missions in the west till the land offensive starts.

b. To prevent IAF from interfering with the Pak Army’s operations in the main sectors of the land battle, and to provide max air cover to a planned counter offensive in the west.

c. To provide limited CAS and reconnaissance to Army and Navy when urgently needed.

d. Interdict Indian line of communication in the West.

e. Provide transport support to sister services.

f. Provide AD of selective VAs and VPs in both wings.

India’s Military Strategy

12. Central to the India’s military strategy was to fight a holding , offensive - defensive ops in the West, while in the East, drive at maximum speed to force Pakistan to hand over the country to Bengalis. To meet this strategy the Indian Military leadership formulated the following directives:

a. Launch operation in winters to ensure China doesn’t come to the aid of Pakistan.

b. Launch multi-pronged attacks in East Pak to deny Pak mil leadership any reaction or readjustment capability

c. Secure command centres and destroy enemy's command and control capabilities as subsidiary objective.

d. Offensive defensive operation - maintain defensive posture but resort to local offensive actions to gain tactical advantage.

India's Air Strategy

13. The then chief of IAF Air Chief Marshal PC Lal, in his book "My years with the IAF" listed the Air strategy on the priorities given to different air operations. The air strategy by IAF in 1971 complemented his directives which were as follows:

a. To attain and maintain air superiority in the eastern theatre.

b. To attain local air superiority over the land battle in the western theatre.

c. To provide air defence of selective VAs and VPs in both sectors.

d. To disrupt LOC and damage logistic bases in both fronts.

Bangladesh's Military Strategy

14. The "Taliapara Document' spells out the military strategy of the liberation war. It outlines that, first; a large guerrilla force would be raised and trained. Their task would be to clear up the collaborators of the Pakistani army, destroy communication lines to immobilize the Pakistani forces and engage in hit-and-run operations against convoys and isolated posts of Pakistan forces to create perpetual tension for them. Second, the regular units of MuktiBahini would be enlarged, divided into sectors troops and placed in different areas to give cover to guerrilla operations. Third, the best material among the regular units of the MuktiBahini and guerrillas would be recruited to form a regular force which would launch direct attacks on the Pakistani Army strongholds once guerrillas and sector troops have demolished them and cut off their lines of logistic support. Although the strategy did not envisage the forming of an air wing, yet the DBF leadership was responsive to the idea of forming the Kilo flight with the objective of providing air support to the MuktiBahini.

Concept Of Air Operation: IAF

15. The IAF concept of operation was based on a joint doctrine, which had its emphasis on air support for ground operations. Indians had developed this concept based on the tactics of Soviet Tactical Air Force Frontal Aviation Units. The priority in the west was to offset the imbalance in ground forces by the application of air power while fighting for attaining local air superiority and in the East the Indian operation was to achieve air superiority and thereafter continue providing air support to the land offensive. As a result over 50% of their sorties in the West were dedicated for the ground strike near the battle area while the remainder was divided between air interdiction and air defence missions.

Concept of Operation: PAF

16. The role of the PAF was to fight the air battle offensively, so to make it possible for the Army to operate without serious interference from the enemy air force. Furthermore, in essence the PAF was to provide limited close air support and reconnaissance support to the Army and Navy, but also maximum support in the case of a major battle on the ground; to coordinate all early warning systems; and to transport troops and equipment in both theatres of operations. It followed that a condition of air superiority would have to be achieved in the form of moving umbrella over Pakistan army's deep thrust.

17. To keep own losses low while inflicting maximum possible losses to the IAF, the PAF was to avoid a war of attrition. PAF planned to attack IAF at its weakest points while

operating in favourable environments as often as possible; the PAF was to maintain a high state of air defence initially, in order to minimize the effects of likely Indian counter-air strikes saturating Pakistani airfields. The Pakistani aircraft were not to be unnecessarily exposed to small arms fire, AAA and SAMs until the results fully justified this: for example, the PAF was to launch strikes against forward Indian airfields in order to reduce the overall weight of attack that could be launched from these in return; also strikes against Indian radar stations were to be flown. With such concept, PAF launched a pre-emptive attack on 03 Dec 71 on five airfields and two radar sites in western India. Operations in East Pakistan were to be undertaken in such manner as to conserve the PAF force as long as possible.

Comparison of Air Order Of Battle: Aircraft

18. On the eve of the 1971 War, PAF had a total of 288 aircraft, Whereas the Indian Air Force had 1025 aircraft in its inventory, this gave the IAF an advantageous overall ratio of 4:1(10:1 in Eastern front).The ORBAT ratio in eastern front indicates the overwhelming numerical superiority of IAF due to Pakistan's poor mobilization of resources in East Pakistan. Out of IAFs total 39 combat squadrons which were deployed in 20 airfields, 10 combat squadrons were deployed in East and rest on the West. Whereas, PAF had total 13 combat squadrons out of which only one F-86 squadron (No 14 squadron) was deployed in East Pakistan. IAF also had 4 helicopters Unit under Eastern Air Command.

Comparison of Air Order Of Battle: Air Defence and Radar

19. PAF had three medium-level and five low-level radars. The coverage was not at all requisite because these radars provided only 25% of high level coverage. On the low level side only 7% of the desired coverage was available. The only thing that was adequate on the western side was the Mobile Observer Units, but on the Eastern theatre they also had to be removed due to the fear of MuktiBahini. Overall it can be said that on the western side the network left dangerous gaps in Kashmir sector, area south of Multan, between Sukkur and Hyderabad and Karachi region. On the eastern side, only one radar was available to cover all levels and sectors. Contrary to this, the Indian air defence system was greatly improved from that of 1965. This was made possible with the soviet assistance. The system consisted of a vast network of early warning and low level radars. The terminal defences at most of the airfields had also been upgraded with radar controlled AAA guns and SAMs. A lot had also been done for the passive air defence. Most of IAF combat aircraft could be dispersed over a number of airfields and house in concrete pens.

Application of Air Power: Air War in the Eastern Front

20. **General**. The Air war in the East was brief and intense. It began on 22 November, 1971, several days before the formal declaration of war. PAF's four of the Sabre launched attack against the MuktiBahini positioned in Boyra, a place within the Indian territory of West Bengal. PAF's attack was swiftly responded by IAF gnat fighters which marked the beginning of air battle between the two rivals. Finally, IAF took the initiative of launching full scale air attack in the east that began on 4th Dec 71.With a huge numerical superiority (10:1) of IAF; it took only few hours of air effort to obtain the eventual air superiority. On the other hand, PAF was handicapped by its poor strength which could only delay IAF's air superiority for two days.

21. **IAF Air Effort**. The IAF's Eastern Air Command (EAC) flew a total of 1978 sorties, of which 1178 (60%) were in direct support of the Army. The first three days of the war consumed a fair effort towards Counter Air and CAP missions. The subsequent effort was biased towards CAS, interdiction and Air Transport Operation. The high marks of the IAF campaign are undoubtedly the prompt CAO against the three airfields, virtually grounding the PAF in the first 48 hours of the war and its intimate support of the Army.

a. **CAO**. Attacks were mounted on the night of 3 Dec by Canberras against Kurmitola, Chittagong and Tejgaon. These results were, however, indecisive as they were found to be repaired the next day. To obviate the vulnerability of the slower Canberras by day, Hunters and MiGs attacked these airfields, by day, on the 4th, 5th and 6th. IAF was in the face of PAF's resistance on 4th and 5th. Both the side experienced attrition after intensive dog fight. IAF continued with the principle of persistence and PAF found it difficult to counter with their decreasing strength. This allowed IAF to damage the Tejgaon runway surface on 6th December which made PAF non-operational. Thereafter, PAF had given up its effort to repair these runways. Recce of runway damage was well carried out by Canberras and Sukhois. On 08 December, IAF launched 32 attacks against these bases unhindered by PAF. IAF continued with persistent attack till the end of the war.

b. **Air Defence**. Initially Gnats and MiGs were engaged for CAP and escort missions. The only AD encounter took place over Boyra was by three Gnats of IAF against four Sabres of PAF. Three F-86 Sabres were reported to be shot down by Indian Gnats. After gaining the air supremacy over East Pakistan, this effort was diverted towards CAS and interdiction.

c. **Close Air Support**. IAF's Hunter, Gnats, Sukois and MiG-21 carried out close air support mission in the east. Not a single request for CAS for army was turned down at any stage of the war. Movements of Pakistani troops during day time came to a virtual halt due to relentless IAF air attack. A few details of CAS, Ac wise, are listed below:

(1) **Hunter**. On 6 Dec, Hunter of No 37 Squadron provided massive firepower support for the ground force in the Battle of Hili. On 11 Dec, a significant contribution was made by attacks on Chafee tanks near Comilla.

(2) **Gnats**. 22 Sqn was intimately involved in CAS from 6th onwards, in areas of Jessore, Ishurdi, Barisal, GoalondoGhat, Hardinge Bridge and Sathkira. 24 Sqn aircraft carried out a spectacular neutralization of en Arty Op on a grain silo in Bhairab Bazar. The Gnats also carried out regular attacks on country boats in the numerous rivers, based on reports by MuktiBahini as well as by visual spotting.

(3) **Sukhois**. Su-27 provided CAS at Jessore and Jhendia on 5th, 6th and 7th December. The spectacular bombing of Hardingebr on 11 Dec prevented en retreat. The routine attacks against en positions in Kushtia area on 9th, 10th, and 11th helped soften the en resistance to advancing Indian Army.

(4) **MiG 21**. This effectively started from 11th onwards in areas around Comilla, Sonaimura, Maulovi Bazar, Lalmai and Mainamati. Their rocket

attacks proved extremely effective against troops and gun positions. On the night of 10/11, the combined result of air attacks by Mig-21 and the blockade massacred the Pakistani Army. The climax of their action was undoubtedly the 4-ac rocket attack on Governor Malik's residence in Dhaka on 14th. This had a tremendous psychological effect on the top brass. It not only led to the instant resignation by the governor, but also hastened Gen Niazi's surrender which materialized on 16 Dec.

d. **Interdiction**. While all fighter aircraft carried out interdiction, the most noteworthy action was the effective neutralization of river transportation by Gnat ac. The destruction of Hardinge Bridge by Su-7s and the numerous small bridges by MiGs deserves credit.

e. **Airborne Operations by IAF Transport Aircraft**. On11December, a Para battalion was dropped in daylight near Tangail. IAF transport aircraft, such as An-12, C-119 and DC-3 Dakotas carried out the operations. The descending paratroopers faced no interference from the enemy. Next day, further reinforcement and re-supply were flown in. The Paratroopers had cut-off the rear line of Pak Army units in Jamalpur-Mymensingh axis.

f. **Helicopter Operations**. Meanwhile, the helicopter fleet of the IAF played key role in two major operations. First, on 7 December a battalion of infantry was lifted to the border of Sylhet. These forces captured Sylhet virtually without a fight. The Pakistani forces scattered in disarray. Then on 10 December, while the Pak Army were in their dug-in position around Bhairab-Ashuganj area, elements of the Indian heliborne forces were transported by Mi-4 helicopters across the river Meghna and dropped in Narshingdi-Raipura area cutting the Pak Army's line of retreat. In the next 36 hours, over 110 sorties were flown. The Mi-4, which normally carried fourteen troops, carried as many as twenty-three on board. After securing Narshingdi, Indian forces captured Daudkandi and Baidder Bazar on 14 and 15 December respectively, both with helicopter assault. The skyline of Dhaka was soon visible in the distance.

g. **Maritime Air Operations**. The day war was declared, the INS Vikrant, which had been anchored off the northern-most tip of the Andaman & Nicobar chain of islands, moved towards the principal East Pakistani port, Chittagong. The first wave was mounted against Cox's Bazaar by Eight Sea Hawks on 4th December. The second wave attacked Chittagong. They carried out repeated attacks on the airfield. On 5th INS Vikrant sailed towards the Mongla-Khulna area. Next attacks were mounted on those harbors. Then it came back to Chittagong. A total of 400 sorties were launched from INS Vikrant.

22. **PAF Air Effort**. PAF air effort in the eastern front is described in subsequent paragraphs:

a. **AD**. Apart from being vastly outnumbered, PAF had ignored a few fundamental concepts. PAD measures taken by PAF were inadequate. The AD system was devoid of missiles and the radar system not very effective against LL threats. A P-35 radar was shifted to West Pakistan in Nov 71. Sabres of no 14 squadron managed to engage IAF attacker and could shot 9 aircraft with the loss of 3 sabres. People of Dhaka witnessed thrilling low-level dogfight throughout 4 and 5 December.

b. **OAS**. PAF's only one F-86 squadron was entrusted to provide air support to Army in the Eastern theatre. The situation was quite dismal in the eastern wing much before the initiation of war. Operations in support of Army had started as early as March 71. During March and April 170 sorties were flown to support army which was heavily engaged in fights with the freedom fighters of Bangladesh. In Nov PAF flew 100 sorties to assist army units. In later part of November, PAF in eastern theatre put all effort to impede the thrust of Indian infantry and amour penetration. After the formal declaration of war, the air support missions did not extend beyond 30 miles from Dhaka. The last air support missions from the east, for providing cover to army at 20 Miles northeast of Dhaka were flown on 6th December.

c. **Air Interdiction**. The only air interdiction mission PAF flew was on 22 Nov in Boyra to impede the MuktiBahini training activities. This was quickly responded by IAF gnats when the PAF F-86 started straffing on the MuktiBahini in their third wave. After that PAF did not carry any other sorties except few support missions to Pakistan Army.

Air Operations of BAF

23. **KILO FLIGHT Formation**. In the height of our liberation war the Kilo Flight was formed by the initiative of some dedicated airmen who left PAF to join the war of liberation. The aim of Kilo Flight was to provide air support to the MuktiBahini. The pioneer Bengali airmen included Group Captain Khondaker, Wing Commander Bashar, Wing Commander Mirza, Flight Lieutenant Rahim, Flight Lieutenant Sadruddin, Flight Lieutenant Shamsul Alam and Flying Officer Nurul Kadir. The proposal for forming the Kilo Flight was initially kept pending as the BDF had no aircraft in its inventory till then. After repeated persuasions and discussion with the Indians the Kilo Flight emerged in 28 September 1971. IAF Chief, Air Marshal PC Lai and Group Captain AK Khandaker Deputy Chief of BDF inaugurated the flight in a simple ceremony at Dimapur, Assam. The Indians gave one DC -3, one Alouette-III and an Otter. Nine officers and 47 airmen were absorbed from different sectors in the air element. Squadron Leader Sultan Mahmud was appointed as the commander. Flight Lieutenant Shamsul, Flying Officer Badrul, Civil pilot CaptKhaleque, Sattar, First Officer Sarfuddin, Akram and Mukit joined later.

24. **Training**. From September to the beginning of December the crews were trained in night supply and attack operationS23. Pilots were divided into three groups. Squadron Leader Sultan, Flight Lieutenant Badrul, and Captain Shahabuddin were in Alouette-III, Flight Lieutenant SamsulAlam, Captain Sarfuddin and Captain Akram was in Otter, Captain Khaleque, Mukit and Sattar were in DC-3. There were no weapons fitted in the aircraft. The technicians modified the aircraft for attack and bombing role. Two rocket pods were fitted under the wings of the Otter, while the machine gun was kept inside the aircraft and arrangement was made to drop bomb. Alouette-III was also modified in the same manner as Otter. Dakota was assigned for transportation role. Several training missions were flown in the forest of Nagaland against dummy targets. The aircraft did not have any camera and gun sight. The target used to be aimed with the help of own marked 'red cross' on the windshield.

25. **Air Operations**. A number of air operations were carried out by the kilo flight during the war. Out of which night attack on fuel dump at Patenga and Narayanganj on 03 and 04 Dec 71 were prominent. The first air operation was on 03 Dec 71 by Otter at the oil refinery at Chittagong port area. The successful bombing mission with primitive weapons denied the oil supply to the Pakistani. The aircraft received few bullet hit but the dare devil pilot Flight Lieutenant Alam managed to evade the Pakistani anti-aircraft firing by low flying on the river of Karnafuli and land back safely. Soon after, the Otter carried out few more missions in Sylhet area. Squadron Leader Sultan Mahmud with his Alouette-III carried out the second successful mission attacking fuel storage at Godanail of Narayanganj area. During this mission the helicopter got a few bullets hit but could land back safety in the Base. DC-3 was dedicated for the transportation of forces and VIPs. The modest effort by the Kilo Flight with the meagre number of aircraft signifies the commitment of the Bengali airmen to the cause of our liberation war. This flight formed the embryo of today's BAF and bears the testimony of our predecessors who ceaselessly toiled against all odds to shape up a future Air Force for Bangladesh.

26. The very formation of Kilo Flight signifies the dedication, commitment and will of Bengali airmen for the cause of their liberation. The overall impact of the air operations on the conduct of the war was probably hardly significant, but they greatly contributed to the raising of the morale of the MuktiBahini and the people who supported them. The careful selection of the target also signifies the foresightedness of the Bengali airmen as it was chosen to maximise the effect through limited resources.

Conclusion

27. Emergence of Bangladesh as a nation is an epic history of blood bath and honour. It had the participation of People of all walks of life. The political manipulation, economic deprivation antisocial discrimination by the west pushed the people of east to as limit to for an arms struggle for freedom. Being separated by 1200 miles, the two wings had nothing in common except for religion. The 25 March crackdown eventually broke this thin line of common feelings, which resulted in arms conflict.

28. The rudimentary state of preparation to fight against the well-equipped Pakistani forces was actively supported by the Indians which paved the way for our victory. Initially the BDF was formed comprising freedom fighters, regular Bengali soldiers, sailors and airmen defected from Pakistani forces. Later on the Kilo Flight, the air arm of BDF, came into being comprised of Bengali airmen. The Kilo Flight was the embryo of today's BAF.

TASK -8

AIR POWER IN VIETNAM WAR

Historical Background

1. Vietnam War physically started in 1964, but it had a close interlink with the happenings from the end of World War ll. Before 1940 Vietnam was a part of French Colony for about 100 years.In World War II, Japan took control of Vietnam in 1940. At the end of World War II, the Vietnamese expected the Allies to support their claims for independence. But again, French took control of Vietnam with the help of British and United states. In 1946, Vietnamese started arms struggle against the French dominance that lasted for eight years. The French left Vietnam in 1954 when the North Vietnamese defeated the French decisively at the Dien Bien Phu under the leadership of Ho Chi Minh by bringing an end of France rule. In July 1954, the Geneva Agreements were signed, partitioning Vietnam into North and south along the 17th parallel. Thus Vietnam was divided intoa Communist North and non-Communist south.

2. South Vietnam was always under the threat of its communist insurgents called the Viet Cong. By the end of 1964 Viet Cong forces controlled about 2/3 of the South. This time, both NATO and the Warsaw pact were in hard contest to extend their dominance all over the world. Since Ho Chi Minh was pre-dominantly a communist leader, the American became concern about the growth of Communism in that region. They feared that if South Vietnam left under the hands of Communist then soon Laos, Burma and subsequently the whole south Asia would fall in their grip. Accordingly, President Johnson sent two American destroyers USS MADDOX and USS TURNER JOY to the Gulf of Tonkin for search patrol. On 2nd Aug the famous Tonkin incident took place. North Vietnamese force attacked two American ships and in retaliation American bombed North Vietnamese Naval Patrol Boat, Bases and Oil Depots.With increasing hostilities the situation continued to deteriorate. Finally President Johnson ordered to take all necessary stepsto use force on 7th Feb 65 which marked the start of long lasting war in Vietnam.

Air Strategy

3. **American Strategy**. Initially US had three military strategies to attack South Vietnam. Firstly, the United States must “persuade” the North Vietnamese to abandon their invasion of South Vietnamese territory. Secondly, the U.S. military must disperse the Vietcong units operating in South Vietnam. Finally, the United States must implement continuous patrolling to disperse guerrillas. The U.S. air strategy was to achieve the political aim and support the military strategy.The conflict went on too long and it is difficult to simplify the air strategy of US in the Vietnam War. The American policymakers did not have a clear focus on their political objectives and it was changed again and again with the changing situation of the war.

4. Thus, instead of being proactive, it was reactive to Hanoi's initiatives. Early in the war, the air commanders had rightfully prepared the list of strategic Centres of Gravity in North Vietnam. But the overall strategy in Vietnam was handicapped by theoretical, bureaucratic rigidity among military and civilian planners. But owing to selections of incorrect strategy, they were not allowed to use airpower to its fullest capacity. American strategic strength and power were never directed towards solving the political problems. The United States failed to develop an agreed upon strategy for success because it continued to attempt to impose a military solution on a political problem.

5. **Vietnamese Objective**. Hanoi on the other hand was following the strategy of revolutionary warfare by fighting a guerrilla war. A protracted war of this nature imposes heavy costs & wastage. A situation reaches when the revolutionary movement without winning any battle imposes unacceptably high cost on the enemy, which is the point of winning the war. The North Vietnamese had only one objective of occupying South Vietnam. Throughout the spectrum of conflict, they remained strict to their objective.

Air Campaigns

6. US air campaigns began in early 1965 with the Flaming Dart reprisal raids against North Vietnamese and concluded with Linebacker I and Linebacker II campaigns of 1972, although some bombing shifted to Laos and Cambodia in 1973. It has been estimated that all US air campaigns were finally terminated in Aug 1973. During the 10 years of the war, USA carried out massive operations through all dimensions. Air power was used extensively in different operations or battles in its entire role. However, the air campaigns can be segmented into two major categories:

a. Independent Air Campaigns:

(1) Rolling Thunder

(2) Commando Hunts

(3) Line backer-I

(4) Linebacker –II

b. Air Campaign in Support of Ground Forces:

(1) Tet Offensive

(2) Battle of KheSanh

(3) Helicopter Operation

Independent Air Campaigns

7. **Operation Rolling Thunder(1965-1968).** Operation Rolling Thunder was a series of interdiction operation over North Vietnam, which began on 13 Feb 1965 and suspended on 31 Oct 1968. The operation involved Air Force and marine aircraft flying from the bases in South Vietnam, Thailand and Hawaii. Naval aircraft flying from carriers on the South China Sea were also involved. Operation Rolling Thunder was a highly restricted operation designed to build up gradual pressure on the enemy. First it was tasked to interdict North Vietnam supply routes. Later, it was expanded to include North Vietnamese ammo dumps, oil Storage facilities, power plants, factories and airfields in the Hanoi and Hiphong area. Besides interdiction, fighter Sweep and close air support missions were also conducted. But the pressure was built up gradually and in between many breaks were given to allow the North Vietnamese for negotiation. So the operation failed to produce any sustained result. From 1965 to 1968 some 643,000 tons of bombs were dropped over North Vietnamese targets at the cost of 922 aircraft but hardly any significant of damage could be done to the North Vietnam. During this period North Vietnamese grew up AD network with the induction of soviet made SAMs and artillery guns.

8. **Achievement in Rolling Thunder**. The operation Rolling Thunder could not bring success due to following reasons:

a. Target selection in the initial stage was done from Washington, which barred the commanders to take action as per situation. Although the control was loosened at the later stage, it could not create positive impact.

b. The operation put gradual pressure to the North Vietnamese. Therefore, it otherwise, allowed the North Vietnam to build up their force and continued the war.

c. The North Vietnam fought the unconventional war while the US tried to defuse it through conventional application of air power.

d. The pilots were restricted to attack North Vietnam missile sites beyond 20th parallel despite it accounted huge losses of aircraft.

Commando Hunts (1968-1972)

9. Operation Commando began on 15 Nov 1968 and continued up to April 1972. The operation carried out as many as seven series of campaigns. The campaigns had two objectives:

a. To reduce the enemy’s logistical flow by substantially increasing the time needed to move supplies from North Vietnam in to the South.

b. To destroy trucks and supply caches along the roads, pathways, and streams and in the truck park storage bases along the trail.

10. In the Commando hunt interdiction campaign, B– 52 bombers dropped over 02 million tons of bombs to close the roads or divert the traffic on to specific direction. Despite these heavy efforts, North Vietnam moved men and supplies southward at a steady rate till spring 1972.

Line Backer I

11. This campaign started won 8 May 1972 with the announcement of US president Nixon for a comprehensive campaign against North Vietnam. The objective of the campaign was:

a. To stem the flow of supplies into North Vietnam from its communist allies.

b. To destroy existing stockpiles in North Vietnam.

c. To reduce markedly the flow of materials from Hanoi to the South.

12. Some 41,000 sorties were flown during this mission using various kinds of air force ac including B-52 bombers, F-111s and F-4 phantoms. During LB-1 US bombing destroyed 10 MiG bases. In the face of heavy destruction, North Vietnam agreed for peace. In Oct 72 LB-1 campaign was partially stopped to allow the North Vietnam to the negotiation table. Linebacker I succeeded, as President Nixon was decisive in his action and gave the military leader greater latitude in targeting. Air power had been used forcefully and appropriately with the use of modern technology like PGMs.

Line Backer II

13. The Negotiation that was brought through Line Backer-1 broke down by Dec 1972 and President Nixon ordered an all out air campaign against North Vietnam. US Air Force started an all-out air Campaign known as Line Backer-II against Hanoi area. During this operation America used carpet-bombing by B-52 aircraft and fighter Bombers against North Vietnamese targets. In 11 days 700 B-52 sorties and 1000 Fighter-Bombers sorties were carried out. A total of about 60,000 tons of bombs were dropped, of which more than 40,000 tons fell over South Vietnam. Liner backer-II could force the North Vietnamese to the negotiation table and North Vietnamese signed a peace accord. Thus the war was ended.

Air Campaigns In Support Of Ground Forces

14. Numerous Operations took place in support of ground forces in the Vietnam war. Tet Offensive, Battle of KheSanh and Helicopter Operations are the three significant operations which merit consideration for the decisiveness they brought to the whole campaign.

15. **Tet Offensive**. During Tet offensive Air Power played a key role in denying the enemy from accomplishing his military objectives. Beginning on 31 Jan 1968, the Viet Cong and North Vietnam army launched simultaneous attacks on 36 of the 44 provincial Capitals and 23 airfields of South Vietnam. North Vietnam military Commander Gen Giap made several attacks with a hope to capture the whole North Vietnam. In response to that, American carried out 16,000 strike sorties between 31 Jan to 25 Feb 64 to support the American and South Vietnam ground forces. Air power denied the enemy any kind of sanctuary in South Vietnam day or night. Radar controlled fighter and bomb struck the enemy even in the bad weather. C-130 delivered supplies under all conditions. This resulted exceptionally heavy looses to North Vietnam and Viet Cong.Overall North Vietnam losses during the month long attack were 45,000 personnel. The extent of damage was so high that Viet Cong was never again a major factor in the war. Nonetheless, the Tet Offensive proved to be a political disaster for the Johnson administration. The battle failed to have the desired effect upon the South Vietnamese population. It caused Americans to doubt the possibility that the US could ever achieve its goal in Vietnam.

16. **Operation Niagara (Battle of KheSanh)** Operation Niagara was conducted by the American in battle of KheSanh, when Gen Giap sieged a Marine base at the KheSanh in Jan 68. He deployed about 3 North Vietnam infantry division in this venture. About 6000 troops were surrounded from all sides by the North Vietnamese force. The fighters of USAF, Marines and Navy provided a massive close air support. Thousands of supply sorties were flown to reinforce the troops. In every 90 min, a formation of three B-52 ac used to approach the area to bomb the enemy lines. North Vietnam forces suffered terribly and were forced to give up the siege. It was the air power, which helped the American to avoid another Dien Bien Phu at KheSanh.

17. **Helicopter Operations**. Helicopters were extensively used in Vietnam War mainly for Counter- Insurgency and Close Air Support Operations. Few major operations where the helicopters took part were IA Drang Champaign, Ops Attleboro and op An Lock. The IA Drang Campaign was the 1st Campaign where the air borne 1st cavalry Div took part with 400 helicopters. All these were conducted to destroy Viet Cong insurgency camps inside South Vietnam. The helicopters were also widely associated with the war in Vietnam carrying troops over difficult terrain, providing the gunship support, observing the enemy, evacuating the wounded and transporting supplies. Some helicopters were used for lifting artillery pieces and even armoured cars. The result was impressive air mobility. Though the helicopters showed stunning air mobility in the Vietnam War, but their comparative slower speed and lower altitude of flying made them very vulnerable to ground fire.Over 4869 helicopters were lost during the war.

Conclusion

18. Vietnam War was a long lasted war which spread over a period of about 10 years, longer than the 2nd world war. Vietnamese fought the war with a single aim of occupying South Vietnam. During the war they received all sorts of mil supply and other supports from the communist Russia and China. They could develop a strong AD network to counter the American air threat. They fought the war with full dedication and patriotic attitude under a unified commander. On the other hand, the American came to Vietnam with limited objective of supporting South Vietnamese. They used Air Power with gradual escalation and limited objectives at different phases of the war. Economic use of air power was hardly given any consideration. War was controlled by the politician of the Washington without any practical knowledge of the theatre. As a result American power through the sky failed in Vietnam. The flavour of failure was not in the sky above Vietnam, nor in the jungle of Vietnam, rather was it lost in the heart and mind of people.

20. The American learnt a good lesson from Vietnam War. Later they refined their Doctrine as well as tactics that were applied in the Gulf War. As a result AP alone could achieve the decisive victory. The dominance of air power was once again established.

TASK-9
FALKLAND WAR 1982

Introduction

1. The Falkland War was one of the most intensely fought Air War in between 1973 Yom Kippur war and 1991 Gulf war. After many years of dispute over the Falkland Islands between Argentina and Britain, on 02 April 1982, Argentina invaded the Falkland Islands. It was an act of retaliation by Argentina against the British occupation. To recapture the islands, the British constituted a tri service task force to project military power 8000 miles away and evict the Argentine invaders from Falkland Islands. The Argentines also redeployed their forces, transferring some of their Air and Land forces to the Falkland Islands. Thereafter, the events progressed in quick time culminating in a major Air/Naval battle between the two forces. But it was the application of air power, together with naval assistance that resulted in the British recapture of the Falkland Islands only 74 days after the Argentine invasion.

Background

2. **History**. A Spanish voyager discovered the Falkland Islands in 1520. The islands had, at various times, been claimed and inhabited by the French, the Spanish and the British. Argentina has claimed the islands since 1820. In 1829, Argentina established a colony that lasted until 1833 when Britain reasserted control and evicted the Argentineans. Britain had occupied and administered the islands since 1833 and had consistently rejected Argentina's claims. Thereby, the Falkland Islands became a British colony. In 1945, Argentina reasserted its claim to the islands. Argentina invaded the islands on 02 April 82. Britain decided to recapture the island by force and the war became inevitable.

3. **Geography**. The Falkland Islands, a group of 200 islands, are situated in the South Atlantic Ocean, South East of the Argentine mainland. It is a combination of two main islands named East and West Falkland. Port Stanley and Goose Green are located in East Falkland, and Pebble Island is located in West Falkland.The average distance of Falkland Islands from Argentinean mainland is 400 miles and from Britain 8,000 miles. South Georgia is located 200 miles South East of Falkland Islands. Ascension Island, which was used by the British, as a forward base is 4,200 miles from Britain and 3,800 miles from Falkland Islands.

Strategy

4. **Argentine Strategy**. The Argentine strategy was to retain control of the Falkland Islands.

5. **British Strategy**. The British Task Force's strategies were to:

   a. Establish a sea blockade around the Falklands.

   b. Retake South Georgia for use as a secure base and transit area.

   c. Recapture the Falkland Islands.

Air Strategy

6. **Argentine Air Strategy**. The Argentine Air Strategy was to support her forces with Close Air Support (CAS) and Maritime Air Operations from bases in Argentina and the Falklands.

7. **British Air Strategy**. The British air strategy was to destroy Argentine air assets, wherever possible, to achieve and maintain control of the air and support her forces. In light with the British goal, the use of air power was to accomplish three distinct objectives:

a. To protect the fleet from Argentine air attacks.

b. To provide CAS for the army and Royal Marines during the amphibious operations.

c. Establish air superiority in the area of operation.

Prime Events

8. The Argentine invasion of the Falklands commenced on 02 Apr 1982. Had the Argentine Junta postponed the attack by a few months, Argentine forces would have been better prepared and the approaching Atlantic weather would have prevented Britain from launching its attack. The major events of the war are shown below:

Date	Events
19 Mar 82	Argentina invades South Georgia.
02 Apr 82	Argentina invades Falkland Islands.
03 Apr 82	British Forces in South Georgia surrender.
05 Apr 82	British Main Task Force sets out for the Falklands.
07 Apr 82	Britain announces 200 nm MEZ around Falklands.
25 Apr 82	South Georgia re-captured by the British forces.
01 May 82	British air attacks on Falklands start.
15 Jun 82	Argentine forces surrendered to the British.

Air Defence

9. **Ground Based Air defence Weapons**. Argentine deployed AAA guns of 20mm, 35mm, and 40mm calibre. The SAMs include Blowpipe, Tiger Cat, Roland and SAM-7 missiles at Stanley and Goose Green airfields.

10. **British Ground Based Air defence Weapons**. The British task force relied on a mix of systems for protection against the Argentine air threat. These systems included limited electronic detection systems, fighter aircraft, and different category of ship borne and ground based SAMs. The SAMs include area defence missile like sea dirt and short-range missiles like Rapier, and close-range point-defence systems like sea cat and sea wolf.

11. **Early Warning / Ground Control Interception Radars and their Roles**. The Argentines had Tactical surveillance radars like AN/TPS-43 and AN/TPS-44 and played a vital role in providing early warning. The protection of the British task Forces was in the hands of Fleet air arm. The RN's type 965 Long Range surveillance radar fitted in most ships provided limited coverage. However this was almost useless at the time Argentine raiders approached at a very low level. Sea King helicopters, besides its primary role, were also responsible for Over the Horizon radar warning. But crediting the Air Defence Control and surveillance through ship born element is an important aspect too. Falkland had numerous close air combat in a persuasion of interception missions. British Forces had numerous CAP missions mostly under the ship born GCI controllers' directives.

12. **The Airspace Control**. Both the sides were unable to plan and implement procedural airspace control. Argentina had poor Airspace management in their coastal areas and over the territorial water. The Argentine Roland had four successes, out of which two were their own Mirages. The British forces also had "Blue-on-Blue"; their own point defence Blowpipe missile shot one of their helicopters down. On 07 April Britain declared Maritime Exclusion Zone (MEZ) of two hundred nautical miles around the Falkland Islands. Britain warned that any Argentine war ship or vessel in that area would be attacked. They sent three submarines to enforce the Maritime Exclusion Zone. On 30 April the Maritime Exclusion Zone was declared as Total Exclusion Zone (TEZ). It meant that in addition to ships, Argentine civil and military aircrafts would also be engaged in Total Exclusion Zone.

Offensive CAO

13. The British forces flew a number of offensive counter air missions attacking Stanley and Goose Green airfields in the Falkland Islands. The air attacks by British forces on the Falkland Islands were commenced by a series of 'Blackbuck' counter air missions by Vulcan long-range bombers, operating from Ascension Islands. These missions targeted Stanley airfield in the Falkland Islands with conventional bombs dropped from medium levels. These missions were flown over a distance of 8000 miles and involved numerous air-to-air refuelling enroute. These missions did not achieve the desired damage with only a few bombs hitting the Stanley runway. However, it signalled the British capability in attacking the targets located in the Falkland Islands. This forced the Argentineans to divert its air defence aircraft for defence of mainland Argentina.

14. After the Vulcan raids, Sea Harriers and Harrier GR 3 aircraft were used to attack Stanley and Goose Green airfields. But the desired results were again not achieved and Argentinean aircraft operations from these airfields continued.

Maritime Air Operations

15. **Anti-Ship Operations.**

a. **British Operations**. Since major Argentinian navy ships did not venture out after the sinking of 'General Belgrano' on 02 May, the British forces did not carry out extensive maritime operations against surface vessels. The role of heliborne anti-ship operations was very significant. Major British anti-ship operations were carried out by helicopters armed with missiles. Sea Harriers were also used for bombing and strafing. The combined operations destroyed 4 small ships and damaged 4 others.

b. **Argentinean Operations**. The Argentinean air force and the air arms of the other services fought a gallant battle against the British Task Force. Operating at the limits of its range and with technological inferiority, they inflicted heavy losses on the British Task Force. Argentinian A-4 Skyhawk, Mirage, Dagger and Pucara aircraft carried out attacks on ships with bombs, rockets and cannon. Five ships: two frigates, one destroyer, one support ship and one assault ship were sunk by free fall bombs.Seventeen other ships were also damaged. Out of these, six ships would have been destroyed if all the bombs that hit the ships exploded. Fewer than half the bombs that hit the ships exploded due to less arming time, owing to ultra-low level weapon delivery.A number of bombs did not explode due to shallow impact angles. Argentine Naval Air Arm's small force of Super Etenderd aircraft flew 5 missions and fired five AM-39 Exocet Anti-Shipping Cruise missiles, which destroyed HMS Sheffield and HMS Atlantic Conveyor. If a few more of the bombs had exploded and few more British ships sunk, the result of the war may have been different. During these operations, the Argentineans suffered heavy losses due to lack in EW and radar cover, losing more than 100 aircraft to the British defences.

16. **Anti-Submarine Operations**. The British forces carried out extensive anti-submarine operations using ASW helicopters and other battleship weapon systems. Again due to non-engagement by the Argentinean submarines, missiles sank the Argentine submarine 'Santa Fe' from helicopters, during the recapture of South Georgia.

17. **Maritime Anti-Air Operations**.

a. **British Operations**. The British task force was singularly deficient of an air borne early warning capability. She tried to compensate this by creating a multi layered screen of defences around their task force and ground units with the help of radar picket ships for early warning and air defence alertness by Harriers. The 17 ships armed with Sea Cat, Sea Wolf, Sea Dart, Sea Slug and Rapier SAMs in collaboration with the Harriers provided area air defence and ships close in weapons systems. She also employed Harriers on CAP for air defence of her ships. Radar controller from ships vectored the Harriers. It degraded her overall employment of air power, as out of 1315 operational sorties flown by the Harriers during the war, as many as 1100 i.e. 84% sorties were CAP missions. The Sea Harriers proved its superiority in air combat, shooting down 18 Argentinian aircraft with Sidewinder air-air missiles and another 6 with cannon. The Sea Harriers did not suffer any losses in air combat. However, 10 Harriers were lost during the war, out of which 5 were due to AAA and Argentinean SAMs. The British surface to air defence weapon accounted for 22 Argentinean aircraft, out of which, 17 were shot down by SAMs. All this helped the British to attain a fragile balance in the air. Along with this the British employed Phantoms in Ascension Island for air defence through CAP.

c. **Argentinean Operations**. The Argentinean aircraft attempted escorting their strikes in the initial stages of the war. But due to lack of radar cover, ineffective tactics and range limitations, superior British Harriers shot down most of these aircraft. After this, the Argentineans did not attempt any other escort missions.

Air Operations in Support of Land Forces

18. **British Operations**.

a. **Close Air Support**. During the ground offensive by the British forces and the amphibious landing, Harriers and different helicopters carried out a number of CAS missions.

b. **Other Operations**. Helicopters were used for air borne assault missions and special air operations during the process of recapturing the islands. Prior to that, they carried out a number of reconnaissance missions. For the deployment and support of ground and naval forces the British used transport aircraft and helicopter. In this conflict helicopters were also extensively used for SAR and MEDEVAC.

19. **Argentinean Operations**.

a. **BAI/Close Air Support**. A-4 Sky hawk, Pucara and MB-339 carried out numerous BAI/CAS missions in support of the land forces. Pucaras performed many CAS missions against British troops during and after the San Carlos landing, while MB-339A flew attack sorties from Port Stanley airfield.

b. **Other Operations**. In addition to supporting the combat, the Argentine forces carried out other operations like air transportation, SAR etc.

Combat Support Operations

20. **British Operations.**

a. **Air Reconnaissance**. Nimrod and Victor ac were used for long-range Maritime Reconnaissance missions from Ascension Island. Most of these mission's durations were up to 14 to 16 hours. Nimrods were also used as radio relays for submarines and to coordinate the numerous air-air refuelling missions. Almost 200 such sorties were flown from Ascension Island.

b. **Air-to-air Refuelling**. Since all British aircraft had to route via Ascension Island to the Falkland Islands, covering a distance of 8000 miles, air-air refuelling sorties by Victor tankers were flown extensively. A total of 600 refuelling missions were flown. Nimrods, Vulcan and Hercules aircraft were refitted with AAR probes.

c. **EW**. A few of the 'Blackbuck' missions were carried out with 'Shrike' anti-radiation missiles on the Argentine radars in the Falkland Islands. The British ships used Chaff clouds to decoy Exocet sea-skimming missiles.

21. **Argentinean Operations**

a. **Air Reconnaissance**. Argentineans aircraft carried out numerous reconnaissance sorties with MB-339A ac throughout the conflict. They also carried out maritime reconnaissance and target tracking with P-2 Neptune, B-707, C-130, F-28, Lear Jet and L-188 Electra transport aircraft. These MR aircraft guided many of its attacks against the British ships.

b. **Air-to-air Refuelling**. The Argentinean air force had only 2 KC-130 air-to-air refuelling tankers. With almost all their aircraft operating at the extremes of their ROA, they suffered a lot due to the lack of air-to-air refuelling tankers. Some of their aircraft like the Mirage and Canberra were not configured with refuelling probes.

c. **EW**. No Argentine aircraft had ECM equipment. Due to this they suffered heavy losses to British SAMs during the operations.

Logistics Support

22. The quality of the British Military response was a function of the numbers of men and material that could be transported 8,000 miles to the South Atlantic and then sustained in operational condition over an extended period. The extent to which this was achieved is one of the most remarkable logistical feats of modern times. The British forces used a large variety of military aircraft and ships to transport war material to the Falkland area. A large number of civil aircraft and merchant ships were also to sustain the enormous logistical requirements. The second important factor in the logistical effort was the British Ascension Island, located 3,800 miles from the Falklands Island, which was used as an operating base for transit of personnel and freight. Wideawake airfield in Ascension Island was the busiest in the world and handled 400 flights per day.

23. The Argentines were restricted to use the available runways due to short length. The Maritime Exclusive Zone of 200 nm radiuses around a point in the middle of the Island, declared by the British to protect the Falklands Island prevented the Argentines to provide a sound logistic support for the troops deployed in the Island. The logistic support for the Argentine Army and the Marine troops was provided by the Army aviation UH1H, CH-47 Chinook, Puma, A-109 helicopters and skyvan transports and helicopters from Argentine coast guards.

Conclusion

24. The Falkland war was one of the most intensely fought wars where air power had a major impact. Both the sides prosecuted the air war effectively. Almost all aspects of air power were flown and tested. Characteristics of air power like flexibility, ubiquity, reach, responsiveness and offensive action were validated. Some limitations of air power like impermanence; base dependency, infrastructure requirements, sensitive to technology and situational limits etc also manifest itself during the war. Force multipliers like air-to-air refueling, standoff PGMs, sustained maintainability, EW etc were also used extensively.It also emerged that technology has a major impact on air power, but the basic strategic and tactical principles cannot be ignored for any future wars.

TASK -10

AIR POWER IN GULF WAR 1991

Introduction

1. .The stage for Gulf War was set on 02 Aug 1990 when Iraq invaded Kuwait with an aim to end her economic sufferings utilising Kuwaiti oil and resources. Iraqi invasion sparkled wide spread criticism and opposition from almost every corner of the world. Western powers, most notably the USA demanded unconditional withdrawal of Iraq from Kuwait. In next five and a half months, intense political and diplomatic measures followed by massive concentration of military forces took place in Persian Gulf to persuade Iraq to quit from Kuwait. However, when diplomatic measures and military deterrence failed, coalition forces resorted to the application of military power against Iraq. Thus, the Gulf War-1991 had started on 17 Jan 1991 with a planned and dedicated air campaign named 'Desert Storm'. Well-orchestrated offensive employment of air power not only rapidly drained out the Iraqi capability to wage war; it also prepared the battlefield for the friendly surface forces to operate at ease. Ultimately, the war ended in 43 days as the coalition land forces evicted Iraqi forces from Kuwait in only 100 hours remaining under the protective shield of air power. In the Gulf War-1991, air power dominated the war and drew the line between the victory and the defeat.

2. During the Gulf War, air power played an important role. Latest technology, new tactics and a shift in the traditional paradigm of application of air power were the salient aspects of air power in the Gulf War. Concepts of EBO(Effects Based Operation) and parallel warfare emerged as key ingredients of air campaign planning. These new concepts were the testimony of a shift in the traditional paradigm of application of air power.

Background

3. On 02 Aug 90, Iraqi troops crossed the border into Kuwait. Three Iraqi Republican Guard divisions virtually wiped out the tiny Kuwaiti Armed Forces. Iraq captured the entire Kuwait in less than 24 hours. By another 48 hours, Iraqi troops were massed along the Kuwaiti-Saudi border. On 08 Aug 90, Iraq declared Kuwait as her 19th province. A map showing Iraq, Saudi Arabia and Kuwait is given at Figure-1. Age old territorial dispute and a recent economic disparity between the countries were the contributing factors, which persuaded Iraq to invade Kuwait.

4. Saddam Hussein, the Iraqi president always believed that Kuwait came into being because of the mischievous politics of British during the post WW-I era. He and other leaders of Iraq perceived Kuwait as part of Iraq, having originally existed as Gaza (lesser district) in the Vilayet (province) of Basra. The invasion was, therefore, correcting an historical injustice. However, it was not only territorial boundary which lead Iraq to invade Kuwait.

5. During the time of invasion, Iraq was in serious economic crisis. Iraq's eight years long war against Iran was expensive. It had cost Iraq some $102 billion in military hardware with an additional loss of $106 billion in oil revenues. Her foreign debt for the war amounted to $80 billion, which was mainly contributed by Kuwait. Once the war was over, Iraq not only declared a moratorium on all war debts to Iraq, but also demanded an additional grant of $30 billion from the Persian states. Moreover, she also accused Kuwait of stealing Iraqi oil from the Rumailla oilfield and violating quota on oil production. As compensation, she further demanded $2.4 billion from Kuwait. Kuwait and other Gulf States continued to reject Iraqi propositions. Ultimately, in a desperate attempt to come out of the economic quagmire, Iraq invaded Kuwait on 02 Aug 90 and became the owner of 20 per cent of World's oil reserve. However, Iraq's move to become wealthy overnight was not meant to succeed because of the resistance from all over the world.

Formation of Coalition

6. The US and UK led the effort to create a coalition to force Iraq to leave Kuwait. When the Saudi King invited US to deploy in KSA, support was solicited from other nations to form a coalition. With overwhelming support from all over the world, nearly 50 countries made contribution. Among those, 38 countries deployed air, sea, or ground forces. Together, they committed more than 200,000 troops, more than 60 warships, 750 aircraft, and 1,200 tanks. Many countries contributed financially by donating billions in cash to the United States.

Coalition Strategy

7. **National Objectives of the United States**. Within a week of Iraqi invasion, the president of the United States outlined four national objectives. These were as following:

a. Securing the immediate, unconditional, and complete withdrawal of Iraqi forces from Kuwait.

b. Restoring the legitimate government of Kuwait.

c. Assuring the security and stability of the Persian Gulf region and;

d. Protecting American lives.

8. **Military Objectives**. While formulating the military objectives, both Central Command (CENTCOM) and coalition planners made use of the Concept of 'Centres of Gravity' as advocated by Carl Von Clausewitz. The military objectives of the coalition were:

a. Destroy Iraq's military capability to wage war.

b. Gain and maintain air supremacy.

c. Cutoff Iraqi supply lines.

d. Destroy Iraq's chemical, biological, and nuclear capability.

e. Destroy Republican Guard forces and;

f. Liberate Kuwait City.

9. **Air Strategy**.To achieve the military objectives, air campaign planners devised four overlapping phases to employ air power:

a. Phase I: Strategic Air Campaign.

b. Phase II: Air Supremacy in the KTO.

c. Phase III: Battlefield Preparation.

d. Phase IV: Ground Offensive.

Coalition Air ORBAT

10. Coalition air ORBAT consisted of 1875 combat aircraft, 75 per cent of which were from the United States. Coalition air ORBAT also included around 970 combat support aircraft. Besides numerical superiority, coalition forces also enjoyed a marked advantage over Iraq in terms of technological advancement. A prime example of technological superiority was the Lockheed F-117A 'Stealth Fighter', the first aircraft in the world to be designed specifically to avoid radar detection.

Iraqi Air ORBAT

11. IQAF was the largest in the Middle East in August 1990. The quality of the aircraft and aircrew, however, was very uneven. Its effectiveness was constrained by the conservative doctrine and aircraft systems limitations. Iraq had more than 700 combat aircraft in its inventory before the invasion of Kuwait. Fewer than half of these aircraft were either third generation or fourth generation and were flown by pilots of marginal quality, compared with US aviators. These aircraft included the Soviet MiG-29, MiG-23, MiG-25, Su-24 and the French Mirage F-1. The French-built F-1s and their pilots were the IQAF elites. Iraq had also acquired a wide range of weapons and electronic warfare gear for the F-1, including laser-guided air-to-surface missiles. Iraqi aircraft were deployed at more than 24 primary and 30 dispersal airfields throughout the country.

Conduct of Operations

12. Operation Desert Storm was a sustained 43-day air campaign from 17 Jan 91 to 28 Feb 91. As per the OpO of Desert Storm, the conduct of the operation was planned in four overlapping phases with specific objective to be achieved at the end of the each phase. The planned phases were as following:

a. **Phase I - The Strategic Air Campaign**. First phase was estimated to require 06 to 09 days to meet its objectives. The objectives were to destroy Iraq's Vital COGs, offensive and defensive air capabilities, national communications, NBC weapons research and production capabilities, war production potential and transportation system.

b. **Phase II – The Attainment of Air Superiority in KTO**. Second phase was estimated to begin sometime between day 07 and day 10 and would require 02 to 04 days to complete. The ultimate goal of this phase was to achieve air supremacy in the KTO by attacking aircraft/airfields, air defence weapons and C2 systems of Iraq.

c. **Phase III – Battlefield Preparation**. Phase III was estimated to start sometime between D+9 to D+14 and would require 06 to 08 days to complete. The objective of the phase was to cut Iraqi supply lines, destroy Iraqi NBC capability, and reduce Iraqi combat effectiveness in the KTO by at least 50 percent. Attainment of the objectives would allow ground forces to initiate offensive operations against a confused and terrorized Iraqi force in the KTO. Targets included Iraqi ground forces, armour and artillery, bridges and C3 system in Southern Iraq.

d. **Phase IV – The Ground Offensive**. Phase IV was also known as CAS phase. It had no estimated concrete start day since it was dependent on the achievement of the goals of the first three phases. The objective of the phase was to win the air/ground campaign by providing intelligence, massive firepower and protective air cover for friendly ground forces.

Application of Coalition Air Power

13. **Strategic Air Operations**. Strategic air operations were the nerves and spines of Desert Storm. The main punch of strategic air operations were delivered within the first 24 hours of the air campaign. As the dead line imposed by UN was over without any sign of compliance from Iraq, coalition air campaign started against Iraq on 17 Jan 91 at around 0300 hours. Altogether, 668 aircraft attacked Iraq on that night. B-52 bombers carrying ALCMs, F-117A Stealth fighter bombers with LGBs and TLAMs from US Warships carried out surgical attacks against Iraqi leadership, C3I network, strategic air defence system and NBC warfare capabilities. Simultaneously, AH-64 attack helicopters, F-15E Eagle fighter, and GR-1 Tornado fighter-bombers neutralized Iraqi radars, SAMs and the C2 network to create safe passage for successive non-stealth aircraft to operate. Within minutes of attack, lights went out in Baghdad and did not come on until well after cease hours. Microwave towers, telephone relay exchanges, cables and land lines had been transformed into rubble. By second week, Saddam Hussein was reduced to sending orders from Baghdad to Kuwait by messenger, which took 48 hours.Hundreds of coalition aircraft marked by precision, successfully isolated Iraqi leaders from their troops and rendered the whole country into extreme sufferings by cutting off electricity, water and other daily necessities.

14. **OCAO**.

a. **SEAD**. Towards the beginning of the air campaign, one of the prime requirements of the coalition air forces was to suppress and destroy the Iraqi air defence system. Initially, coalition forces used a pair of F-117As to attack the SAM sites, where one aircraft acted as illuminator. As the air defence capability of Iraq gradually drained

out, F-15E, EF-111A, A-7 Corsair II, F-4G Phantoms and TALDs were employed in packages to destroy the SAMs. Using the Israeli tactics of Bekka Valley War (1982), coalition forces employed TALDs to turn on the SAM radars and then use AGM-45 Shrike or AGM-88 HARM to destroy the SAM sites.Because of the number and mobility of enemy anti-aircraft systems, SEAD continued throughout the war.

b. **Air Field Attack**. Initially, RAF Tornados and French Jaguars carried out attack against Iraqi airfields. RAF Tornados attacked Iraqi airfields at LL using JP-233 runaway catering bombs. As the IQAF showed no inclination to engage the coalition in the air, Iraqi aircraft were destroyed on ground inside HAS using PGM. As a result, IQAF moved their air assets closed to the residential areas and to Iran. However, the aim of OCAO was achieved as long as IQAF did not contest coalition aircraft in the air. As such, the Coalition Commander declared air supremacy on 22 Jan 1991. During the war, an estimated 290 (40 per cent) of Iraq's 724 fixed-wing aircraft were destroyed in the air or on the ground by the coalition. Another 121 escaped to Iran, leaving 313 (43 per cent) intact and inside Iraq at the end of the war. Coalition aircraft also destroyed or severely damaged 375 HAS out of a total of 594.

c. **SCUD Hunt**. The objectives of the scud Hunt were to locate, attack, destroy or suppress mobile scud launchers and associated support equipment. Scud Hunt missions were of tactical priority as the use of scud missiles against Israel threatened the unity of coalition, had Israel retaliated. About 25 per cent of F-15Es, seven percent of A-10s, 25 per cent of LANTIRN-equipped F-16s and eight per cent of F-111Fs were dedicated to the Scud hunt. Moreover, F-117s, B-52s, Navy A-6Es, F/A-18s, KC-130 and RAF GR-1 Tornados were also used occasionally. Despite all-out effort, Iraq continued to employ scud missiles until the last day of the war totalling 86 launches.

15. **Air Interdiction (AI)**. The objectives of AI missions were to shape the battlefield to help coalition ground forces achieve their objectives. AI missions started in the first days of the air campaign, when key C3 centres in Baghdad and elsewhere were taken out. Tornado, F-111, Jaguar, A-6 and A-10 aircraft were used for AI missions. AI missions were carried out 24 hours a day attacking rail links, bridges and supply depots. Out of 45 principle bridges, coalition forces effectively destroyed 44 bridges, often rendering a bridge inoperative by firing single missile. With the help of JSTARS, coalition forces also carried out a clean sweep of Iraqi transport network.

16. **CAS**. The final phase of the air war aimed to support the ground offensive to liberate Kuwait. As ground forces advanced into Kuwait and southern Iraq, unprecedented level of CAS was available to them. It can be even argued that the CAS provided was actually out of proportion to the threat posed by a demoralised and badly mauled Iraqi Army. Employing A-10 aircraft, coalition forces were quite successful in destroying Iraqi tanks and artillery pieces in KTO. At the end of the war, although disputable, coalition forces claimed to have destroyed 1508 artillery pieces and 1210 APCs of Iraqi forces. B-52 bombers were also used in CAS role to carpet bomb the front line Iraqi troops.

17. **Combat Support Air Operation**.

a. **Air to Air Refuelling**. Desert Storm is also widely known as 'Tanker Dependent War'. Virtually every type of strike and direct combat support aircraft required air to air refuelling. During Desert Storm, at least 339 US in-flight refuelling tankers off-loaded more than 800 million pounds of fuel. For Air Force tankers alone, there were approximately 60,184 recorded refuelling events. On average, there were 1,399 refuelling events per day or approximately 58 in each hour.

b. **EW**. Platforms that conducted electronic combat missions or EW in a combat-support role included EF-111s, EC-135s, EC-130s, and EA-6B aircraft. These aircraft conducted missions involving jamming or destruction of radar sites. For jamming and destruction of radars, TALD and HARMs were used respectively. Electronic combat support missions enabled primary strike aircraft to conduct attacks on targets.A total of 160 coalition aircraft participated in EW during the entire air campaign.

c. **CSAR**. During 'Desert Storm' Air Force Special Operations Command, CETCOM was responsible for the management of CSAR assets. Aircraft supporting CSAR were located at five bases in KSA and at two bases in Turkey. MH-53 and MH-60 of USAF and UH-60 and CH-47 of US Army were the only helicopters capable of penetrating high threat environment for CSAR missions. Central Command's CSAR guidelines required reasonable confirmation of a downed crew's survival and location before a CSAR mission launch. The CSAR system was set-up so that once a crewman ejected and reached the ground, fighters would be diverted to the designated area. The JRCC then alerted AFSOCCENT to execute the mission. Due to dense enemy concentrations on the battlefield and Iraqi use of radio direction-finding equipment, downed pilots were frequently captured immediately after parachuting to the ground. As a result, only seven CSAR missions were launched, resulting in three saves.

d. **PSYOP**. Coalition forces employed a wide variety of air assets in tactical PSYOPs. MC-130, HC-130, EC-130 Volant Solo aircraft, B-52s, F-16s, Marine F/A-18s and Navy A-6s regularly participated in various PSYOP like radio transmission, loudspeaker broadcasts and leaflet dissemination. The aims of PSYOPs were to reduce the morale and combat efficiency of enemy troops and to convince enemy forces to take actions favourable to the coalition forces. B-52s employed in leaflet dissemination mission, dropped around 29 million leaflets to persuade Iraqi soldiers to surrender. This was quite successful as thousands of soldiers of RG were influenced and surrendered even without any fight towards the end of the campaign.

Iraqi Operation

18. **Air Operation**. During the two weeks before the war, IQAF flew around 100 sorties daily, including about 60 combat aircraft sorties. It sustained a good effort for the first several days of the war, considering the state of its air defence, C2 and the damaged airfields. On the first day it flew 96 sorties, including 53 combat sorties. On second day, its sorties surged to 118, although combat sorties dropped sharply to 23. The number of combat sorties remained the same on the third day, but the total number dropped to 42. On the fourth day, combat sorties accounted for 58 out of 60 sorties flown. Thenceforth, the number of sorties fluctuated but remained low until sixth day, when it stopped. During the war, Iraq had lost 35 aircraft in air to air combat, while the coalition forces suffered no loss. The first half of these was lost early in the war and by 21 Jan 91, Iraq had lost 17 fighters (08 MiG-29s, 06 Mirages, 02 MiG-25s and one MiG-23) in aerial engagements. Other 18 were lost when Iraqi fighters fled to Iran. Besides, it is estimated that further 227 aircraft were also lost on ground.

19. **PSYOP**. The objectives of the Iraqi PSYOP campaign were to rationalize the invasion of Kuwait, gain the support of the Arab masses, discourage nations from participating in the U.N. embargo, and discourage or hinder military attacks on Iraq. Strategically, Saddam met with some early successes. He used Scud missiles to attack Israel and Saudi Arabia. As political and psychological weapons, Scuds were useful in diverting coalition attention and military effort away from the main battlefield. While the impact of the Scuds was militarily negligible, they did produce emotional and psychological effects. The disparity between the small number killed by Scuds and the enormous coalition effort devoted to anti-Scud operations highlights the importance of the psychological effects.

Conclusion

20. Gulf War-1991 was a milestone in the history of air power. The air campaign of Gulf War-1991 was planned in four overlapping phases. The air campaign commenced on 17 Jan 91 and ended after 43 days on 28 Feb 91. During ‘Desert Storm’, coalition forces had distinct technological, numerical and qualitative advantages over the Iraqi Forces. Stealth aircraft enabled coalition forces to attack deep inside Iraq right at the onset of the war. Almost simultaneously, OCA missions were launched to establish the control of the air. Coalition forces gained air supremacy on 22 Jan 91; only 04 days after the war had started. Thereafter, air power was skilfully applied to isolate the Iraqi commanders from their troops in the battlefield. Similarly, basic air defence units were also isolated from the commander resulting in meagre and non-unified Iraqi effort in utilizing the air power. Air Refuelling, Stealth and PGMs acted as ‘Force Multiplier’ and increased coalition’s capability manifold. However, Iraqi mobile Scuds, AAA and SAMs remained as multiple source of potential threat to coalition.

21. Iraq, despite having the largest Air Force of the Middle East, failed to exploit its capability. They underestimated the capability of coalition's air power and hoped to engage in ground battle after a short air war. Iraqi leader's inability to appreciate the importance of achieving the 'Control of the air' caused her surface forces to concede defeat in only 100 hours.

22. The achievement of air power in Gulf War-1991 was manifold. For the first time in the history, air power was utilized to exploit its full potential and played a decisive role in the outcome of the war. Gulf War-1991 also witnessed the other extreme of the usage of air power. Despite having a capable Air Force, Iraq's strategy of 'saving the air assets for tomorrow's use' was a hallmark of failure.Air power with its inherent characteristics of height, speed and reach coupled with tremendous advancement in technology will continue to play a vital role in all future wars. Trends suggest that the employment and exploitation of air power are likely to be the determinant of success in future wars.

TASK-11

OPERATION IRAQI FREEDOM

Introduction

1. In the history of armed conflict, there are very few conflicts that would match up to the recent operations in Iraq in terms of the employment of aerospace power and impact of technology. The operation though widely criticized for its political objectives or lack of it can be termed a technology demonstrator as far as new concepts and new war fighting techniques are concerned. The operation was popularly known as Op Shock and Awe, especially during the planning and initial phases of execution though officially the Americans termed it as Operation Iraqi Freedom (OIF). The name of this Operation for the British troops was Operation Telic and the Australians called it Operation Falconer. The name 'Shock and Awe'[vi] came about since the operations were planned to be executed in accordance with the doctrine of Rapid Dominance developed by Mr Harlan K Ullman and Mr James P Wade. This doctrine was formulated in September1996 in the form of a paper for the National Defence University, USA and the authors named it 'Shock and Awe'. During the later phases of the operation, the term 'Shock and Awe' was used less frequently, and OIF was a more commonly used term. Though the operation is officially not yet over, considering that the coalition forces have not yet withdrawn from Iraq, what remains is probably the administrative aspects of the operation.

2. OIF was lauded for being extremely "joint," with conventional ground forces playing a role more prominent than had been seen in years. The war's daily progress tended to be measured on the ground. Newly "embedded" TV crews produced riveting footage of American soldiers and marines taking fire and shooting back. By contrast, coverage of the air war was rare. Even so, this was an airpower war. Pre-war planning fine-tuned air and ground coordination mechanisms from the tactical to the operational level, all to produce the optimum level of joint firepower. Credit goes to the joint and coalition force for a stunning operation. However, it was the recent developments in airpower that put in place the entire framework for victory.

3. The air war is significant in the history of warfare since it was a unique operation in more ways than one. The following significant could be identified :

a. It was an unequal war with the sole superpower in the world along with an erstwhile superpower pitted against a weak developing nation.

b. It was a war that displayed true joint ness in operations and the synergy that is created by jointmanship.

c. It was a war in which technology played such a key role in operations and the conduct of operations saw a paradigm shift from mere power projection or brute force to effect based operations.

Background

4. Post ‘Desert Storm’, after the expulsion of Iraqi forces from Kuwait in 1991, UN resolutions imposed strict conditions on Iraq in order to remove the threat Saddam Hussein’s regime posed to neighbouring countries. These included the destruction, removal or rendering useless of Iraq’s Weapons of Mass Destruction (WMDs) under the supervision of inspectors from the UN and the International Atomic Energy Authority (IAEA). Iraq was not cooperating with the inspection regime.

5. On 11 Sep 2001, the world witnessed one of the most daring and outrageous terrorist strikes when the twin towers of the World Trade Centre came crashing down. This added to the insecurity of the already paranoid Americans and a war against terror was declared by President Bush. Against the background of this war against terrorism, it was argued that Iraq possessed Weapons of Mass Destruction and these were perceived as a threat by the western countries.

6. One year later, UN Security Council Resolution (UNSCR) 1441 was unanimously adopted, declaring Iraq to be in material breach of previous resolutions, and setting out new procedures for the conduct of inspections. The resolution provided a final opportunity for Iraq to comply with its disarmament obligations. However, reports by inspectors from the UN and the IAEA showed clearly that not only was Iraq failing to offer active co-op but it was engaged in a systematic pattern of concealment and deceit.

7. On 24 February 2003, the UK, the US and Spain tabled a draft resolution, making it clear that Iraq had failed to take the opportunity provided in UNSCR 1441. Despite significant diplomatic efforts, it was reluctantly concluded that a Security Council consensus on this new resolution would not be possible. Faced with continuing Iraqi intransigence, coalition forces commenced military ops against the Saddam Hussein regime on the night of 19 March 2003.

Military Objectives And Strategy

8. **Military Objective**. The military objective of the coalition forces were as follows:

a. Defeat or compel capitulation of Iraqi forces.

b. Neutralize regime leadership.

c. Neutralize Iraqi TBM / WMD delivery systems.

d. Control WMD infrastructure.

e. Ensure the territorial integrity of Iraq.

f. Deploy and posture necessary forces for post-hostility and humanitarian assistance ops for the Iraqi people.

g. Set military conditions for provisional/permanent government to assume power.

h. Maintain international and regional support.

j. Neutralize Iraqi regime's C2 & security forces.

k. Gain and maintain air, maritime and space supremacy.

9. **Air Strategy**. To achieve the military objectives, air campaign planners formulated the Air Strategy as follows:

a. Break the will of the Iraqi regime and people through Shock and Awe ops.

b. Maintain Air and Space Supremacy.

c. Destroy Iraqi military's ability to control the movement of its grd forces.

d. Prevent Iraqi effort to employ WMD/TBM.

e. Provide Close Air Support to coalition ground forces.

f. Support CFMCC to Maintain Maritime Supremacy.

10. **Iraq's Objective and Strategy**. The Iraqi regime's overall defensive plan for Baghdad is unclear because it failed so quickly that it is not possible to fully characterize Iraqi intentions. Since available information does not in any way indicate Iraq's objectives or strategy, it would not be possible to spell out the same in this paper.

Air Campaign Planning

11. **Planning**. The planning for the operation was done in US CENTAF in Florida. The plan evolved over time, and was sufficiently flexible to respond to changing circumstances. Since coalition aim was to achieve Iraqi compliance by diplomatic means if possible, it was not certain when actually the operation would take place. Despite these variables, the essence of the plan remained consistent, with the focus on mounting a rapid, synchronised and precise campaign to overwhelm Saddam Hussein's regime and its security forces and minimise the risk of civilian casualty or damage to Iraq's essential services.

12. **Early Preparations**. Support diplomacy while preparing to use force if that diplomacy failed, presented difficult choices and required a fine balance to be struck. US did not wish to prejudice the UN process by making overt military preparations too soon. In late November 2002, an initial assessment of the possible requirement for reservists, the need for additional mil equipment and specific modifications was reviewed. Further preparations included approaching the shipping market in mid-December to tender for transport vessels, and improving the readiness of troops by undertaking specific training and reducing the NTM of some units.

13. **Intelligence**. Intelligence played a vital role in planning the coalition's air campaign. Assessments of Iraq's military capability depended on intelligence gathered over more than a decade of surveillance and containment. Tactical intelligence from a wide diversity of technical and other sources played an invaluable part in the campaign itself. Modern Intelligence Surveillance and Reconnaissance assets helped to provide urban situational awareness.

14. **Target Selection**. Planning for the air campaign included the development of a list of potential targets that would help the coalition to achieve its overall objectives. Over 900 potential targets areas were identified in advance. All targets were derived from the campaign plan and were selected to achieve a particular military effect. Coalition had to take legal advice before finalising the target to comply with international humanitarian law. Extensive scientific support included detailed computer modelling was used in assessing potential targets.

15. **Media**. Coalitions had to take the media into consideration for planning the operation. The operations in Iraq attracted unprecedented levels of media interest, both at home and across the world. Building on the experience gained in previous conflicts, the coalition had a system of accredited war correspondents. Some 700 journalists were "embedded" with coalition forces. The planning aspects of the operation even included the indoctrination of these war correspondents.

16. **Command & Control**. Command & Control (C2) played the nerve role to execute such a huge air operation. CENTCOM HQs was established at Tampa, Florida whereas the national command remained at Washington. General Tommy Franks was the Commander in Chief CENTCOM and coalition forces. Lieutenant General T Micheal Moselay was the Coalition Force Air Component Commander (CFACC). The Combined Air Operations Centre (CAOC) was established in Saudi Arabia. The coordination between these HQs was possible due to real time flow of info by satellites, GPS and data link through fibre optics. The key factor of the war was the ability to exercise joint command over all the coalition services, and allied forces, at distances as great as 7,000 miles.

Concept Of Operation

17. **General**. The concept of operation 'Shock and Awe' is nothing new in armed conflict. This concept was advocated by early war theorists like Sun Tzu. Air power by itself is very capable of producing shock and awe. This operation technically known as rapid dominance, is a military doctrine based on the use of "overwhelming decisive force", "dominant battlefield awareness", "dominant manoeuvres", and "spectacular displays of power" to paralyse an adversary's perception of the battlefield and destroy its will to fight.

18. **Rapid Dominance**. In Rapid Dominance, "rapid" means the ability to move quickly before an adversary can react. "Dominance" means the ability to affect and dominate an adversary's will both physically and psychologically. Physical dominance includes the ability to destroy, disarm, disrupt, neutralize, and to render impotent. Psychological dominance means the ability to destroy, defeat, and neutralize the will of an adversary to resist; or convince the adversary to accept our terms and aims without using

force. The target is the adversary's will, perception, and understanding. Coalition intent, however, was to field a range of capability to induce sufficient Shock and Awe to render the adversary impotent. The key objective of Rapid Dominance is to impose this overwhelming level of Shock and Awe against an adversary on an immediate basis to paralyse its will to carry on.

19. **Shock & Awe vs Precision and Focus**. The concept of Shock and Awe is to put in devastatingly accurate and simultaneous firepower on critical nodes/ targets that count for the msn at hand, rather than necessarily having to mass large armies in the field to engage one another. Instead of counting sorties and tonnage of ordnance dropped, what matters is that targets destroyed per sortie. However, this does not eliminate the requirement for sufficient force in the field to defend against an all-out assault.

20. **Land Power Reinforced Air Power and Vice Versa**. The air campaign of 1991 ran into a few problems[vii]. First, the air and land campaign were sequential, not integrated. Secondly, the strategic air campaign in Iraq remained separate from the air effort in Kuwait. And finally there was less synergy between ground and air campaigns. The concept in 2003 was substantially different. Both land and air campaign started simultaneously. The speed of the land operation allowed commanders to sense the impact that the air campaign was having on the enemy. Moreover, the various aerial control agencies were able to redirect aircraft already in the air for the support of land operation. In this war, it is almost impossible to divide the air and land campaigns into segments.

ORBAT

21. **Coalition Forces**. The total Air Forces involved over 1,97,000 personnel from 26 nations with more than 1800 aircraft, including 725 fighters and 268 tanker aircraft. Air operations used virtually all types of combat aircraft in the US inventory. Coalition aircraft came from the UK, Canada and Australia. Breakdown of aircraft that took part in the operation is shown at Annex ‘A’

a. **Combat Aircraft**. The combat aircraft comprised lethal air platforms with state of the art weapons system capable of expending munitions on air or ground targets to affect a kill. The combat aircrafts included F-14, F-15, F-16, F-18, A-10, EA-6B, Jaguar and F-111. These aircrafts were engaged in OCA, DCA, SEAD, AI, OAS and CAP missions and operated from a wide range of airfield which includes: Whiteman Air Force Base Missouri, Diego Garcia, Upper Hayford in UK, five aircraft carriers from Persian Gulf and the Mediterranean and over thirty bases scattered through the Middle East. Details of sorties flown by coalition aircraft is placed at Annex ‘B’.

b. **Combat Support Aircraft.** The combat aircraft could not perform their missions effectively and efficiently without support aircraft. The support aircraft consisted of PC-3 Orion, CH-53, C-17s, C-21s, C-130s, KC-10, KC-135, E-3B (AWACS), RQ-4A Global Hawk and predator UAVs. These aircrafts were also operated from wide range of airfields as stated above. The exact number of aircraft which operated from each of these bases is still not reliably known.

22. **Iraqi Force.** Iraq had quite formidable number of aircraft in her inventory but did not fly a single sortie. The Iraq War was an asymmetric war in several senses. Iraq dispersed its air force in order to preserve it, with no apparent concept of using it.

Conduct Of Air Ops

23. **The Initial Thrust**. The air operations were conducted under the code name of 'Iraqi Freedom'. 'D' day of the operations was on 19 Mar 2003 and the operations continued up to 08 Apr 2003. It was not until the night of March 21-22 that the full force of coalition air power would rain down on Baghdad. On the very first night, coalition aimed to shock the Iraqi C2. The numbers tells the story of the massive air assault on Baghdad throughout the night. The coalition launched 600 cruise missile and flew 1500 missions over the night. 700 strike aircraft hit approximately 1000 targets. The reach of coalition air power can be understood by the bases from which its aircraft were launched. The missions covered full spectrum of air operations ranging from offensive counter air to strategic air offensive campaign. No defensive counter air operations missions were flown as Iraq could not get a single sortie airborne.

24. **Destruction of Iraqi C2**. In the next three days there was distinct change in targeting from the first day. In this period, Iraqi forces managed to fire a few SAMs but none with tracking radar. Iraq also managed to fire a ballistic missile which was successfully intercepted by a patriot battery. More number (800) of strike sorties were flown but numbers of pre-planned targets were dropped by nearly fifty percent[viii]. The number of cruise missiles fired, dropped by nearly one third. Sorties were allotted in the air to support ground forces in contact with Iraqi forces. These targets were provided by JSTARS. From the 25th March2003 onward a dust storm or 'Shamal' started to blow which gave Saddam and his associates an opportunity to move his ground forces to engage coalition troops. Throughout the three days of 'Shamal' JSTARS and long range UAVs watched the Iraqi troops and coalition aircrafts struck Iraqi forces as they were deployed to attack marines and soldiers on the ground. The number of sorties flown in this period is approximately 6000 and most of them were for destroying Iraqi C2.

25. **CAS to Grd Tps**. After the 'Shamal', as coalition forces closed in to Baghdad, the air campaign shifted its focus to support ground troops. Two thirds of strike sorties now targeted The Republican Guards or the Fedayeen. By the first week of April 2003 coalition devoted 85 percent air effort to support ground forces. As coalition ground forces approached Baghdad, the air and ground forces merged into a single, conjoined force. Even though the emphasis of the air campaign was on support ground forces, air strike continued to knock out C2 centres in Baghdad. On 07 April 2003 a bunker buster bomb was dropped from 20000 feet over a location suspected to house Saddam Hussain. The message was clear and on 08 April 2003 air operations stopped. Calendar of events covering major events of the operation is at Annex 'C'.

Application of Air and Space Power

26. **Strategic Air Op**. The coalition air operation started on 19 March 2003. Two F-117 aircraft armed with 4 x EGBU -27 and 40 Tomahawk Land Attack Missiles were used in a dawn attack targeting Iraq's top leadership at 05:34 hours Baghdad time on 20 March 2003. The main blow of the Strategic Air Operations was delivered on the night of 21 March, when hundreds of Coalition aircraft and cruise missiles targeted leadership, command and control structures and other military targets in Baghdad and other various cities. On 21 Mar 2003, the coalition launched about 500 cruise missiles and 1700 attack sorties by 700 attack aircraft against 1000 targets by precision weapons. B-52 bombers, B-2 stealth bombers and F-117 stealth fighter-bombers along with Tomahawk cruise missiles continued to attack the targets across Iraq during the following days. The attacks were so precise that the electricity never went off in Baghdad throughout the war, collateral damages were min and only the leadership was isolated. During the war, about 20,000 PGMs were used mainly for Strategic Air Operations. Total munitions expended during the operation is placed at Annex ‘D’.

27. **Offensive Counter Air Operations**. Certain aspects of Offensive Counter Air operations are discussed below.

a. **SEAD**. The Iraqi Air Defence capability was reduced considerably during the 12 years war of attrition. However, towards the beginning of the air campaign, SEAD missions were given due priority. In total about 2500 sorties were flown to suppress and destroy Iraqi Air Defence and SAMs. F-15E, EA-6B, C-130 and F-117s were used for this purpose. The United States alone fired more then 400 AGM-88 high-speed anti-radiation missile in SEAD missions. The SEAD missions were so effective that the Iraqi's were afraid to switch on their radars even for launching SAMs. To neutralize the AA guns, coalition used the target drone to attract the attention and when the guns started firing at the drones, the F-117 flying in the darkness above destroyed it using their precision weapons. The SEAD missions reduced considerably after 23 March 2003.

b. **Air Field Attack**. The 'No fly zone' imposed after the Gulf war 1991 allowed coalition to utilize their ISR aircraft along with the 'Recreational Bombing' by the Tornados and F-15s to keep most of the military airfields non operational. However, during the initial phase of the war the Iraqi airfields were targeted with precision weapons and subsequently captured by the ground force which was later used as Forward Operating Base (FOB) for the coalition.

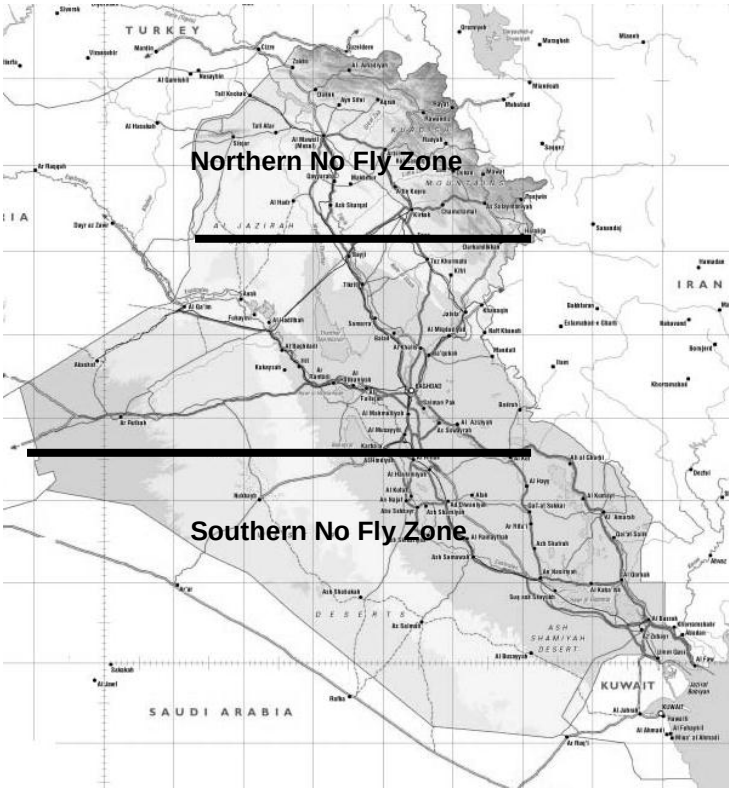

Figure- 2: Map showing the No Fly Zones in Iraq

c. **Ballistic and Cruise Missile Launch Site**. During Operation shock and awe, the Iraqi's were able to fire only six of their Ababil -100 tactical ballistic missile on the night of 20 March 2003. The intelligence gathered before and during the conflict allowed coalition to destroy missile sites at the very beginning and after that night the Iraqi's could not fire any Ballistic Missiles.

28. **Air Interdiction & CAS**. The first air attack over Baghdad was on 19 March 2003 but the main air punch was on 21 March 2003 because on 22 March the coalition air power was utilized to assist the ground forces beginning their move inside Iraq. This supports the concept of shock and awe, which is not only about using air power to create shock but allow rapid dominance as a whole. The OCAO during the initial phase of the operation allowed the Coalition to leap from air supremacy to total air dominance over Iraq and after three days of Strategic and OCAO, the air power priority was shifted to AI and CAS. The coalition flew the majority of the mission for AI and CAS totalling about 15,600 missions which is about 78% of the total mission with an apportionment of about 51%. This happened because the versatile airpower was employed to such an extent and tempo that the strategic portion of the air campaign crossed the limit of different areas. It was airpower which created a conducive ground battle environment and the coalition ground forces encountered burning tanks and artillery pieces rather then engaging them. Distribution of strike sorties is shown at Annex 'E'.

29. **Combat Support Air Operation**. Shock and Awe was not all about blind offensive operations. To effectively deliver the required concentration of shock and awe, combat support air operations played a crucial role. Some of the facets of support operations are discussed below.

a. **Air to Air Refuelling**. Tankers were the backbone of the coalition operation. The only asset considered inadequate was the tankers despite having 268 tankers for air to air refuelling. During the operation, the total tanker sorties flown were about 10,000 whereas the fighter sorties were 20,000.The coalition tanker forces included KC-1, KC-10, KC-130 and KC-135s from US Air Force, Navy, Marine Corp and Royal Air Force[ix]. Despite such a huge air to air refueling effort, one interesting aspect of their missions is that a shortage of refueling tankers forced two-thirds of the F-117 missions flown during the first major night of strikes to cancel their mission before they launched their weapons.

b. **CSAR**. During the operation coalition air planners agreed to put a certain number of aircraft “on call”. This arrangement was made to rescue personnel or isolated reconnaissance patrol which got trapped behind enemy lines during the early stage of the fight[x]. The CSAR operation during the operation was the largest joint CSAR in history involving 191 rescue missions by 72 aircraft and saving 73 personnel. The rescue missions were coordinated by Joint SAR centre.

c. **Air Mobility**. Air mobility dominated the entire operation of the coalition force right from the beginning. A total of 466,985 personnel of active, guard and reserve were air deployed from all over the world together with cargo and weapons. The air mobility operation became even critical when Turkey refused basing and over fly facilities for the coalition force for waging attack in Iraq. However, the global reach of the USAF made it possible utilizing the strategic and tactical air lifter and flying about 7500 sorties by about 150 aircraft during the operation. Detailed breakdown of Air Mobility sorties are at Annex ‘F’.

30. **Space Operation**. Space power acted as a critical force multiplier for coalition forces. More than 50 satellites in the space supported the operations in Iraq. Space provided a wide range of intelligence, targeting, and battle damage assessment capabilities. Space Satellites monitored infrared flashes to provide early warning of Iraqi missile attacks. It was the key to effective command and control and connected global military communications. It allowed timely transfer of targeting information to air, land and sea forces and offered a near real time assessment of the battle area. In addition GPS played a very vital role in the overall conduct of the entire operation. It provided guidance for the weapon, navigation information for the aircraft and most importantly formed one of the basic elements of the Network Centric warfare.

Tactics

31. Coalition force developed many tactics taking lessons from the operation desert storm and operation Enduring Freedom. Moreover, to fight the new war fighting concept innovations in the field of tactics paid dividend in achieving Shock and Awe.

a. **Changes in Air Combat Packages.** It was clear from the operation that substantially fewer air defense and electronic warfare escorts were needed and that the number of electronic intelligence aircraft dedicated to given packages could be reduced because of superior netting, intelligence platforms, and multipurpose aircraft. On the other hand, there are some indications that the number of refueling missions went up because Coalition aircraft had fewer bases near Kuwait, flew longer mission distances, and loitered longer.

b. **Attack Profile**. Addition of GPS guidance and improved reliability allowed coalition force to be much more accurate and to fly a much wider range of attack profiles. The profiles flown were designed to stay out of enemy ground defences without compromising on accuracy. With modern technology available with the coalition Air Forces, most of the attacks were with adequate stand off capability.

c. **Change in Role of the Bomber**. The change in the role of bombers is considered as change in the tactics. B-1, B-2, and B-52 all used as a precision strike system with stealth penetration or stand-off delivery capability to hit large numbers of targets with precision weapons in a single sortie.

d. **Urban Close Air Support**. A variety of UAVs were used for surveillance and targeting, including the Predator and highflying Global Hawk. CAS missions in the urban area required precision weapons and correct profiles to be flown to minimise collateral damage.

Technologies

32. Coalition's success in achieving Shock and awe effect was largely contributed by their overwhelming superiority in modern technologies. A few of the technologies those were used in Operation Iraqi Freedom are as follows:

a. **Stealth**. Both the B-2 and F-117 played an important role in the Iraq War. For example, the 12 F-117 stealth strike fighters based at Al Udeid Air Base in Qatar flew 80 of the roughly 17,000–20,000 sorties classified as strike missions. While the numbers were limited, all of those missions were against heavily defended targets in the greater Baghdad area and struck at key targets like the air defenses, important headquarters, and radio relay stations.

b. **JDAM.** The Joint Direct Attack Munition (JDAM) is a conventional dumb bomb fitted with a tail kit. Since it was developed to meet both USAF and Navy needs, the prefix 'Joint' is given to the munition. The tail kit with Inertial Navigation and Global Positioning System (INGPS) guidance has converted the dumb bomb into an accurate weapon with all-weather capability. The 1,000-pound variant of JDAM is designated the GBU-31, and the 2,000-pound version of the JDAM is designated the GBU-32. JDAM variants for the Mk-80 250-pound and Mk-81 500-pound bombs are designated GBU-29 and GBU-30, respectively.

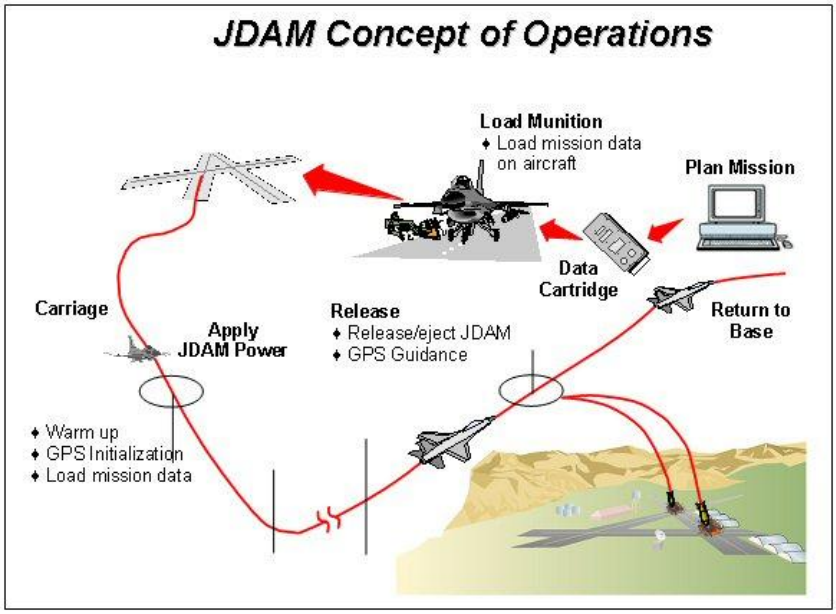

Figure 3: JDAM Concept of Operations

c. **ISR**. During the 21 days operation of the 1,801 aircraft used 80 aircraft were dedicated to the ISR mission. They included RQ-1 Predator and RQ-4 Global Hawk UAVs, EP-3, P-3C "Orion", U-2, E-8C Joint Surveillance Target and Radar System (JSTARS), and RC-135 "Rivet Joint" (collecting signals intelligence) aircraft, to name a few. They flew approximately 1,000 sorties and collected 3,200 hours of streaming video, 2,400 hours of SIGINT, and 42,000 battlefield images.

d. **PGM**. During the operation 68 Per Cent of the munitions used were PGM. Out of the 19948 PGMs expended in OIF, 8382 were LGBs, 1737 were HELLFIRE, JSOW, MAVERICK missiles, 408 were ARMs and 958 were cruise missiles. Use of PGM was quite effective in reducing collateral damages, especially while attacking targets around the crowded area of Baghdad.

e. **GPS Jammers and Countermeasures**. First time in the operation an endeavour had been made by the Iraqi to jam the coalition GPS, which was a technological breakthrough. Iraq had at least four jammers designed to jam the Coalition GPS system, these seem to have been destroyed early in the war and to have had little operational effectiveness. According to one press report, the jammers were successfully attacked by B-1Bs and F-117s; at least some seem to have been attacked with GPS- guided weapons. The very fact such jammers existed, however, is a warning that eventually there is a countermeasure to virtually every tactic and technology.

f. **Unmanned Aerial Vehicles (UAVs)**. The Coalition used more than a dozen types of UAVs in the conflict, building on the U.S. success in using such systems in Afghanistan. In the Iraq War, the Coalition made use of new tactical systems like the U.S. Army Hunter and Shadow, the Marine Corp's Dragon Eye, and the USAF Force Protection Surveillance System. The change was particularly important in the case of field commanders, who had only one type of UAV available in the Gulf War but had 10 types available in the Iraq War.

Failure/Weak Areas of the Air Operations

33. **Allied Forces**. As the period of active hostilities progressed, the United States military continued to target members of the Iraqi leadership in so-called "decapitation strikes," or strikes against high value military targets thought to bring about a swift end to the war as to conform with the Rapid Dominance concept. During the war, the United States launched fifty attacks against Iraqi leadership. None of these attacks resulted in the capture or death of the 55 "most wanted" from the Batiste leadership. Instead, these attacks resulted in dozens of preventable civilian deaths. Moreover, coalition flawed in BDA, Intelligence gathering, Fratricide and finally achieving the Shock and Awe. The failures of the Coalition are discussed below.

a. **Targeting**. In attempting to kill or capture members of the Iraqi leadership, the coalition forces utilised faulty methods of targeting. This directly contributed to the number of civilian deaths that occurred during these futile attacks. The main method by which Iraqi government officials were targeted was through their use of satellite phones. However the GPS system of the satellite telephones is accurate within a 100 meter radius. Such inaccuracies in targeting especially in densely populated areas are not desirable.

b. **Intelligence**. The operation, despite its much success, showed classic limitations in intelligence. The intelligence report claiming the presence of WMDs which was the genesis to the entire operations itself proved incorrect. Thereby wrongly WMD sites were targeted. Though the coalition forces had technologically superior intelligence gathering assets, HUMINT remained a major weak area in the operations.

c. **Fratricide**. During 1991 Gulf War no cruise missile, small airplane, or UAV threats existed. Thus, coalition air forces could afford to establish highly restrictive ROE, which effectively shut down patriot batteries against everything but the ballistic missile threat. This in turn, prevented friendly fire accidents from occurring. But because a cruise missile and UAV threat had materialised by the time of second Gulf War, comparably narrow ROE were apparently not implemented. As a consequence, an American Patriot unit inadvertently shot down a British Tornado fighter three days into the war, killing two crew members. The next day, to avoid the same fate, a USAF F-16 destroyed a patriot ground-based radar after it mistakenly painted the friendly aircraft. In spite of efforts to tailor patriot ROE after these incidents, yet another friendly aircraft, a US Navy F/A-18, was shot down and its pilot killed on 2nd April.

34. **Iraqi Forces**. Many of the lessons regarding Iraqi failures have already been discussed in talking about the advantage of US and British forces. Iraq's military faults are virtually the reverse image of US and British military capabilities. There are, however, some lessons that are worth mentioning:

a. **Popular Support**. There was almost no evidence of broad popular support for Saddam Hussein, although the Iraqis scarcely showed an overwhelming welcome to US and British forces. This meant that Saddam could not develop a popular defence of Baghdad, and his cadres could only fight in scattered areas and without cohesion and coordination. The regular army showed far less commitment to the regime than the Republican Guards.

b. **Compartmental forces.** Iraq's overlapping structure of forces and security elements were often better at watching each other and securing the regime than fighting. There was little coordination except at the local level, and command and control could not direct cohesive action.

c. **Ineffective Command and Control.** It is unclear just how much of the Iraqi collapse was the result of attacks on its C4ISR assets. Iraq was driven out of balance by the speed of US manoeuvre. Once the US approached Baghdad its decision-making cycle fell steadily behind the realities on the ground. By the time the US entered Baghdad, it had lost force cohesion and committed its best forces, the Republican Guards, in a piecemeal way in meeting engagements that virtually ensured its destruction.

d. **A blind force as well as one without a brain**. Iraq had no satellites, minimal UAV assets, no survivable reconnaissance assets, no other airborne intelligence assets, and conducted minimal active reconnaissance. If its C4I problems deprived it of a functioning brain, its lack of modern ISR assets effectively left it blind in most aspects of combat beyond visual range.

e. **Ineffective utilisation of Missiles.** Missile, like bombs, are not terror weapons unless they can be used in sufficient numbers or with sufficient lethality to have major killing or destructive effects. Iraq was never credited with more than 12-25 surviving Scuds and its Al Samoud II and Ababil missiles and rockets lacked the range, accuracy, and lethality to be much of a threat. Missile defences and attacks on delivery systems further degraded a largely symbolic capability.

Conclusion

35. With lightning speed and technological prowess US-led forces in the Iraq war have given a preview of how wars may be waged in this new century. Superior technology, including satellite-guided bombs and unmanned spy aircraft, coupled with speedy ground forces and secret special operations overwhelmed the Iraqis. Iraq War provides us important lessons about the continued value of military fundamentals and the need for the successful integration of these fundamentals with new technologies and tactics.