

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
عَلَّمَ الْإِنْسَانَ مَا لَمْ يَعْلَمْ
TAUGHT MAN THAT WHICH HE KNEW NOT

EVOLUTION OF CONTINENTAL MILITARY THOUGHT AND ITS GLOBAL IMPACT





National Defence University
Islamabad

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EVOLUTION OF MILITARY THOUGHT

CONTINENTAL MILITARY THOUGHT AND ITS GLOBAL IMPACT

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Officer-in-Charge: Lt Col Manzoor Ahmed Abbasi, AEC

Compilers/Editors: Colonel Khush Muhammad Khan
Lt Col Manzoor Ahmed Abbasi, AEC

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Evolution of Continental Military Thought and its Global Impact

**Military History Presentations
National Security and War Course 2010/11**

**Compiled & Edited by
Colonel Khush Muhammad Khan
Lt Col Manzoor Ahmed Abbasi, AEC**

**National and Military History Cell, ISSRA
National Defence University, Islamabad**

*“Victorious warriors win first and then go to war,
while defeated warriors go to war first and then
seek to win.”*

Sun Tzu

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FOREWORD

It was, indeed, a matter of pleasure for me to witness that a centre of excellence, with the name of 'National and Military History Cell', is functioning at ISSRA, NDU. History is one of the oldest academic disciplines and a very rich source of knowledge. It is only through the study of history that we can connect our present with the past. The life of an individual is too short to personally re-live and experiment what the mankind as a whole has gone through for thousands of years. History is, thus, the only source and a treasure trove of knowledge, containing the collective wisdom of the humanity that an individual can benefit from. History, particularly the military history, as an academic discipline has even the greater importance for the military officers. It helps them not only to expand the base of their knowledge but also to promote critical thinking, which is so essential for decision-making at various tiers of leadership.

The publication of the book 'Evolution of Military Thought' is definitely a worthwhile endeavour of ISSRA. I am sure; it will prove to be a good read for the military officers, particularly those who are entering the threshold of senior leadership positions. I am confident that National and Military History Cell will continue its efforts for improving both the quality of research as well as the quantum of publications in the domain of history.

Lieutenant General Nasser Khan Janjua, HI (M)
President National Defence University

PREFACE

The third book, titled as 'Evolution of Military Thought', in the series of military history publications is being presented. In between the publication of our second and third books, this Cell has not only organized a national Workshop on Balochistan, but also published a comprehensive report thereof. In our opinion, the book in hand is extremely useful for all the military officers, particularly for those who are likely to occupy senior level leadership positions. The book consists of three parts vis-à-vis: Evolution of Military Thought, Evolution of Air Power and Evolution of Maritime Strategy. A deliberate effort has been made this time to add a few relevant maps and sketches.

There is no trend in Pakistani universities to undertake research on hard core military subjects, including military history. Therefore, a researcher usually does not find genuine research material on military subjects. National and Military History Cell has been established at NDU to pave the way for focused research in this domain. The Cell is still at its formative stage. It is our utmost effort to come up with a genuine research, after publication of military history presentations. We intend introducing a Military History Journal, on the availability of supporting staff, for which this forum will be opened up to all those who are interested to write and contribute.

Any suggestions in connection with the publications of National and Military History Cell are always welcome. These may, however, be forwarded to the Officer-in-Charge of the Cell.

Compilers / Editors

LIST OF ABBREVIATIONS

ACTS	Air Corps Tactical School
ARG	Amphibious Ready Group
ASW	Anti-Submarine Warfare
ATACMS	Army Tactical Missile System
BAI	Battlefield Air Interdiction
BDA	Battle Damage Assessment
BEF	British Expeditionary Force
C4I	Command, Control, Communication, Computer and Intelligence
CAS	Counter Air Operations
CIA	Central Intelligence Agency
CMCP	Coalition Maritime Campaign Plan
COG	Centre of Gravity
COIN	Counter Insurgency
COS	Chief of Staff
CTF	Counter-Terrorism Force
DMPI	Desired Mean Point of Impact
DP	Decisive Point
EBO	Effects-Based Operations
EBP	Effects-Based Planning
EEZ	Exclusive Economic Zone
EMP	Electro-Magnetic Pulse
ERF	Extra Regional Forces
EW	Electronic Warfare
FN	French Navy
FoF	Follow on Forces
HPM	High Powered Microwaves
IADs	Integrated Air Defence Systems

IJN	Imperial Japanese Navy
IMD	Indian Maritime Doctrine
IN	Indian Navy
IOR	Indian Ocean Rim
IRF	Immediate Response Force
ISR	Intelligence, Surveillance, Reconnaissance
JFCOM	Joint Forces Command
JTRS	Joint Tactical Radio System
KGB	Komitet Gosudarstvennoy Bezopasnosti
LGBs	Laser Guided Bombs
LGBs	Laser Guided Bombs
LIC	Low Intensity Conflict
LRPS	Long-Range Precision Strikes
MAD	Mutually Assured Destruction
MSR	Main Supply Route
NATO	North Atlantic Treaty Organization
NCW	Network Enabled Capacity
NEC	Network Centric Warfare
NPS	Nuclear Power Submarine
NSA	Non-State Actors
PGMs	Precision Guided Missile
PK	Probability of Kill
PLA	People Liberation Army (China)
PN	Pakistan Navy
PSO	Peace Support Operations
RAF	Royal Air Force
RN	Royal Navy
SEAD	Suppression of Enemy Air Defences
SLBM	Submarine Launched Ballistic Missile

SLCM	Submarine Launched
SLOCs	Sealanes of Communications
SOC	Sector Operations Centres
SOC	Sector Operations Centre
UAV	Unmanned Aerial Vehicle
UAVs	Unmanned Aerial Vehicles
UCAV	Unmanned Combat Aerial Vehicle
UK	United Kingdom
UN	United Nations
UNSCR	United Nation Security Council Resolution
US	United States
USN	United States Navy
WMD	Weapons of Mass Destruction
WUAVs	Weaponized Unmanned Aerial Vehicles
WW-I	World War-I
WW-II	World War-II

CONTINENTAL MILITARY THOUGHT AND ITS GLOBAL IMPACT

“The Continental school argues that control over land is the organising principle of nation-states... Man lives on the land, not in the sea or air.... in historical perspective, conflict has taken place almost exclusively with control over territory as the stake in the contest”¹

Roger W. Barnett

Introduction

1. Texas was formally annexed to the United States in 1846. Contesting this decision, Mexico continued to fight for two years until US Army landed at Vera Cruz and fought its way into Mexico City². In World War-I, though, the British Navy dominated the world oceans; the Allied Powers faced the prospects of a certain defeat³ until American ground forces joined the Western Front. In 1991, forty days of constant air and missile attacks could not dislodge the Iraqi Army from Kuwait⁴. It was the ground offensive that compelled the Iraqis to submit unconditionally⁵. These accounts illustrate the centrality of land-power⁶, which has evolved

¹ Barnett, Roger W, 'Maritime and Continental Strategies: An Important Question of Emphasis', in Colin S. Gray and Roger W. Barnett (eds), *Seapower and Strategy*, Annapolis, United States Naval Institute, MD, 1989, p. 355.

² Rostow, Eugene, *A Breakfast for Bonaparte: US National Security Interests from the heights of Abraham to the Nuclear Age* Washington DC: National Defence University Press, 1993, 161-162.

³ Record, Jeffery, *Revising US Military Strategy; Tailoring Means to Ends* Washington DC: Pergamon-Brassey's, 1984, 52-55.

⁴ Lebedev, Yu. V., Lyotov, I. S., and Nazarenko, V.A., The War in the Persian Gulf; Lessons and Conclusions, *Military Thought*, No. 11-12 (November-December 1991), 109-117.

⁵ Atkinson, Rick, *Crusade: The Untold Story of Persian Gulf War* Boston: Houghton Mifflin, 1993, 496.

⁶ Macgregor LTC Douglas A., *Breaking the Phalanx: A New Design for Landpower in The 21st Century* Washington DC: Center for Strategic and International Studies, 1995, 10.

through the crucible of ‘Continental School of Military Thought’. *The Continental school has been and continues to be the most important influence on the shape of warfare*⁷.

2. Indeed, even when ground forces dominate a conflict, it is an article of faith among modern soldiers that they cannot operate alone. As a result, perhaps, more than many sea and air power advocates, the land power theorists recognize the importance of inter-dependency. In Wylie’s words, *“The soldier cannot function alone, his flanks are bare, his rear is vulnerable, and he looks aloft with a cautious eye. He needs airman and the sailor for his own security in doing his own job”*.

3. The study of the subject assumes significance in Pakistan’s context, where the onus of winning the nation’s war pre-dominantly rests in the Pakistan Army, in collaboration with sister services. Therefore, unless we have a thorough understanding of Continental Strategy and its dynamics, the efforts to understand military strategy shall remain a deficient endeavour.

Aim

4. To study the evolution of the Continental military thought and its global impact.

Sequence

5. The paper has been developed in the following sequence:-

- a. **Part-I:** Understanding the context of Continental Military Thought and its Evolution through Napoleonic Era, Codification of Napoleonic Wars by Jomini and Clausewitz.
- b. **Part-II:** Continental Military Thought during Industrial Revolution, World War-I and II.

⁷ Horner, Lieutenant Colonel D. M., ‘The Continental School of Strategic Thought’, *Australian Defence Force Journal*, May–June 1990, no. 82, p. 35.

- c. **Part-III:** Nuclear Age and the Cold War.
 - d. **Part-IV:** Coalition Wars and Future of Continental Military Thought.
6. **Scope.** Evolution of Continental Strategy, with focus on the following aspects (last two points are of key value, that is why these have been included in addition to the given scope) :-
- a. Napoleonic era.
 - b. Industrial Revolution and its impact on warfare.
 - c. World War I and II.
 - d. Super power rivalry (Cold War and proxy wars).
 - e. Regional wars between non-nuclear states.
 - f. Coalition wars.
 - g. Future of Continental strategy.
 - h. Implications for Pakistan.
7. **Framework**
- a. The essence of ‘Continental Strategy’ is the use of land as the medium of conflict, without undermining the strategic importance of other mediams⁸.
 - b. Covering the developments of over two centuries in a a small paper is not easy. Therefore, this presentation is not a detailed chronology of land warfare, but only a snapshot, capturing the continuity and changes in its development.
 - c. Study of Continental Strategy essentially revolves around the study of principles of war, strategies and tactics. It is, therefore, important to see it through the prism of military theory.

⁸ Collins, John M., *Military Strategy: Principles, Practices and Historical Perspectives*, Washington, DC ,Brassey’s Inc. , 2002, pp. 61–2.

PART-I**UNDERSTANDING THE CONTEXT OF CONTINENTAL
MILITARY THOUGHT****The Place of Continental Military Thought**

8. The existence of a land power – sea power antithesis can be traced to a nation’s strategic geography⁹. Take the example of the struggle between continental Sparta and maritime Athens in the 5th Century BC, brilliantly described by Thucydides¹⁰. Mackinder called it, a choice between ‘land wolves and sea wolves’¹¹. Only two states in human history have possessed continental and maritime power of global scale at the same time, the ancient Rome and the modern United States or, so to call them, the ‘amphibious wolves’.¹² Thus, when it comes to husbanding military resources, most modern states have had to make an ultimate choice between land and sea; a choice between being a Sparta or an Athens¹³.

9. Collins, has identified three traditional schools of strategic thought:-

⁹ Platias, Athanassios G. and Koliopoulos, Constantine, ‘Grand Strategies Clashing: Athenian and Spartan Strategies in Thucydides’ “History of the Peloponnesian War”, *Comparative Strategy*, 2002, vol. 21, no. 5, pp. 377–400.

¹⁰ Cawkwell, George, *Thucydides and the Peloponnesian War*, Routledge, London 1997, esp. ch. 3 on strategy; Livy, *The War with Hannibal: Books XXI–XXX of The History of Rome from its Foundation* trans. Aubrey de Séincourt, Penguin Books, Harmondsworth, 1965; and Adrian Goldsworthy, London, *The Punic Wars*, Cassell, 2000, chapters 3–4.

¹¹ Parker, W. H., *Mackinder: Geography as an Aid to Statecraft*, Oxford, Clarendon Press, 1982, p. 149.

¹² Evans, Michael, ‘The Continental School of Strategy: The Past, Present and Future of Land Power’, Study Paper No. 305, Canberra, Land Warfare Studies Centre, 2004, pp. 13-14.

¹³ Gray, Colin S., ‘Seapower and Landpower’, in Gray and Barnett, *Seapower and Strategy*, pp. 3–27; Martin Wight, ‘Sea Power and Land Power’, in Martin Wight, *Power Politics*, ed. Hedley Bull and Carsten Holbraad, Leicester University Press, Leicester, 1978, pp. 68–80; and Williamson Murray and Mark Grimsley, ‘Introduction: On Strategy’, in Williamson Murray, MacGregor Knox and Alvin Bernstein (eds), *The Making of Strategy: Rulers, States and War*, Cambridge University Press, Cambridge, 1994, pp. 1–23.



- a. The *continental* or land power school, dominated by the teachings of Carl Von Clausewitz.
 - b. The *maritime* or command of the sea school, whose devotees favour the teachings of Alfred Mahan.
 - c. And the *aeronautical* or air power school, founded by the Italian theorist, Giulio Douhet.
10. The other commonly referred to schools are more recent and include :-
- a. The *astronautical* school (embryonic infosphere and space strategy).
 - b. The *special operations* or clandestine warfare school.
 - c. And the *unifying or beyond joint* school of thought (integrated military power school)¹⁴.
 - d. Revolutionary and Nuclear schools are prominent, but they are essentially the derivatives of continental school of thought.

Evolution of Continental Strategy

11. The Continental school of strategy formally emerged in the early 19th Century Europe and has evolved through five main influences:-
- a. The first influence was the experience of decisive land battle in Napoleonic era.
 - b. Second, there was the theoretical codification of Napoleonic warfare by Antoine Henri Jomini and Carl Von Clausewitz and its dissemination to successive generations.
 - c. A third factor was the Prusso-German general staff, that transitioned the ideology of decisive battle to industrial warfare conditions.

¹⁴ Collins, John M., *Military Strategy: Principles, Practices and Historical Perspectives*, Washington, DC, Brassey's Inc., 2002, pp. 61–2.

- d. The fourth development came after World War-I, with the rise of a ‘modern European operational theory’, which continued to evolve till the end of Cold War.
- e. The final development can be considered in the context of information age.

12. **The Era of Decisive Battles.** Historically, warfare on land was perceived to have two levels: *strategy* (derived from the Greek word *strategika* or generalship) and *tactics* (derived from the Greek word *taktika*). Strategy was narrowly interpreted as referring to the ‘art of the manoeuvre of forces towards battle’, while tactics were seen as ‘the art of arrangement of forces on the field of battle.’¹⁵ This is a classical paradigm. Isserson, describes it as ‘representing *the strategy of a single point*’.¹⁶

13. Under the strategy of a single point, dense masses of troops would meet in a lethal battle, compressed in both space and time. Once the mass was concentrated at a decisive point, victory was usually achieved through breakthrough, envelopment or encirclement. This created the cultural tradition of ‘decisive battle’; a tradition that stretches from Scipio Africanus to Norman Schwarzkopf.¹⁷

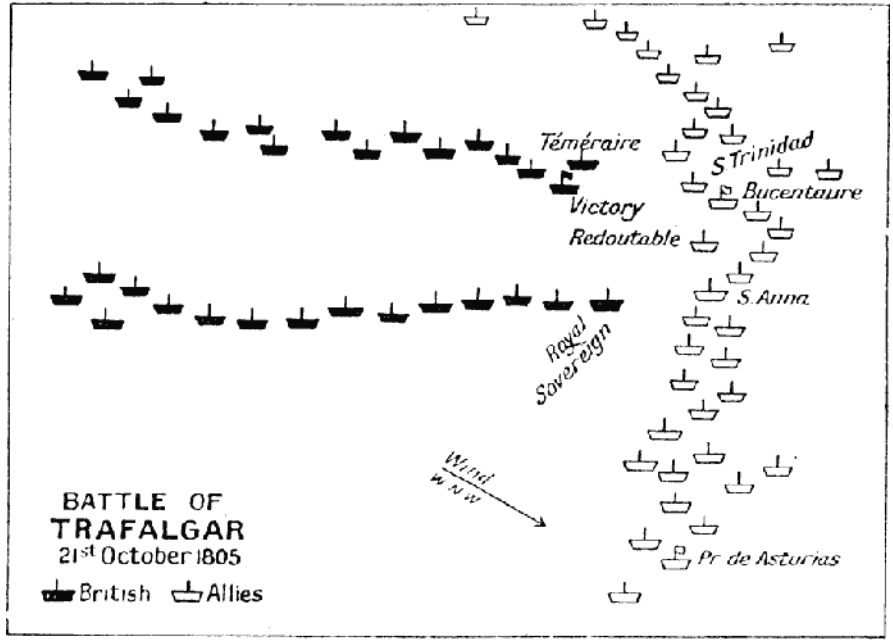
Napoleonic Era

14. On the morning of October 21, 1805, the French and British fleets collided, just off the coast of Spain. When the day closed, the

¹⁵ Anderson, J. K., *Military Theory and Practice in the Age of Xenophon*, University of California Press, Berkeley, CA, 1970, pp. 94–8; Doyne Dawson, *The Origins of Western Warfare: Militarism and Morality in the Ancient World*, Westview Press, Boulder, CO, 1996, pp. 79–80.

¹⁶ Schneider, James J., ‘The Loose Marble—and the Origins of Operational Art’, *Parameters: US Army War College Quarterly*, March 1989, vol. 19, no. 1, pp. 85–98. See also Richard W. Harrison, *The Russian Way of War: Operational Art, 1904–1940*, University Press of Kansas, Lawrence, KS, 2001, chapters 3–4.

¹⁷ Hanson, Victor Davis, *Why the West Has Won: Carnage and Culture from Salamis to Vietnam*, Faber and Faber, New York, 2001.



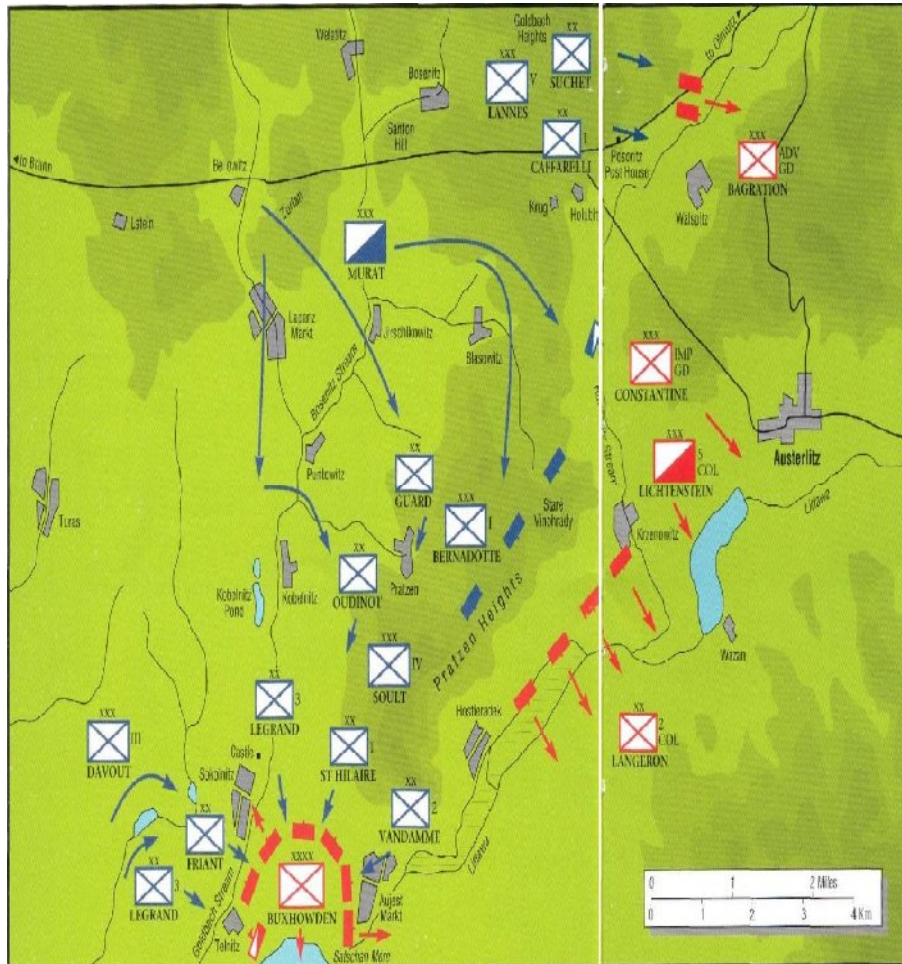
most spectacular sea victory of the age had been achieved. Sinking eighteen French and Spanish ships in just four hours, Royal Navy's Admiral Nelson had become immortal. Napoleon, acknowledging his inability to defeat British maritime dominance, opted to neutralize her influence over the Continent. Six weeks later, on December 2, 1805, the French Army met and defeated the combined armies of Austria and Russia, near Austerlitz. The victory was so complete and so overwhelming that French dominance of the European Continent would not be successfully challenged again for another eight years.

15. It was the formal beginning of the Continental strategy, as known today. This also explains the basis to trace its origin to Napoleon onwards. Over 100,000 books have been written on this legendary figure, making the task of covering all aspects of his personality nearly impossible. This presentation shall only cover those aspects, which had profound influence on the evolution of continental strategy. The question arises how the Continental Strategy evolved through Napoleon's way of warfare? Though his inventions are a few in number, Napoleon's mastery begins with inspiration from the theories of the legends of the past such as Saxe, Bourcet, Guibert and Frederick the Great. He incarnated their theories by evolving strategies of manoeuvre, a masterly manipulation of TSR matrix, and a compatible military system. When these elements are harmonized with technological innovations and leadership, a revolution is bound to take place; a development now called as Revolution in Military Affairs.

16. **Contributions towards Development of Continental Thought.** Napoleon's landmark contributions that have left near indelible mark on warfare on land, include the following:-

- a. **Levée en-Masse.** While, other European rulers were perpetually struggling to maintain their armies, Napoleon was capitalizing on unlimited potential of 'Levée en-masse' and a centrally directed war economy, unleashed by the French Revolution. This was the first mass army in modern history. Faced

Battle of Austerlitz



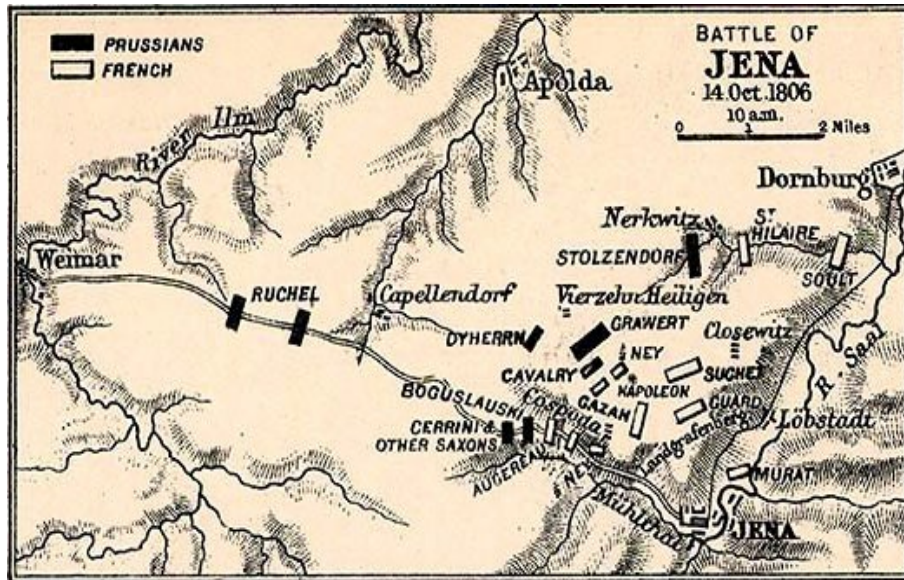
with disaster, the other nations of Europe were forced to follow the French example, in an effort to counter him.



Napoleon on horse back with his Army

- b. **Operational Art.** Napoleon's most important contribution to the art of war is his mastery of 'Operational' level of war; he called it 'grand tactics' and his contemporaries called 'strategy'. Rejecting the legacy of 'face to face death', Napoleon taught the meanings of 'Manoeuvre Warfare' at operational level. This added a new 'Third Dimension of 'Operations' to hitherto only two dimensions of war i.e. strategy and tactics. Chandler cites Jena-Auerstadt Campaign as the beginnings of the successful application of the operational art. If one were to identify his single most decisive principle of war, it was his ability to concentrate a superior force

The Battle of Jena



The Battle of Ulm



at the decisive point in time and space. His Maxim No.77 demonstrates his view of grand tactics: "Commanders-in-Chief are guided by their own experience and by their genius. Tactics, manoeuvres, the science of the engineer officer and of the artillery officer, may be learned from treatises; but the knowledge of grand tactics is gained only by experience and by the study of the history of the campaigns of all the great captains."

- c. **Interfacing Theory with Technology.** He was the first to identify, harness and harmonize the potential of developing fire arms technologies with tactics. Fully aware of the increased lethality of muskets and cannons, his focus shifted from 'out-gunning to out-manoeuving'. His ability to concentrate artillery fire to revitalize infantry manoeuvre is worth recalling.
- d. **Organizational Innovations**
 - (1) If one were to identify the single most outstanding element of his military system, it was the evolution of the '*corps dé armée* (Army Corps). These were, in fact, *mini armies* that could operate independently against larger enemy and sustain themselves for 24 to 36 hours of combat.
 - (2) His most favoured formation was '*le bataillon carré*', developed from the basic building block of a Corps and a 'shurikan', like a Formation, that could react in any direction with equal effectiveness.
- e. **Importance of Tactical Battle.** He reinforced tactical battle, as the central force behind the theoretical development of modern land warfare. In all of his campaign plans, he had a decisive battle in

mind and every move made by his units was geared to a possible battle situation.

f. **Five Principles of Opening a Campaign.**

Napoleon laid down five principles of opening a campaign:-

- (1) **First.** The ultimate objective must be clear from the start, without wasting any effort on secondary operations.
- (2) **Second.** Concentrate on the main enemy army or the army that poses a greater degree of danger. It is best illustrated in Napoleon's own words, "*There are in Europe many good generals, but they see too many things at once, I see only one thing, namely the enemy's main body. I try to crush it, confident that secondary matters will then settle themselves.*"
- (3) **Third.** Strive to isolate various elements of enemy's forces and tackle them piecemeal.
- (4) **Fourth.** Develop manoeuvre on flank or rear of enemy to create psychological and physical dislocation (Ulm).
- (5) **Fifth.** Never expose your lines of communication and compromise on freedom of action.

g. **Dominant Manoeuvre**

- (1) While, the other armies marched at the speed of 70 paces per minute, Napoleon's army would march at 120 paces per minute. This single organizational innovation was the key to introducing the concept of large-scale manoeuvres for future wars on land. His ability to move large forces simply and

swiftly, shift units from one mission to another, combine separate columns on the battlefield, and achieve decisive success demonstrated its main characteristic.

(2) Napoleon repeatedly demonstrated dramatic positional advantage in time and space. Ulm Campaign can be termed as the best example of the dominating manoeuvre. 200,000 troops moved 300 miles along multiple axes, to converge in Ulm within seven weeks. Surprised and isolated by the crushing rapidity of the French Army's advance, far behind their front, the Austrian forces were compelled to surrender. It also set the terms for his titanic action at Austerlitz.

(3) Napoleon's idea of manoeuvre envisaged balancing the apparently contradictory requirements of concentration and dispersal, but this is the miracle that he managed to perform time after time.

h. **Distributed Manoeuvre.** The Ulm campaign also exhibits elements of distributed manoeuvre, which can be termed as nothing less than 'a different genre in the military art'.¹⁸

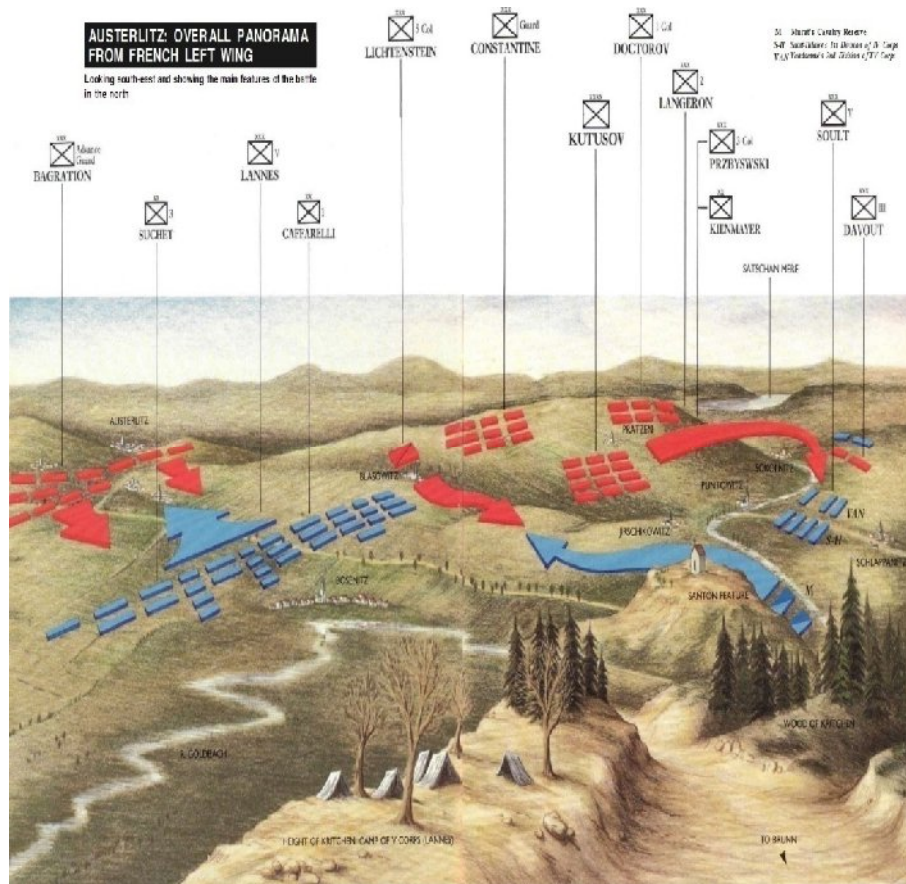
i. **Forms of Manoeuvre.** He evolved three basic forms of manoeuvre:-

(1) **Manoeuvre of Central Position.** Without getting into its modalities, this manoeuvre was demonstrated in Italian Campaign of 1796 and Austerlitz. Even in Waterloo, the Emperor came

¹⁸ Schneider, *The Structure of Strategic Revolution: Total War and the Roots of the Soviet Warfare State*, p. 138; and 'The Loose Marble—and the Origins of Operational Art', p. 86. On the phenomenon of mass in Napoleonic military method see also Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory*, pp. 30-4.

within hair breadth of a major success by using this manoeuvre¹⁹.

The Battle of Austerlitz



¹⁹ Chandler – “waterloo”.. p 76

- (2) **Manoeuvre of Strategic Envelopment.** This was Napoleon's favourite manoeuvre that was repeated almost thirty times including at Marengo, Ulm, Jena-Auerstadt and Bautzen. Using a part of army to distract the enemy, he would rush the remainder superior force to block the enemy's lines of communications and forcing the dilemma of reversed battle.
- (3) **Manoeuvre of Strategic Penetration.** Not decisive perse, this manoeuvre led to the creation of a favourable situation (springboard) for the decisive action, as witnessed in the battle of Austerlitz. When facing the enemy holding an extended line, he would smash through it at a convenient place and seize some important point as a 'centré dès opérations' for the next phase.
- j. **Use of Artillery to Re-vitalize Infantry Manoeuvre.** Whereas, the aim of 18th Century linear tactics had been to create the maximum possible small arms fire power, Napoleon used massed artillery to blow a hole in the hostile battle formation, into which infantry and cavalry could be launched. Freed from the need to provide the main fire power, infantry's potential for shock action could be maximized.
- k. **Centre of Gravity.** Napoleon, always identified the Centre of Gravity of his enemy and oriented his effort towards it. At the strategic level, he identified the members of the coalition, in whom lay the COG and at the operational level, the linkage between the balance of enemy's system of forces, disruption of which led to their dislocation and destruction.
17. In a nutshell, Napoleon represented a mastery that rested on

exploiting the phenomenon of revolutionary political conditions in Europe. Napoleon's decisive campaigns of Marengo, Jena and Ulm had set an operational tone that successive commanders around the world have laboured to replicate for nearly two centuries, till information age started changing the complexion of the Continental strategy.

Codification of Napoleonic Warfare

18. **General.** The second main influence on the evolution of the Continental strategy was the codification of Napoleonic warfare by Jomini and Clausewitz. This codification enabled dissemination of the Napoleonic principles of land operations to successive generations of soldiers.²⁰

19. **Jomini.** David Chandler has described him as, 'the doyen of Napoleonic scholars'²¹:-

- a. **Didactic Interpretation of War.** Jomini's legacy lies in his effort to bring predictability to war, by codifying basic tenets in terms of small timeless principles²².
- b. **Exclusive Domains of Politics and War.** His focus ignores the larger political context for which wars are conducted and reduces the problem of war to professional and operational concerns of military commanders only²³. This view is the antithesis of both strategy and strategic art, as we know and

²⁰ Baron Antoine Henri de Jomini, *The Art of War*, Greenhill Books, London, 1992 edn; and Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret, Princeton University Press, Princeton, NJ, 1976.

²¹ Chandler, David G., 'Napoleon: Classical Military Theory and the Jominian Legacy', in David G. Chandler, *On the Napoleonic Wars: Collected Essays*, Greenhill Books, London, 1999, 248.

²² Chilcoa, Major General Richard A. t, *Strategic Art: The New Discipline for 21st Century Leaders*, US Army War College, Washington D.C., 1995, 13.

²³ Jomini, John Shy, " , in Peter Paret (ed.), *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, Oxford University Press, Oxford, 1986, p. 161, 167.

experience it in the 21st Century²⁴.

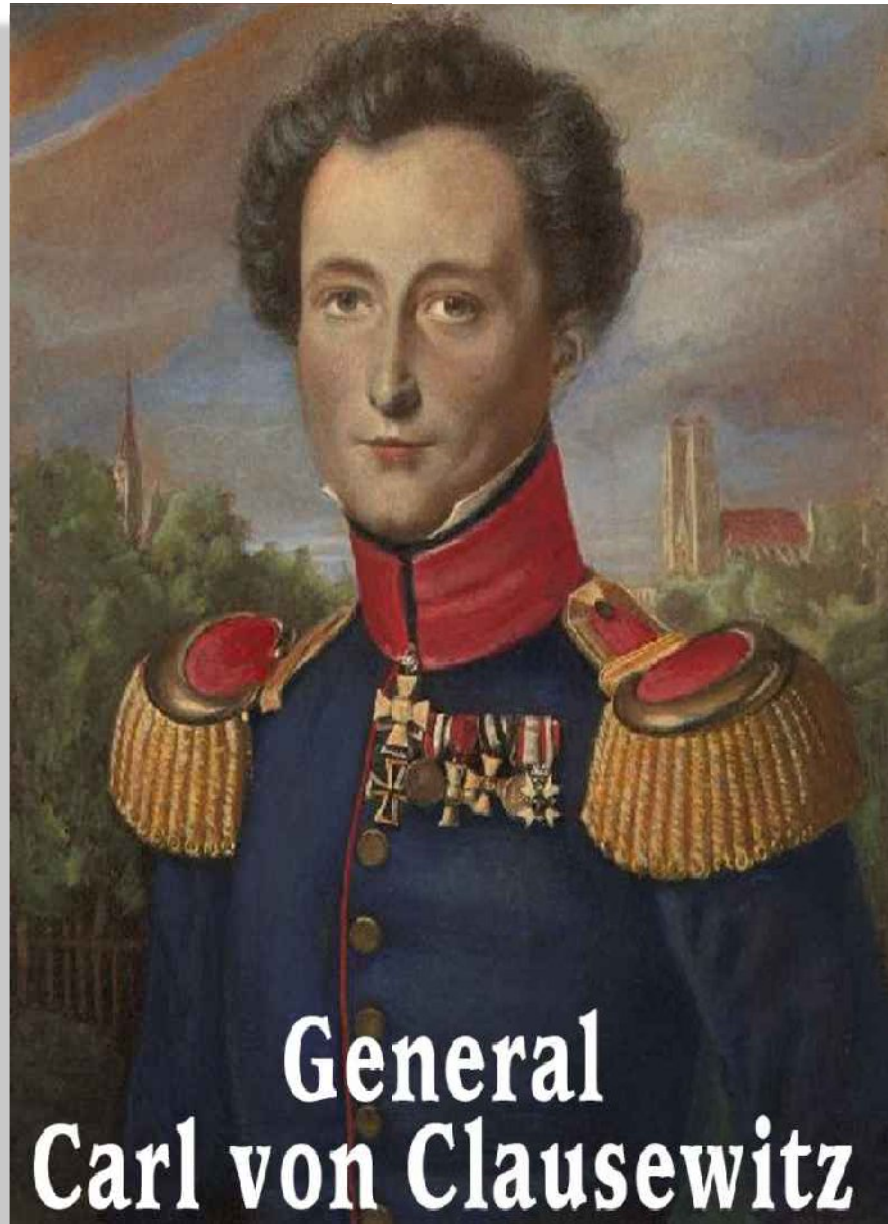
- c. **Geometrical Lines of Operations.** Jomini's excessive pre-occupation with lines of operation and preference for interior lines, tend to reduce strategic problems to an exercise in geometry.
- d. **Domination of Geographical Places.** His emphasis on domination of zones of operation tended to turn the emphasis of warfare away from destruction of enemy's armed forces.
- e. **Perspectives of Warfare.** His view of war was sub-divided into four perspectives i.e. strategy, operations, tactics and logistics.
- f. **Unchanging Principles of Strategy.** He wrote that in military practice, 'strategy alone will remain unaltered, with its principles the same as under Scipios and Caesars, Frederick and Napoleon, since they are independent of the nature of the arms and the organisation of the troops'.²⁵ Not surprise, 'the battles of Wagram, Pharsalia and Cannae were gained from the same original source'.²⁶
- g. Didactic in nature, Jomini's principles profoundly influenced the European thinkers till 1870s and practitioners of American Civil War.

20. **Clausewitz.** Who has not heard of famous triad of 'ends, ways and means'? This is the strategic formula of Clausewitz; that has become ultimate platform to develop the understanding of strategy.

²⁴ Chilcoat, Major General Richard A., *Strategic Art: The New Discipline for 21st Century Leaders*, US Army War College, Washington D.C., 1995, p. 13.

²⁵ Jomini, *The Art of War*, p. 48. See also Brigadier General J. D. Hittle (ed.), 'Jomini and His Summary of the Art of War: A Condensed Version', in *Roots of Strategy: Book 2*, Stackpole Books, Mechanicsburg, PA, 1987, pp. 433; 452.

²⁶ Quoted by Gat, *The Origins of Military Thought from the Enlightenment to Clausewitz*, p. 112.



Clausewitz was deeply inspired by his mentor and teacher Scharnhorst, a renowned scholar, soldier and politician, who guided, “A theorist wishing to understand the state and the nature of war must never allow his thoughts to diverge far from the element central to each – ‘power in politics’, ‘violence in war.’” His treatise, ‘Vom Kriege’ or ‘On War’, is one of the most powerful influences on the Continental military thought. In Clausewitz's work, attack and defence, risk and decisiveness, combat and manoeuvre, politics and violence, appear as dynamic concepts and explain the chameleon-like nature of organized violence. His main ideas included:-

- a. **Identification of Operational Perspective of War.** Though he did not term it as such, the idea of ‘operational’ aspect of war was at the centre of Clausewitz’s attention.
- b. **Clausewitzian Trinity**
 - (1) One of the most important theories espoused in ‘On War’ is the famous ‘Trinity’. According to this theory, there are three factors at play in war²⁷; the people, the military and the government:-
 - (a) People will resort to violence, when faced with ideas differing from their own.
 - (b) The Army commander must use his creative genius, when faced with the unknowns of war.
 - (c) Government must ensure that the people and the commander are following the established guidelines.
 - (2) **Application of Trinity to Guerrilla War.** Interestingly, he did not ignore the guerrilla

²⁷ Clausewitz, *On War*, 89.

wars, regarding which he argues that the ‘people’ element of the triad takes precedence over the other two²⁸.

c. **Other Ideas**

- (1) **War as a Continuation of Politics.** This theme is too well known and does not need any elaboration. Suffice to say, he placed war fairly within its political, social and economic context.
- (2) **Clear distinction of Limited and Total War.** War, he states, may either be:
 - (a) “Waged with the aim of completely defeating the enemy, in order to either destroy him as a political organism or to force him to accept any terms whatever”; or
 - (b) “Waged to acquire territory in order to retain the conquest or to bargain with the occupied land in the peace negotiations”.²⁹
- (3) **Concept of Culminating Point.** The art of attack is to achieve decisive objectives, before the culminating point is reached. Conversely, the art of defence is to hasten the culmination of attack, recognize its advent, and be prepared to go over to the offence, when it arrives.
- (4) **Centre of Gravity.** According to him, ‘COG develops from the dominant characteristics of both belligerents. To quote him, ‘On this, everything depends and against this all our

²⁸ Michael I Handel, *Masters of War* (Frank Cass Publishers, Great Britain, 2001), 103.

²⁹ Clausewitz, *On War*, 97.

energies should be directed³⁰.

- (5) **Decisive Points.** ‘The best strategy’, he wrote, “is always to be very strong; first in general, and then at the decisive point”.³¹
- (6) **Superiority in Numbers.** He laid supreme emphasis on the superiority of numbers. “We may be sure that, in ordinary cases, in small as well as in great combats, an important superiority of numbers will be sufficient to ensure victory.”
- (7) **Defence a Stronger Form of Warfare.** Clausewitz regarded defence as a stronger form of warfare with a caveat that it is also essentially negative in nature and cannot win wars.
- (8) **Chance and Friction in War.** He sums up danger, bodily exertion, information in war, and other factors of uncertainty and chance under the heading of friction. We all are too familiar with his maxim, “everything is very simple in war, but the simplest thing is difficult. The difficulties accumulate and end by producing a kind of friction that is inconceivable, unless one has experienced war’s countless, unforeseen minor incidents, combined to lower the general level of performance, so that one always falls far short of the intended goal”. For professional soldiers, what mattered to Clausewitz was his emphasis on major victory and his concept of imponderables in war, such as chance and

³⁰ Clausewitz, *On War*, 595-6

³¹ Clausewitz, p. 204. Emphasis in original.

friction.³²

- d. **Changing Nature of War.** Regarding the often-debated question of Changing Nature of War, Clausewitz explained that War has a dual nature, comprising the 'Objective' and the 'Subjective'. The Subjective is changing but the 'Objective' is not. Subjective aspects are 'colours of chameleon' whereas, the objective nature is the true nature i.e 'chameleon itself'. These domains are as given below:-

	Objective Nature	Subjective Nature
(1)	Ends, ways, means equation	Technological aspects.
(2)	Clash of wills and failure of peaceful means.	Manoeuvre and battle combinations.
(3)	Chance, friction and luck (no technology has been able to remove any of these).	Size and lethality.
(4)	Trinity of violence, chance and rationality.	Speed and duration.
(5)	Chameleon-like nature of war.	Actors and identities.

- e. Clausewitz's influence on evolution of Continental strategy is unrivalled. Whether favouring him or attempting to reject him, no discussion on land strategy can be considered complete without a reference to Clausewitz. The stage is now set to

³² Peter Paret, 'Clausewitz', in Paret, *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, p. 212; and *Clausewitz and the State: The Man, His Theories, and His Times*, Princeton University Press, Princeton, NJ, 1976, chapter 11

examine the impact of Jominian and Clausewitzian thought on the American Civil War, Franco–Prussian War and World Wars.

PART II
CONTINENTAL MILITARY THOUGHT DURING
INDUSTRIAL REVOLUTION AND WORLD WAR I & II

21. **General.** The theoretical development of the Continental school of strategy is closely associated with the evolution of modern European land warfare. After Napoleonic era, the Continental school of military thought was influenced by development of the Prusso-German general staff in the second half of the 19th Century. The rise of the Prussian–German staff system saw an ideology of decisive battle, transferred to industrial warfare conditions, as Germany emerged to military greatness in Europe. The final development in the evolution of the Continental school of strategy came in the inter-war period between 1918 and 1939. The main focus in the historical treatment of the Continental school of thought in the succeeding paragraphs is on those aspects from the 19th Century to the mid-20th Century that have decisively contributed to the development of a modern concept of land warfare.

Industrial Revolution and its Impact on Continental Warfare

22. Industrial Revolution was the process of change from an agrarian economy to one dominated by industry and machine manufacture. The process originated from England in the 18th Century and later engulfed other parts of the world. By the middle of 19th Century, on the invention of railway system, the cumulative effect of Industrial Revolution started having its impact on the organisation of armies and development of strategy³³. The advent of the Industrial Revolution in the 19th Century began the erosion of the classical model of European warfare. Some of the salient technological advancements that affected and changed the

³³ Military History – A Primer, Staff Course 2000, Command & Staff College, 63-81.

perception of military thinkers and gave rise to great spatial scope and long duration battles were³⁴: -

- a. The industrialization of transport and communications gave armies a new speed and capacity for distribution across space and time, which had been impossible in the age of horse-drawn military movement.
- b. The railway expanded the scale of the battlefield, by permitting mass mobilization of huge conscript armies.
- c. The invention of the telegraph permitted the integration and reinforcement of large, dispersed forces in a way that had been impossible for earlier armies dependent for command and control on visual line of sight and on mounted couriers.
- d. Industrialization also produced a revolution in weapons technology through breech-loaders, magazine-fed smokeless powder, machine guns and rapid-firing artillery. The power of modern weapons favoured the defensive, and challenged both the ideology of the decisive battle and the strategy of the single point.

23. Impact of Industrial Revolution on Strategy/Warfare

- a. **Dispersed Battlefield.** New technologies created a dispersed battlefield. The strategy of the 'extended line' grew as railways and telegraphs made battlefields longer and deeper, and as firepower made them stronger³⁵.

³⁴ Evans, Michael, "The Continental School Of Strategy: The Past, Present and Future of Land Power" (Study Paper No-305, Land Warfare Studies Centre, Australia, 2004), 34.

³⁵ Ibid.

- b. **Positional Warfare.** Increasingly, flanks vanished and envelopment was replaced by positional warfare, involving the need for attacking armies to penetrate a continuous front.
- c. **Military Theory versus Military Technology.** As is often the case in military affairs, military theory lagged well behind military technology. Consequently, the reaction of most European military theorists was, an attempt to adapt the methods of Napoleon and the interpretations of Clausewitz to the new tools of industrialization.
- d. **Rise of Prusso-German General Staff**
 - (1) The need of an effective General Staff, lack of which had so largely led to the ruin of Napoleonic system, was first recognized by Prussia. One of the most far-reaching military re-organization in 19th Century, as a result of Industrial Revolution was the rise of Prussian-German General Staff system. Under Field Marshal Helmut von Moltke (the elder), industrial methods involving the combined use of railways, mass armies and breech-loading weapons were adapted to the task of seeking decisive victory, according to the precepts of classical strategy. Both Moltke and later his most famous successor, Alfred von Schlieffen, *'taught and practiced a mode of offensive warfare that adapted to the industrial age Napoleon's precept to seek prompt decision by battle'*.
 - (2) Moltke developed the notion of the *'Operativ'*, using a modern general staff. It is important to note, however, that Moltke's notion of *'operativ'* did not equate to the modern operational level of war. Rather, in

Von Moltke – The Chief of German General Staff



the Moltkean lexicon, the concept of the staff operation, the objective became the efficient planning of mobilization and the movement of forces to concentrate mass for the ‘*Vernichtungsschlacht*’ or the ‘decisive battle of destruction’. The key to success was seen as being the march and manoeuvre of mass armies, with the tactical engagement pivoting around the use of railways and the telegraph. Moltke’s rapid victories—first at Königgrätz in 1866 over the semi-industrialised Austrians, whose organisation was inferior, and then at Sedan in 1870 over the French, appeared to vindicate the methods of the Prusso-German General Staff organisation and its system of war fighting in the eyes of European contemporaries.

- e. **European Continental School of Military Thought.** By the beginning of the 20th Century, German methods of mass, industrialised warfare on land had been almost universally adopted by European armies, leading to the flowering of the Continental school of military thought. However, as these armies developed similar types of weaponry and methods of organisation, so the possibility of positional warfare based on attrition grew. Indeed, European military theory became increasingly divorced from the true nature of warfare in an age of steam power and telegraphy. This reality was first demonstrated by the events of the American Civil War, the first great industrial-age war, but one shaped by European ideas of war—particularly those of Jomini. The Confederate General, Robert E. Lee, could not achieve victory by the use of Napoleonic style encounter battles. Instead, success went to Union Generals, notably Ulysses S. Grant, who

employed attrition and positional operations to wear down the Confederate Armies. After 1870, under the Napoleonic paradigm, the European Continental School of Strategy underwent a fatal divergence between modern technological capability and classical military theory. European strategists, such as Graf von Schlieffen in Germany, continued to emphasize the ideology of decisive battle, in effect suspending technological realism in favour of strategic idealism.

- f. **Development of Strategy**³⁶. Helmut Von Moltke influenced Prusso-German military thinking from mid 19th Century into the First World War that was adapted to the industrial age. Political, economic and foreign policy and a sound industrial base, gave birth to the following strategic concepts:-

- (1) **Revival of Strategy of Envelopment.** Confronted with the deadlock imposed by new weapons and extended frontages, Moltke developed the concept of outflanking the enemy in one continuous, strategic, operational sequence combining mobilization, concentration, movement and fighting. By seizing the initiative from the outset, it aimed at driving the opponent to a partial or complete envelopment, destroying him by a decisive battle of annihilation or encirclement. Moltke demonstrated the potential of new methods in 1866 (Austro-Prussian War) and 1870 (Franco-Prussian War). Schlieffen, Moltke's eventual successor from 1891 to 1906, became historically significant as a teacher and an exponent of

³⁶ Military History – A Primer, Staff Course 2000, Command & Staff College, 70.

Franco-Prussian War – 1870



strategic envelopment, which he described and glorified as ‘Cannae Concept’.

- (2) **Strategy of Mobilization.** In case of Prussia, the unhappy geographical structure, with its far-flung east-west extension, aggravated its military problems. Industrial Revolution, in the form of railroad network, offered a remedy that Moltke exploited to the full. The railroads offered new strategic opportunities and were exploited by Moltke in time and space dimensions.
- (3) **Renewed Application of Operations on Interior and Exterior Lines.** Moltke’s strategy in 1866 showed that the much contemplated inner line of operations was merely of relative significance. He summed up his experiences in these words “*The unquestionable advantages of the inner line of operations are valid only as long as it retains enough space to advance against one enemy by a number of marches, thus, gaining time to beat and pursue him and, then, to turn against the other who is in the meantime merely watched. If this space, however, is narrowed down to the extent that you cannot attack one enemy without running the risk of meeting the other, who attacks you from the flank or rear, then the strategic advantage of the inner line of operations turns into the tactical disadvantage of encirclement during the battle*”.

Continental Military Thought – World War I & II

24. Development of Continental Military Thought– Pre-World War-I (1900-1914). A brief account is as follows:-

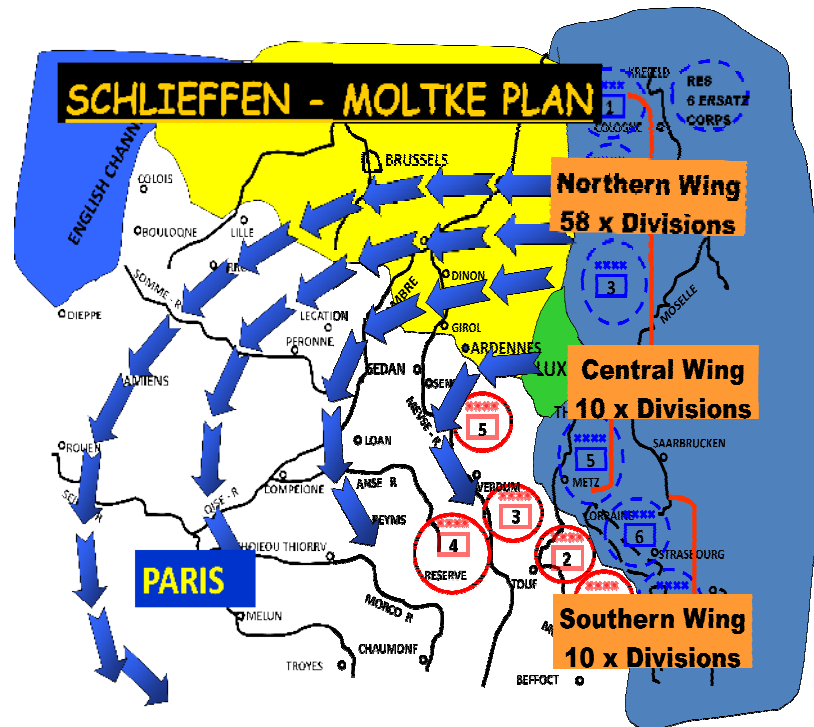
- a. **Mackinder’s Theory of Land Power.** In 1904, Mackinder in his book ‘*Democratic Ideals and Reality*’ developed ‘*The Heartland Theory*’, which proposed that a land-based power, not a sea power, would ultimately rule the world. At the heart of ‘Eurasia’, lay an impregnable, resource-rich ‘pivot area’ and if this pivot area (heartland) became influential in Europe, a great empire could be formed. He believed that with the advent of railroads, this area would be pivotal, as it would be easy to defend and hard to conquer. The heartland theory was “*Who rules East Europe, commands the Heartland, who rules the Heartland commands the World Island and who rules the World Island commands the World*”³⁷.
- b. **Continental Military Thought Before the Start of World War - I**³⁸
 - (1) **The German Military Thought**³⁹. Schlieffen was the most celebrated of the late 19th Century European soldiers, who elevated strategic idealism over tactical and technological realism. His famous 1905 two-front plan against France and Russia sought to avoid firepower attrition on an extended front, by emphasising envelopment through a

³⁷ Papava, Vladimier, ‘The Heartland Theory and the Present Day Geo-Political Structure of Central Asia’, [updated 15 Nov 2010; cited 15 Dec 2010], available from <http://www.silkroads.org/new/docs/pub/1006Rethinking1006.pdf>

³⁸ Peter Paret, ed. *Makers of Modern Strategy* (USA: Clarendon Press, Oxford University, 1986).

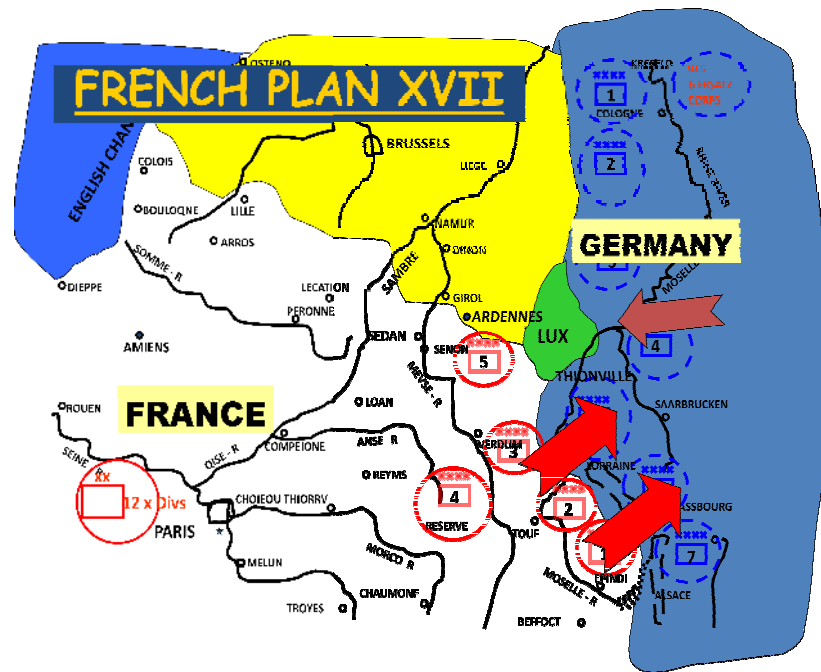
³⁹ Evans, Michael, “The Continental School Of Strategy: The Past, Present and Future of Land Power” (Study Paper No-305, Land Warfare Studies Centre, Australia, 2004), 41.

Gesamtschlacht (complete battle), in which the structured manipulation of superior numbers and mass could be exploited. While aware of the power of modern military technology, Schlieffen believed in the ‘*Cannae Concept*’, namely that ‘the fundamental conditions of battle have remained unchanged. A battle of annihilation can be carried out today according to the same plan devised by Hannibal in long forgotten times’.



- (2) **The French School.** A generation of French military commanders, influenced by Du Picq, believed that the surest way to succeed in war was, to seize the offensive at the earliest. Though, they had not discounted a German offensive through Belgium, they thought it

less likely. According to them, the Germans were more likely to make a shallower enveloping manoeuvre through the Ardennes, which could be handled without giving away the option for an early offensive and the plan was known as 'Plan XVII'. The general concept behind this plan was that the French should take the strategic initiative rather than passively waiting for the German assault.



- (3) **The British Military Thought.** In the first half of the 20th Century, Britain discovered that her traditional strategy based on naval blockade, peripheral Continental attack and coalition diplomacy, as evolved between the 17th and 19th centuries, was inadequate against a unified, industrialized Continental power, such as Germany. By 1911, Britain was

forced to seek a new balance of power in Europe, by emphasising a more balanced policy between maritime and Continental strategy. This geo-political approach involved the modification by the British, of their 400 year old policy of limited war, based on maritime power in favour of developing a continental strategy, involving the deployment of a large professional army on European soil.

25. **World War–I Period (1914-1918).** The search for influence and economic self-sufficiency, led to a clash of interests among major European powers in peripheral colonial areas like Morocco and Bosnia-Herzegovina. It finally perpetuated into the First World War on 28 Jul 1914. In John Shy's words, "*the Great War shattered many things and none more than military theory*"⁴⁰:

- a. Period between 1914 and 1917 saw impact of modern firepower and incompatibility of tactical mobility with strategic mobility, leading to millions of casualties at Verdun and Somme (1916). These battles were one of the heaviest in casualties. Following details explain the context:-

Serial	Battle	Duration	Casualties (Both Sides)	Outcome
(1)	Verdun	10 Months	0.8 Million	No gains by either side
(2)	Somme	3 ^{1/2} Months	1.5 Million	Germans lost less than 10 kms of territory

⁴⁰ ibid

- b. The British military thinker, J.F.C. Fuller, identified the reason for such carnage when he noted, '*the Germans were copying Von Moltke; and the French were trying to discover how to copy Napoleon*'.
- c. Trinity of bullet, spade and wire gave birth to stalemate and defence became a stronger form of warfare.
- d. It was not until the last year of the Great War, that technology and theory began to re-converge dramatically in European armies. A key technical breakthrough was the advent of accurate indirect artillery fire that made possible the simultaneous engagement of targets throughout the two-dimensional area of the battlefield.
- e. By 1918, nearly all of the weapons and techniques of 20th Century conventional warfare had either been invented, or were in the process of being refined on the Western Front; including indirect artillery fire, tanks, combat aircraft, chemical agents and aerial bombardment. The conceptual implications of these weapons systems were far-reaching and shaped the future of 20th Century conventional war. Military historians do not exaggerate, when they speak variously of 'the Revolution in Military Affairs (RMA) of the First World War', the advent of a 'Combined Arms Revolution' and 'the birth of the modern style of warfare' occurring on the Western Front.
- f. The First World War involved a number of peripheral land campaigns but essentially the war was decided in the great Continental campaigns in France and Eastern Europe. It is in the German and Allied offensives of 1918 on the Western Front, that one can detect the seeds of a transformation in the Continental school of military thought, away from linear infantry tactics towards all-arms modern

an operational art. The formal recognition of an operational dimension in the school of Continental military theory was based on recognition that strategic victory in war could no longer be achieved by a single battle of annihilation, according to the Napoleonic or Moltkean ideals. It was the Soviets who truly pioneered the theoretical development of operational military theory in the inter-war period. In addition, the impact of the writings of the British armoured theorists, Liddell Hart and J.F.C. Fuller, had considerable practical influence in the development of the Continental school of strategy after 1918.

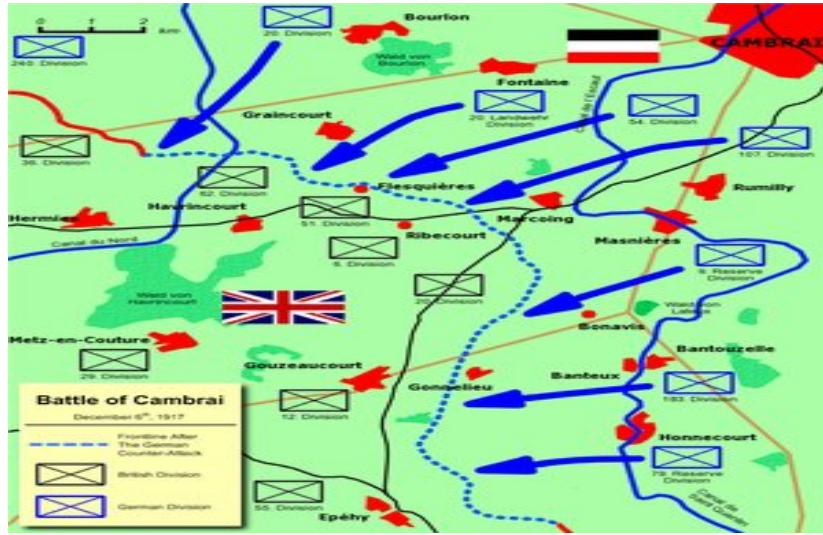
27. **Development of Thought by Theorists**⁴². The major contributions of a few of the theorists are given in the ensuing paragraphs:-

- a. **J.F.C Fuller (1878-1966)**⁴³. British army officer, military theorist, and a war historian, Fuller became one of the founders of modern tank warfare. As Chief of Staff of the British Tank Corps since December 1916, he planned first massed tank assault of 381 tanks at the Battle of Cambrai in November 1917. Important ideas of Fuller are as under:-

⁴² MHP, 'Evolution of Military / Operational Thought from 18th Century to End of WW-II', AFWC-2006 & 2007, NDU.

⁴³ Maj Gen J.F.C Fuller, *The Conduct of War 1789-1961* (Services Book Club, 1986), 242.

The Battle of Cambrai – 1917



(1) **Mechanized/ Mobile Warfare**

- (a) Gauging the potentials of tanks, he said, “*No longer is movement by fire the tactical pivot of battle, but movement in order to fire*”. Through his ‘Plan 1919’, he was the first to lay down the concept of mechanized warfare. ‘Plan 1919’ envisaged employing about 5000 heavy and medium tanks, with close air support, for a thrust some twenty miles deep that would paralyze the German command system.
- (b) Correctly appreciating the tremendous impact of tanks, he thought, when used en-masse, tanks provide the answer to restore manoeuvre. He conceived the idea that the bold employment of armour forces would make strategic and operational envelopments more decisive and efficient.
- (c) The Psychological effect that the tanks produce through bold employment cause what he termed as ‘*Strategic Paralysis*’, especially into enemy’s rear.

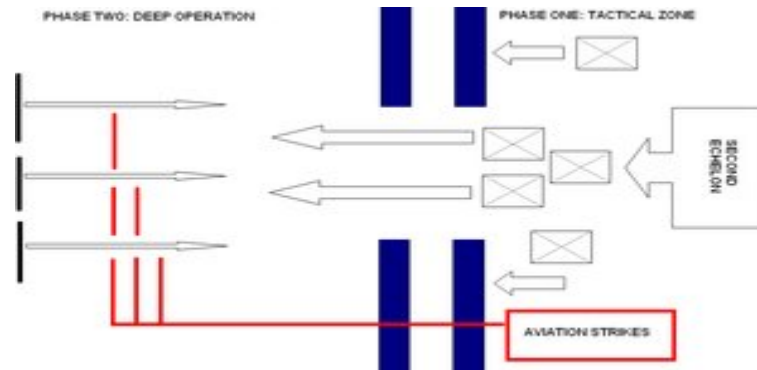
(2) **Defensive Operations.** Fuller’s ideas were farsighted and were used during World War-II, which included the following:-

- (a) He maintained that ‘*mobile defence*’ is the most effective form of defence.

- (b) Tanks should be used first to canalize the attacker, followed by swift counter attack.
- b. **Basil Liddell Hart (1895-1970).** Fuller's inspiration was enthusiastically taken up, developed and publicized by Liddell Hart, who from the mid-1920s to the late 1960s was Britain's best known writer on military strategy. Some details of his revolutionary ideas are given below:-
- (1) **Mechanized Warfare.** He advocated the coordinated use of aircrafts and tanks, drawing strength from mobility, surprise and indirect approach. His concept of 'Expanding Torrents', using mechanized forces was the basis for Germans Blitzkrieg. His concept implied:-
 - (a) Progressive induction and the simultaneity of action for engagement of enemy at multiple tiers.
 - (b) Grouping of mechanized infantry for defeating the enemy behind the held obstacle.
 - (c) Targeting communication centres and headquarters and causing paralysis upon enemy through deep manoeuvres.
 - (2) **Indirect Approach**
 - (a) In the absence of an overwhelming superiority, a direct approach will result in self-exhaustion. He said "*the dislocation of the enemy's psychological and physical balance should be the vital prelude to a successful attempt at his overthrow. This dislocation can*

be produced by the indirect approach”.

- (b) In essence, the ‘Indirect Approach’ involves an attempt to weaken resistance before attempting to overcome it. This is to be achieved by exploiting movement and surprise, away from the line of natural expectation. The most effective indirect approach is one that lures or surprises your opponents into a false move, so that they become victims of their own plans.
 - (c) **The Concept of Contracting Funnel.** In his opinion, the defence was markedly superior to attack in modern warfare, unless it was handled indirectly. He proposed the concept of ‘Contracting Funnel’ i.e. placing a small portion of the defenders in front and holding a strong mobile element in the rear to converge on to the infiltrating attacker’s flank and destroy him.
- c. **Marshal Tukhachevskii (1893-1937).** Tukhachevskii was a military theorist and a great modernizer, who reformed Red Army and laid technical foundations of Soviet armoured, mechanized and airborne forces. He remained Chief of Staff from 1926 until his execution in 1937. He foresaw the effects of technical innovation and new weapons in the future war, which included:-
- (1) **Deep Battle Concept.** In 1929, Tukhachevskii enunciated the concept of deep and rapid battle as:



- (a) Attacking echelons, made up of infantry formations supported by tanks and artillery, break in the first enemy defensive area over a frontage of 6 – 8 kilometers.
- (b) This was to be followed by tanks and motorized infantry formations to develop the penetration up to a depth of 60 –100 kilometers for neutralizing enemy's main supply route and headquarters.
- (c) Light bombers to attack deep targets, while aviation was to isolate target area from enemy's strategic reserve.
- (d) Airborne forces would interdict headquarters, communication and supply organization.
- (e) Tukhachevskii influenced and highlighted the need for mechanized airborne forces rather than simple airborne forces to ensure that they

had sufficient tactical mobility to organize themselves before the enemy mobile reserve can neutralize them.

(2) **Deep Operation Theory.** His concepts were further developed in 1942, as ‘Deep Operation Theory’, which envisaged employment of three to four echelons during an offensive.

d. **Alexander Svechin (1878-1938).** On modern extended fronts, a succession of systematic blows or successive operations, were required to control a battlefield in time, space and scale, and to link all tactical actions to a strategic objective. Thus Alexander Svechin, probably the greatest of the inter-war Soviet military theorists, argued that, in industrial conditions, the dual dimensions of tactics and strategy had to be intellectually connected by an ‘intermediate member’—or operational level of war. Only at the operational level could combat actions be forged into an assemblage to provide the creative tactical material for extensive operations united by strategy. In 1926, Svechin coined the term ‘the operational art’ to define a new relationship between tactics, operations and strategy.⁴⁴ It is explained by his quote, “*Strategy . . . is not only interested in stating the goal of an operation but also makes certain requirements of the methods of achieving it. All branches of the art of war are closely interrelated: tactics takes the steps that make up an operational leap, and strategy points the way*”.

⁴⁴ Evans, Michael, “The Continental School Of Strategy: The Past, Present and Future of Land Power” (Study Paper No-305, Land Warfare Studies Centre, Australia, 2004).

Application of Military Thought⁴⁵ in World War-II (1939-1945)

28. World War II, was a global military conflict which involved majority of the world nations, including all the great powers, organized into two opposing military alliances: the Allies and the Axis. The war involved the mobilization of over 100 million military personnel, making it the most widespread war in the history of mankind, and placed the participants in a state of 'total war', erasing the distinction between civil and military resources. This resulted in the complete activation of a nation's economic, industrial and scientific capabilities for the purposes of the war effort. The Second World War was more complex than the First World War. The Germany pursued the Continental strategy, supported by naval forces acting as an ancillary to the land forces. As in the First World War, Britain (eventually) and the United States realised that a Continental army had to defeat the Germans in France and on the North Western plains of Europe. Britain's maritime power assisted by the US Navy enabled her to avoid defeat, when threatened by the German submarine blockade and enabled the Allies to continue the war in the Mediterranean. But it remained for the Allies to win the war, in the long run, Germany was beaten by superior land forces and the most of those land forces came from an even greater continental power, the Soviet Union. Faced with major German onslaught based on a superior strategy, Russians started to actualize the ideas of Marshall Tukhachevskii and Svechin. Their concepts of mechanized warfare played significant role in reversing the situation in World War-II and the ultimate encirclement of German Army at Stalingrad (1942-43) and in the Battle of Kursk (1943). The Second World War marked a return to the war of movement and manoeuvre.

29. **Germany.** During Second World War, theory of Jomini was relevant to Germany. Adolph Hitler was the supreme authority

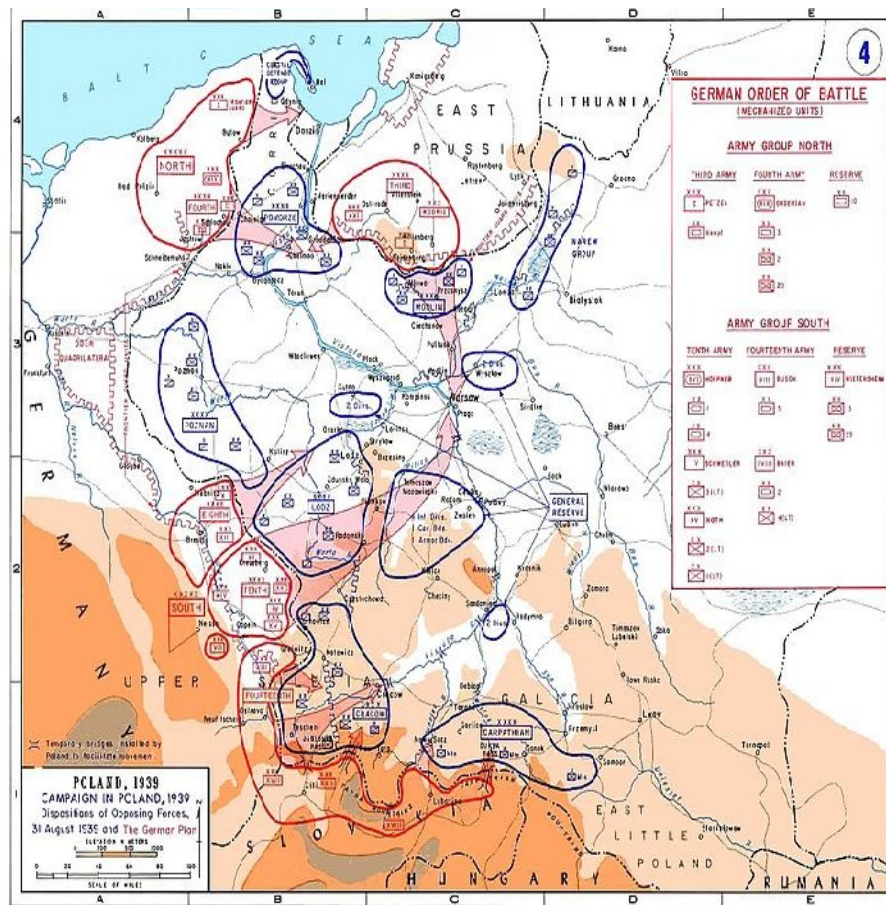
⁴⁵ MHP, 'Evolution of Military / Operational Thought from 18th Century to End of WW-II', AFWC-2006 & 2007, NDU.

in his country. The salient aspects of German strategy were as under:-

- a. **Blitzkrieg.** Benefiting from the thoughts of Fuller and Liddell Hart, Germans evolved Blitzkrieg. It employed concentrated air power offensively, to prepare the way for advancing armour. Unlike the earlier doctrine, it aimed more at the dis-orientation and dislocation of the enemy's command system. This was to be achieved by deep penetration into the enemy's rear areas. Between 1920-30, General Heinz Guderian refined this concept. The essence of 'Blitzkrieg Theory' was to concentrate maximum strength, to surprise the enemy, to invade suddenly, advance deep into his country territory, to paralyze his will to resist, and to force him to surrender. It was brilliantly executed in Poland, France and Russia. Application of this concept encompassed other notions of strategy like:

- (1) Use of indirect approach.
- (2) Initial rapid concentration to provide the necessary combat power.
- (3) Multiple thrusts to sever enemy's communications.
- (4) Breaking up counter attacks before they were formed.
- (5) Flexibility and decentralization in the conduct phase.
- (6) Bypassing resistance.
- (7) Sound logistics support.

German Offensive Plan of 1939



- b. **Panzer Divisions.** Panzer Divisions and later Panzer Formations were designed in mid 1930s. This was to be the most significant development of Second World War. This development played a key role in bringing about a swift collapse of Poland, France and initial success in Russia.
30. **Russia**
- a. **Operativnyi.** The development of the post-1917 Soviet School of Operational Warfare (Operativnyi), has been called ‘the most creative theoretical

adventure in the military history of the 20th Century'. In terms of the art of war in industrial conditions, the development of *operativnyi* in the Soviet Union represented the most significant advance in the evolution of Continental strategy since the Napoleonic wars.

- b. **Mechanized Warfare.** Tukhachevskii was first of course to convert the Russian Army in line with the modern concepts of mechanized warfare. Other aspects included the following:-
- (1) **Integrated Campaigns and Mobile Operations.** Integrated operations and the mobile war, as displayed in the Russian counter-offensive were manifested by the extensive mechanization and induction of strong offensive weapons i.e. tanks and aviation.
 - (2) **Mobile Defence.** Soviet strategists thought the concept of defensive doctrine to be stronger form of war. '*Only he shall win, who will find it within himself the spirit to attack*', wrote Soviet theorist Mikhail Vasilyevich Frunze. The Soviet defensive concept was based on mobile defence to gain time for mobilization and then, go over to the strategic offensive. The transitory period was characterized by tactical counter attacks and temporarily relaying on fixed defence fortifications.
 - (3) **Selection of Strategic Direction.** Aligning with the concept of Grand Strategy, the Soviet Supreme Command always selected that strategic direction for main thrust, which assured the accomplishment of major military and political objectives, leading to a

sharp change in the strategic situation. In the winter operations of 1941-1942, the Soviet forces delivered the main blow in the direction of Moscow, against the largest enemy group attacking Moscow. The destruction of this group resulted in a sharp change in the military-political situation on the Soviet-German front.

31. **French Army.** The salient features of the French military and operational strategy are as under:-

- a. **Two Extreme Military Policies.** Prior to Second World War, French military policies oscillated between two extremes: Marshal Foch's concept of 'Total Offensive' and Marshal Henri Philippe Petain's concept of 'Total Defence'.
- b. **Defensive Doctrine.** In 1925, Franco-German rapprochement strengthened political optimism about a more powerful European order. Therefore, mechanization and motorization, appearing more suitable for offensive actions, were criticized politically in France, being inappropriate for a defensive strategy. Petain followed Foch, as the supreme commander of the French Army. The construction of Maginot Line, reliance on short service, lack of powerful offensive armoured forces and consideration of air support and tanks as auxiliary to infantry, provided obvious indication of the French defensive doctrine.
- c. **Re-organization/ Mechanization.** There was also a group advocating mechanized warfare in France. General Charles de Gaulle was its most famous member. In early 1930's, he played decisive role in creation of mechanized forces. Still the re-organization of mechanized formations and adoption

of new doctrine was not fully mature, when the French Army was caught by war.

32. **British Army.** During Second World War, it was again Clausewitz's theory, like First World War, that was valid for the British system, but Prime Minister Winston Churchill had much greater influence in the direction of war. His thinking was deeply influenced by his memory of enormous losses of the First World War, suffered by his country and a determination that the defeat of Hitler should not be won at the same cost. In consequence, his strategic ideas had a more emphatic political cost. The military and operational thought followed by the British during World War-II included:-

- a. **Disbandment / Demobilization.** At the conclusion of First World War, the British Army was totally disbanded and only skeleton forces were maintained. The first real effort at re-armament took place in 1936, after Hitler's decision to re-militarize the Rhineland.
- b. **Doctrine of Limited Liability.** In 1937, the doctrine of 'Limited Liability' was adopted, which implied the traditional policy of naval blockade and economic warfare. The rejection of a 'Continental Strategy' was the essence of this doctrine. As a sequel, Britain embarked on the rearmament of her Naval and Air Force, while the land fighting was left to her allies.
- c. **Lack of Combined Arms Orientation and Cautious Moves.** British displayed lack of fundamental combined arms orientation. The strategic heritage of the British, described by Liddell Hart as a 'British Way of War', characteristically produced a British Army, mentally primed to conduct careful campaigns with limited objectives. Operation Battle Axe (North Africa, 1941), illustrated how the British penchant for deliberate planning and

methodical execution betrayed operational efforts, requiring initiative for success.

33. **United States of America.** Though USA did not have direct involvement both in World War I and II, however, its joining towards the end of both great wars resulted into decisive alliances. The major role was played by their strong political leader Roosevelt, who followed the relationship between war and policy on the concept of Clausewitz. To the military situation, he responded with vigour and assurance. United States emphasized on the following:-

- a. **Development along Individual Service Lines.** Since the beginning of the 20th century, American military planning had been geared to its Continental defence and security of her territorial acquisitions in Pacific. Influence of military thinkers like Fuller and Liddell Hart and experience of First World War introduced offensive strategic thought in United States. There was renewed emphasis during the 1930s on motorized, mechanized, aviation, tank warfare and their effects on time and space factors. American strategic theory from 1919 to 1939 developed essentially along individual service lines, without any serious attempt at any level to evolve the Theory of Grand Strategy.
- b. **Reliance on Fire Power.** United States Operational Art favoured application of fire power to defeat enemy forces rather than to manoeuvre large formations into rear of opposing forces. Examples are employment of US Forces in February 1943 in North Africa, the operations after Normandy invasion.
- c. **Use of Air.** The British and American tactical air forces were grouped as teams with the land armies. However, preference was given to attainment of air superiority and once acquired, to support the land

battle. The British and American thinkers advocated and introduced strategic day and night bombing.

- d. **Sea-borne Launching.** American interests in the Pacific made it essential for them to develop concepts and doctrines related to sea borne launching. 'Operation Overlord', which was designed to liberate France, to ensure destruction of German military might and to put an end to the world war, was the largest amphibious operation of its kind ever attempted.

34. **Post World War-II Period.** After World War-II, the eclipse of Germany and France as great military powers saw the mantle of leadership of the Continental school of strategy passed permanently to the two rival super powers, the Soviet Union and the United States, whose armies confronted each others across a divided Europe in the Cold War era.

PART III

NUCLEAR AGE AND THE COLD WAR

35. **General.** The developments in Continental Military Thought and its impact on warfare during the period between the end of World War-II and the Cold War period was greatly influenced by two concomitant events, namely the bewildering scientific and technological advancements and emergence of the nuclear weapons, the presence of which presented the world with a danger of universal holocaust. The discourse includes basic reference to some wars and developments, with a view to explaining the overall context of Continental strategy. The scope of this discourse includes, The Socio-Political Environment, Cold War Era and Nuclear Strategy and Conventional Wars.

The Socio-Political Environment

36. The period following World War-I and the Cold War was characterized by:

- a. Major ideological division of the world in two camps that resulted in various forms of engagements along this divide, including proxy wars, nuclear arms and space race.
- b. With major support from super powers through proxy wars, low intensity conflicts and wars of national liberation became common phenomena around the world.
- c. Despite their enormous power potentials, the US and the Soviet Union did not engage each other during the Cold War, mostly due to the deterrence factor of the nuclear weapon and fear of a nuclear Armageddon, as cost of nuclear retaliation was viewed as too high for any nation to contemplate its use. Rather, they were engaged against each other in the following ways:-

- (1) **Intelligence.** Actively spying on each other in an attempt to gather military and other

information of value, mostly leveraging the network of the CIA (USA) and KGB (Soviet Union).

- (2) **Nuclear Arms Race.** Both super powers were locked in competition over development of all forms of nuclear weapons for strategic and tactical purposes.
- (3) **Space Race.** Both sides competed against each other to explore inner space. The Soviet Union started the 'race' by sending the first ever satellite, 'Sputnik' into the orbit.
- (4) **Media Propaganda.** Both sides portrayed each other's government and social living order as inferior, evil and a great injustice to mankind through propaganda, using the print and electronic media.
- (5) **Proxy Wars.** On a very violent side, the United States and the Soviet Union indirectly engaged in wars overseas through third party or 'proxies', including support to state and non-state actors in these overseas territories.

37. The United States and Soviet Union fulfilled the super power criteria in the following ways:-

United States

Soviet Union

Political

- | | |
|--|--|
| <ul style="list-style-type: none"> • Strong Capitalist Federation • Permanent seat on UNSC • Two allies on UNSC • Strong ties with West Europe, Latin America, East Asia | <ul style="list-style-type: none"> • Strong Socialist State • Permanent seat on UNSC • Strong ties with East Europe, anti-colonial movements, some countries in Latin America, South East Asia and Africa |
|--|--|

Geographic

The fourth largest country in the world with an area of 9.37 million square kilometers.

The largest country in the world with surface area of 22.27 million square kilometers

Cultural

Wielded influence through sponsoring right-wing republics or dictatorships, capitalist democracies, and numerous democratic organizations around the world.

Wielded influence through Communist dictatorship, and numerous socialist organizations around the world

Military

- Essentially naval-based advanced military with the highest military expenditure in the world and the world's largest navy.
- The largest nuclear arsenal in the world during the first half of the Cold War.
- One of the largest armies in the world.
- One of the two largest and most advanced air forces in the world.
- Powerful military allies in Western Europe (NATO) with their own nuclear capabilities.
- The most powerful global intelligence network, the CIA.
- Essentially land-based: largest armed forces in the world and one of the two largest air forces in the world.
- One of the world's strongest 3 Navies.
- The world's largest stockpile of nuclear weapons for the second half of the Cold War.
- The founder of powerful Warsaw Pact countries in Eastern Europe.
- The strong global intelligence network, the KGB.

Economic

The largest economy in the world. The second largest economy in the world.

Demographic

Had a population of 248.7 million in 1990, at the time, the fourth largest population. Had a population of 286.7 million in 1990, at the time, the third largest population.

Cold War Era and Nuclear Strategy

38. Rivalry of the super powers had its foundation way back prior to the Second World War. Relations between the United States and the Soviet Union had been strained ever since the revolution of 1917 which first brought Communists to power in Russia, deepening with the Soviet Union's invasions of Poland, Finland and the Baltic Republics, and lingering through the Second World War. The failure of the United States and the Britain to confide in the Soviet Union regarding plans to drop atomic bombs in Japan, in anything but the vaguest terms, only heightened the extreme suspicions of the Soviets. Consequently, not only did the atomic bombings of Hiroshima and Nagasaki helped end the Second World War, but they equally played a role in setting the stage for the half-century of conflict between the Soviet Union and the United States, popularly known as the Cold War.

39. Nuclear weaponry and strategy for its employment evolved greatly with major impact on warfare during the Cold War period. This impact could be summed up in Churchill's words upon learning of the successful test of the atomic bomb in 1945: "*What was gunpowder? Trivial. What was electricity? Meaningless. This atomic bomb is the second coming in wrath.*"⁴⁶

40. Key concepts of the nuclear strategy during the period included:

⁴⁶ Freedman, Lawrence, *The Evolution of Nuclear Strategy* London: Palgrave Macmillan, 2003, 15.

- a. **Policy of Containment.** The actual origins of nuclear strategy lie in the growing Soviet threat to Western Europe, as a key component of the post World War-II East–West rivalry. The Containment, especially in preventing Soviet attack on Europe, became important, thus, enhancing the concept of nuclear deterrence. The Deterrence gained further prominence during the Korean War, when Eisenhower’s threat to use nuclear assets was rebuffed by strategists, on the basis of its mutually destructive effect. Thus, the Korean War became the first illustration of the new context of warfare – that any strategy for total annihilation of an opponent was excessively dangerous.
- b. **Massive Retaliation.** The Soviets in 1949 tested its first atomic bomb, drastically impacting the monopoly on nuclear weapons that the United States possessed. In the re-appraisal of American strategy that followed the Soviet test, it was generally presumed that the days in which the United States could rely on nuclear weapons for its strategic advantage were numbered. When the US Secretary of State Dulles in 1954 made a speech to the effect that in future the United States intended to deter aggression by depending “primarily upon a great capacity to retaliate, instantly, by means and at places of own choosing”, a policy that became known as “massive retaliation”,⁴⁷. The strategy was aimed at targeting an adversary’s political and economic assets, but its critics argued against the suicidal effects of the strategy. Strategists were, however, divided on utility of the strategy. Consequently, in search of the perfect strategy, both super powers became oblivious to the vulnerability of surprise attacks directed at the adversary’s nuclear arsenals, leading to Albert

⁴⁷ Freedman, Lawrence, “The First Two Generations of Nuclear Strategists” in *Makers of Modern Strategy: from Machiavelli to the Nuclear Age*, Peter Paret (ed) New Jersey: Princeton University Press, 1986. p.738.

Wohlstetter's theorization in 1950 of the concept of First Strike (directed towards the adversary's means of retaliation) and Second Strike (ability to absorb a first strike and still inflict a devastating retaliation on the adversary's, capabilities)⁴⁸, which became the dominant nuclear strategy that has endured into the 21st Century.

- c. **Limited Nuclear War.** The Limited Nuclear War concept was theorized by Andre Beaufre, with the aim of making nuclear war fightable and reducing the risk of escalation.⁴⁹ This sub-limited nuclear war theory highlighted a requirement for use of small number of nuclear weapons, with the intention of persuading the Soviet Union that the United States and its NATO allies were prepared to take the nuclear decision, and as such, both sides should stay out of any forms of conventional conflicts, either directly or through proxies, implying that conventional forces had to be prepared for nuclear weapons' offensive and defensive use. This strategy became 'centre stage' in subsequent wars, including Arab-Israeli and the Indo-Pakistani Wars.
- d. **Flexible Response.** The Flexible Response concept was based on 'Graduated Deterrence', requiring that nuclear aggression should be held back by conventional means. In the event of failure, there would be recourse to tactical nuclear weapons, which could be accurately targeted through cruise missiles. If this equally failed, further graduation with recourse to use of strategic assets would be made. This three-stage process included 'Direct Defence', 'Deliberate Escalation' and General Nuclear Response.
- e. **Mutually Assured Destruction.** The Mutually Assured Destruction (MAD) became a dominant

⁴⁸ Ibid. 751.

⁴⁹ Carver, Michael, "Conventional Warfare in the Nuclear Age" in *Makers of Modern Strategy: from Machiavelli to the Nuclear Age*, Peter Paret (ed) (New Jersey: Princeton University Press, 1986). 784-785.

strategic doctrine, emphasizing that nuclear war could best be prevented, if neither side could expect to survive a full scale nuclear exchange with unacceptable damage, defined as the loss of up to 33% of population and 75% of industrial capacity. Thus, the policy of ‘Assured Destruction’, advocated by McNamara during the 1960s, required a survivable nuclear force with credible second strike capability.

- f. **Herman Kahn’s Concept of Escalation Dominance.** Somewhat similar to ‘Flexible Response’ is the concept of ‘Escalation Dominance’, which identified thresholds for restraints on nuclear employment based on a 44-rung ‘Escalation Ladder’. The main theme centres around conduct of nuclear conflict in a controlled manner. Briefly, the 44-rungs of the ladder are as highlighted below:⁵⁰

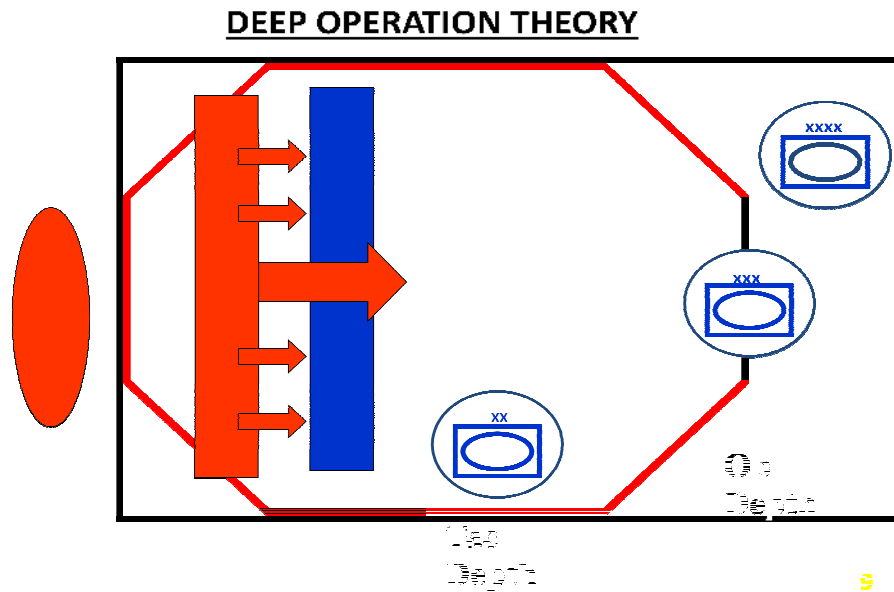
Aftermath	
Ladders 39 – 44	Civilian Central Wars
City Targeting Threshold	
Ladders 32 – 38	Military Central Wars
Central War Threshold	
Ladders 26 – 31	Exemplary Central Attacks
Central Sanctuary Threshold	
Ladders 21 – 25	Bizarre Crisis
No Nuclear Use Threshold	
Ladders 10 – 20	Intense Crisis
Nuclear War is Unthinkable Threshold	
Ladders 4 – 9	Traditional Crisis
Don’t Rock the Boat Threshold	
Ladders 1 – 3	Sub-crisis Manoeuvring
Disagreement (Cold War)	

⁵⁰ Rummel, RJ, ‘*Understanding Conflict and War*’ (California: Sage Publications, 1979), p.114.

- g. **Countervailing Strategy.** This was developed by the United States in 1980, under the guidance of Secretary of Defence Gerald Brown, as follow-on to earlier escalation and graduated concepts. The strategy was based upon United States capacity to respond effectively at every level, in a situation where the Soviet Union moved up the escalation ladder.
- h. **Prevailing Strategies.** The fear of failure of nuclear deterrence resulted in conversion of the countervailing strategy into prevailing strategies, through introduction of improvements in the entire range of nuclear capabilities. One of these was the Strategic Defence Initiative or Star Wars Concept, which was aimed at escaping from MAD, but it never really got off the drawing board, due to prevailing political and technical challenges.

Conventional Wars

41. The evolution of operational thought in the realm of conventional warfare progressed rather slowly after 1945, with the Korean, Vietnam, Arab-Israeli and Falklands conflicts failing to spur revolutionary changes in the operational art. The Arab-Israel War of 1973, the most modern war of its kind at the time, led to debates concerning the relative merits of armour and anti tank missiles, airpower and anti aircraft defences, attack and defence, and quality versus quantity. Subsequently, incited by failure in Vietnam, which was blamed on US strategy of attrition, the 1980s saw a revival in the conventional warfare theory, centering on such ideas as 'manoeuvre warfare' and 'Air-Land Battle'. Before discussing these concepts, it is important to touch upon two important post-World War-II conventional contributions to Continental military thought that impacted these later theories, namely the *Deep Operations Theory* and *Concept of Desert*.



42. **Deep Operations Theory.** This theory was a follow-on to the Russian deep battle theory, developed during the inter-war years. Deep Operations envisaged breaking of the enemy's forward defences for fresh uncommitted mobile operational reserves to exploit the enemy's strategic depth, with the objective of inflicting a decisive strategic defeat and rendering defence of the front more difficult or impossible. The basics of the theory showed little change in the post war period until 1960s with the introduction of nuclear dimension. Introduction of the BMP-I IFV further impacted on deep operations, with its potential for use of light armoured forces at operational level. It led to the resurgence of the 'slashing attack', as an alternative to heavy break in. The slashing attack was to go in through a gap or enemy boundary and, then, turn in diagonally i.e. along the rear boundary of the defending division or corps. The tactical turning movement, coupled with flank screening, was supposed to open a corridor for the mobile forces.

43. **Concept of Desanty.** The Soviet Concept of 'Desanty' envisaged the induction of forces into enemy territory in any direction other than the shortest straight line, drawn from its point of departure. Operationally and strategically, it extended on one hand to major airborne/amphibious operations and on the other to

the insertion of agents or special force detachments. The concept of the Desanty has been fundamental to deep operation theory and modern manoeuvre theory.

44. **Concept of Manoeuvre Warfare on Operational Art.**

Inspired by Tukhachevskii, the concept was theorized by Richard Simpkin, and thrives on a combination of attrition and manoeuvre warfare. The Concept requires that the enemy be confronted with a holding force, with the tasks of clearing a passage through the tactical depth of the defence, for the passage of mobile forces, and drawing the enemy forward. Sequentially, a mobile force would develop a manoeuvre in the rear to cut off the lines of communications. Such a manoeuvre would have an effect to achieve a turning movement or leverage, with such leverage, dependent upon speed and tempo of operations. To achieve maximum leverage a holding force should have a velocity twice as that of enemy and a mobile force four times that of the enemy.

45. **Evolution of Air-Land Battle.** Prior to 1976, NATO doctrine was based on fighting a delaying battle in the case of Soviet attack, with main reliance upon nuclear weapons. This doctrine was replaced by 'Active Defence' in 1976, which called for deepening the battlefield, striking not only at the first echelon of enemy force but using high-tech weapons with longer ranges against the next echelon of follow up troops. Key criticism of the concept included failure to tackle third or fourth echelon forces, over reliance on fire power and neglect of manoeuvre. To overcome these deficiencies, the concept of 'air-land battle' was theorized by Starry and Morelli, requiring interdiction of rear echelon of enemy forces in order to minimize support to invading forces. To implement this concept, the US Army developed the so-called 'concept-based requirement' weapon systems including Abrams, Apaches, Black Hawks, Patriot and Multiple-Launch Rocket Systems, (MLRS). This invariably re-opens the debate regarding the claim that technology has been antecedent to theory. Whereas, both claims are supported by precedence, a superior theory should dictate technology and harness the available resources.

46. **Asymmetric Warfare.** Some military thinkers argue that nuclear weapons have rendered conventional warfare on land inconsequential and that the only forces against which these weapons cannot be used are non-state actors, including trans-national groups. While various conventional wars, in the wake of this strategic thinking, tend to nullify the claim, the growing incidence of asymmetric warfare, as evidenced by the facts shown as under, is an indication of the nature and direction of modern warfare:-

Serial	Period	Number of Asymmetric Conflicts
a.	1800 – 1849	34
b.	1850 – 1899	69
c.	1900 – 1949	31
d.	1950 - 1988	36

47. The asymmetric strategy was effectively used by the Mujahideen against Soviet forces in Afghanistan and by Palestinian forces against Israel, during the intervening periods between Arab-Israeli wars.

48. **People's War Concept.** The concept of People's War introduced by China, relies upon masses to undertake a war, employing guerrilla tactics. The People's Liberation Army of China (PLA) still relies on People's War and has tailored its strategy according to the needs of modern warfare. The PLA, therefore, streamlines its armed forces structure into three formations:

- a. Troops in small number, but outfitted with high-tech weapons that are deployed with greater mobility to respond to regional contingencies.
- b. Troops in large number but outfitted with mid-level to low-tech weapons, mainly to uphold internal stability.
- c. Moderate amount of nuclear arsenal to provide proper deterrence against other countries with nuclear weapons.

PART-IV**COALITION WARS AND FUTURE OF CONTINENTAL
MILITARY THOUGHT**

49. **General.** After seeing the evolution of Continental Military Thought during Cold War period, let us now analyze how recent coalition operations against smaller states have impacted the future of land warfare. The First Gulf War, NATO's actions in former Yugoslavia, invasion of Afghanistan and Iraq emerge as examples of coalition wars against smaller states. The outcomes of these wars signify changing trends that have prompted immense debate over the future of continental military thought. These evolving trends will inevitably affect Pakistan too, due to her legacy of external intimidations, internal frictions and territorial disputes. It is, therefore, important to understand the evolving trends of warfare of the past two decades and its impact on continental military thought. This part will have a look at the evolution of military thought in significant wars of last two decades and project the future of Continental strategy with its implications for Pakistan.

Short Coalition Wars (Gulf War, Bosnia)

50. **Gulf War.** Gulf War showed that many of the changes in Western military forces that originally took place because of the Cold War had great strategic value. These changes include emphasis on combat readiness, high technology, manoeuver, air mobility, night warfare, C4I, space and Battle Management systems. The important imprints of Gulf War on the Continental strategy were as follows⁵¹:-

- a. Of 38 nations that formed the coalition, the US possessed the ability to project power in terms of overall technology, sustainability, air power, sea

⁵¹ Centre for Strategic and International Studies. *The Lessons of Modern War - Volume IV - The Gulf War - Chapter Twelve: Strategic Lessons of the Conflict*, Available from : <http://csis.org/publication/lessons-modern-war-volume-iv-gulf-war-chapter-twelve-strategic-lessons-conflict>

- power and armour in order to achieve quick and decisive victory.
- b. Any military force that can make major advances in tactics, training and technologies, which can conduct joint operations, deploy superior C4I and Battle Management capabilities, it can also fight at superior tempos, having an overwhelming advantage.
 - c. As a result of effects-based air campaign that lasted five weeks, it took fourteen coalition divisions four days to push back thirty five Iraqi divisions out of Kuwait and up to Euphrates River inside Iraq⁵².
 - d. By avoiding collateral damage, they favourably impacted the ground manoeuver.
 - e. The value of force structures and weapons systems in developing countries and their ability to engage developed states in mid to high intensity conflict became questionable.
 - f. The Revolution in Military Affairs (RMA) proved instrumental in success of Gulf War and had a profound impact on Continental strategy, leading to development of Net Centric Warfare (NCW).
 - g. Urban warfare and counter terrorism emerged as weaknesses of Western land forces, needing attention in land warfare.
51. **Bosnia.** The Balkan crisis began in 1991 and after hectic diplomatic activity by UN, led to the deployment of 60,000 strong NATO - led thirty-six nations force, called Implementation Force or IFOR, beginning on 16 December 1995. The operation, codenamed '*Joint Endeavour*', was mandated under United Nations Security Council Resolution No.1031 to implement the military aspects of Dayton Peace Agreement of 21 November 1995, the other two aspects being civil tasks and donor conferences. However, NATO was committed in former Yugoslavia since June 1992, supporting

⁵² Watson, B.W. Ed, *Military Lessons of the Gulf War*, (Services Book Club, 1992), 61-120.

the UN Protection Force (UNPROFOR) peacekeeping operations⁵³. Some of the important influences of NATO / UN peacekeeping operations⁵⁴ in Bosnia on Continental thought can be summarized as follows:-

- a. Blunt force of military formations gave way to soft power of politics, economics, psychology and morality, supported by information operations, careful intelligence and surgical precision at the more direct military or police level, which was new to continental military thought.
- b. Complex, politically dominated, multi-dimensional, multi-organizational, multi-national, and multi-cultural peace and stability operations emerged, as post Cold War strategic scenarios, which placed new demands on land forces.
- c. Notions such as 'enemy', 'war', and 'victory', as expounded in continental strategy needed reconsideration for intra-state conflicts.
- d. Strategic and political implications of tactical actions became significant due to the 'media gaze'.
- e. Force protection took a higher degree of importance than the other battlefield dynamics of fire power, leadership and manoeuver, and often stifled the flexibility of the operational commander, which was divergent from continental strategy of the time.
- f. In coalition wars, only a single politico-military campaign plan could overcome problems of competing interests, a requirement in consonance with continental strategy.
- g. Three years of effective sanctions, followed by a diplomatic peace accord backed by deterrence, led to unhindered deployment of coalition forces in Bosnia, compelling the enemy to obedience.

⁵³ Wentz, L. Ed, *'Lessons from Bosnia'*, (Institute for National Strategic Studies, NDU USA, 1997), 3, 25, 475.

⁵⁴ Manwaring, M.G. *'Peace and Stability Lessons from Bosnia'*, (Parameters, Winter 1998)

- h. Key role of civil military cooperation cadre in facilitating civic amenities, power supplies, displaced persons, legal and property rights etc, was an impact alien to continental strategy.

Ongoing Coalition Operations (Iraq and Afghanistan)

52. The strategic calculus in Iraq and Afghanistan has brought about significant change in the way land warfare is being prosecuted today. The RMA dominated Continental strategy of the Gulf War has transformed into COIN driven operations in Afghanistan and Iraq. The major impacts on Continental strategy of the ongoing coalition operations can be summarized as following:-

- a. Twelve years of containment of Iraq (1991-2003) through strategies of air power and maritime coercion, only aggravated the situation, which was ultimately resolved by recourse to Continental strategy.
- b. US failure to think through the entire campaign in Iraq undermined the initial brilliance of Continental strategy that brought down Saddam's government in forty days.
- c. The coalition enemies in Iraq and Afghanistan were much more swift to competitively adopt revolutionary strategy to offset the disadvantage imposed on them by the coalition's Continental strategy, hence, the emergence of NSAs and insurgencies.
- d. The belligerents manipulate violence in a manner that its pervasive or selective use regulates opposing strategies in the revolutionary and Continental domains of strategic thought.
- e. Since most of this violence has occurred on land and in the minds, control of this violence and the minds, both, require control of the ground, in the realm of land power.
- f. The virtues of information age vis-a-vis mass communication, diminishing geography and power

of media have become essential strategic tools of the state and non-state actors, alike.

- g. Two important COIN schools of thought have emerged in Continental military thinking⁵⁵. Both accept centrality of affected population in COIN operations. The neo-classical or post Maoist school professes the ongoing irregular war in Afghanistan and Iraq as localized insurgency, needing a military-strategic dominated response. The global insurgency school advocates a radical Islamist agenda, pervasive in a 4th generation war, needing a political dominated response.
- h. Transformed character of warfare, as manifested in Iraq and Afghanistan, has put modification of land forces on the forefront.
- i. Unlike the experience gained in the Balkans, insurgent defiance in Afghanistan and Iraq has put a premium on ‘cultural resilience’.
- j. The ‘end of geography’ concept advocates that technological innovation has overcome the constraints of physical terrain and territorial power, hence, signaling a decline of land power. However, events have proved that technological improvement is only an enabler and the timeless challenge of battling the traditional factors of war will persist, expecting adaptation from land warfare.

Future of Warfare and its Impact on Continental Strategy

53. “But in war more than in any other subject, we must begin by looking at the nature of the whole; for here more than elsewhere the part and the whole must always be thought of together.”⁵⁶

⁵⁵ Jones M.D. and Smith M.L.R. ‘*Whose Hearts and Whose Minds? The Curious Case of Global Counter-Insurgency*’. *The Journal of Strategic Studies* Vol. 33, No. 1, 81–121, February 2010.

⁵⁶ Clausewitz, Carl von, ‘*On War*’, Michael Howard and Peter Paret, ed. And trans. (Princeton, N.J. Princeton University Press, 1976), 75

54. As we begin by taking a holistic account of war, it becomes evident that a mix of continuities and changes will characterize warfare in future. The questions; why, when, with whom and where wars will occur? How and with what will they be waged and what will be their outcomes? Difficult questions indeed! But as defence planners, we need to do some guess work, in order to make sensible strategic choices for meeting the security challenges of tomorrow. Colin Gray, the renowned scholar of war, describes future of warfare and strategy through nine arguments, out of which five are more pertinent⁵⁷:

- a. **Nature and Character of War.** War has a constant nature, but an ever-changing character. According to Clausewitz, “all wars are things of the same nature”. If one believes that different wars are examples of different types of political and social behaviour, it would be a serious error in differentiating the continuity from the obvious changes that have occurred over time. Air power has altered the conduct of warfare phenomenally, but in a hundred years it has not changed the nature of war or warfare. Even the advent of nuclear weapons has not changed the nature of warfare, though it has affected it much more fundamentally than missiles or air power.
- b. **Styles of War.** Every war is distinctive and typically waged in several styles. Most wars contain variants of regular and irregular styles in combat. While technologies and tactics change, the strategy options for style or type are relatively unchanging over the centuries. Hence, the perennial relevance of scholars like Sun Tzu.
- c. **Contexts of War.** For holistic understanding, war can be explained with reference to seven contexts; political, socio-cultural, economic, technological,

⁵⁷ Gray, C.S. ‘War – Continuity in Change, and Change in Continuity’, Parameters Summer 2010.

military-strategic, geographical, geo-political and historical.

- d. **Universal and Eternal Possibility of War.** Thucydides' general explanation of the principal motives in statecraft for war, i.e. 'fear, honour and interest', are as relevant in 21st Century as they were some 2400 years ago, since nature of human society has not changed just like the nature of war.
 - e. **Primacy of General Theory of Strategy.** The general theory of strategy, according to Clausewitz, does not specify what to do, but it does advise on how to think about what to do. It so educates strategists that they are intellectually enabled to invent, design and execute historically specific strategies that may succeed. For example, there is a general theory of Airpower, while many airpower strategies like Strategic Paralysis, Coercive Airpower, Effects Based Operations, etc, evolved over time in history in different contexts. Similarly, the Continental military thought, as expounded by Clausewitz and Mackinder, has seen many strategic developments, like operational art, joint warfare, power projection, COIN, information warfare and rise of NSAs etc.
55. The following are significant changes in the character of war that can be predicted for the future and their effects on theory of continental strategy:-
- a. With the primacy of cyber power in creation of wealth and functioning of the armed forces, all future wars will have integral cyber warfare, meaning disruptive communications in joint operations and increased isolation of land forces.
 - b. The maturing of orbital space capabilities for science, commerce and military power, points towards inevitability of space warfare, in conjunction with cyber warfare in future, which entails difficulty in concealing and regulating strategic assemblies.

- c. The rise of global electronic media with real-time access to events, will put increased premium on perception management and moral ascendancy that will endear population centric themes of COIN rather than the no-holds-barred.
- d. The computer based, IT-led RMA does not mean US military hegemony for strategic and political challenges. Rather, strategic ramifications of this RMA include dissemination of relatively high-tech weaponry and support equipment to non-state and weak state belligerents, making the job of land power more difficult.
- e. Irregular style of warfare with prominence of NSAs, illegitimacy of states, counter-insurgencies and cultural fault lines, which is predominant today, is the 4th Generation War. The first three generations being orderly armies from 1648 to 1860, the second of 'firepower and attrition' upto the first world war and third was the manoeuvre warfare, characterized by speed, surprise, initiative and dislocation.
- f. Belligerents, when out-gunned, will resort to outwit by seeking strategic compensation through asymmetry like sensible combatants looking for a winning edge to offset their deficiencies. Adaptive, competitive Continental strategies will be needed to match the strategic advantage being sought by the chameleon-like enemy.
- g. The notion of victory in 4th Generation War will be complex. It will be hinged upon public perception. The state and non-state forces will strongly contest winning of the hearts and minds through superior narratives and counter narratives. Reconstruction, rehabilitation and security without provocation, of insurgency-hit areas, will be the new concept of state actors to defeat insurgents.

- h. Such requirements of 4th Generation Warfare will put increasing demand on military operations being conducted from within the populations, without alienating them by the overbearing dominance of mean looking protection vehicles and UCAVs. Hence the need for more foot infantry; lightly equipped, trained in cultural nuances and capable to act responsibly in the 'strategic corporal', role with minimum guidance and interference.
- i. This concept in 4th Generation Warfare has come about as a consequence of the experiences of Afghanistan, where inherent abhorrence to foreign occupation exacerbated by the intimidating posture of Allied forces, led to failure in garnering popular support against Taliban. Hence, the need of intermingling with the terrorism affected population to win their confidence by balancing the risk between lowering the guard of security forces and bringing them closer to the people, whom they are supposed to secure.
- j. Inter-state warfare will continue, given the Thucydides realism of 'fear, honour and interest', but it will be waged in completely different tactical scenario because new technologies like stealth, precision and information dominance will wipe out any enemy asset, which can be located. Continental military thought is already evolving to offset these disadvantages.
- k. Irregular warfare has propagated the concept of 'mastery of violence'. For example, French Armed Forces are restructuring to prevent, contain and strictly control the escalation of violence in a manner that includes from the very beginning a totality of political, diplomatic, humanitarian and media actions, most of which will be translated through land power.

- l. The evolving military thoughts have affected the countries' military systems. The US, once advocating full scale RMA⁵⁸ and EBO⁵⁹, is now focusing on COIN⁶⁰ and its derivatives.
- m. The American military is re-discovering the fact that the dichotomy between war-fighting and nation-building is a false one – the two are different sides of the same coin, particularly in counter-insurgency, where 'you don't outfight the insurgent, you out-govern him'⁶¹.
- n. Similarly, NATO's strategic concept is also looking at leaner, integrative and adaptable forces. China adheres to taking the Scientific Outlook on Development, as an important guiding principle for national defense and armed forces building⁶².
- o. Countries are building military systems within economic constraints, with the premise that scaling down for a lower shade of conflict is possible, if the force is structured for meeting challenges across the continuum of conflict from full-scale war to nation building.
- p. Population aging, competing requirements for funds and increased threats to economic and security interests of the advanced nations will strain their military planning⁶³. The aging population and increased instances of land power projection will

⁵⁸ Vego, M. 'Is the Conduct of War a Business?' *Joint Forces Quarterly*, 4th Quarter 2010, Issue 59. 58-60

⁵⁹ Cheek, G. Colonel. *Effects Based Operations and Dominant Maneuver*. Available at: www.au.af.mil/au/awc/awcgate/army-usawc/ebo_cheek.pdf

⁶⁰ Thinking Critically about COIN and Creatively about Strategy and War: An Interview with Colonel Gian Gentile. Available at: smallwarsjournal.com/blog/journal/docs-temp/625-manea.pdf.

⁶¹ Betz, D. *Redesigning Land Forces for Wars Amongst the People*. Contemporary Security Policy, 2007

⁶² *China's National Defence in 2008*, Information Office of the State Council of the People's Republic of China, January 2009, Beijing. Available at : http://merln.ndu.edu/whitepapers/China_English2008.pdf

⁶³ Ghosh, C.N. *Tomorrow's War, 21st Century Defence Strategies*. MANAS Publications, 2007, 33.

- especially affect Continental strategy, being manpower intensive.
- q. Indian military thought, being predominantly Continental, would continue its land forces development in a joint and irregular warfare scenario, to meet the full spectrum of threat.
 - r. Capability of sea forces to project their power 'forward from the sea', by virtue of four modern attributes, namely, aircraft carriers, precision missiles, long range guns and marine forces have impacted the Continental strategy in a unique way.
 - s. The wars may be in littorals (Bosnia and Iraq) or hinterland (Afghanistan); it may be regular (Gulf War) or irregular (Afghanistan and Iraq), the influence of seapower, especially the role of marines in projecting power from the sea on the land, has figured out prominently in modern war fighting concepts.
 - t. Currently, there is a debate going on in the US military circles about the viability of this concept in irregular wars and interrelated questions about the size and future requirements of the largest 'forward from the sea' force, i.e. the US Marine Corps.

Pakistan and Future of Continental Military Thought

56. Owing to legacy of Indian coercion, lingering disputes, territorial sensitivities, internal vulnerabilities and restricted defence budgets, Pakistan's military strategy has witnessed a propensity towards Continental school of strategy. The evolving nature of war, as it is affecting us, points towards some relevant thoughts:-

- a. Irregular warfare is putting more strain on combat land forces and their intrinsic force multipliers. An adaptive and competitive strategic advantage for COIN will remain a cyclical requirement.

- b. Deterrence by nuclear and conventional forces will have to be adroitly balanced in land, air and maritime domains against 'superiority in numbers', to rebuff space for war to India.
- c. Failed deterrence may result in a short and swift continental campaign, directly supported by air and indirectly through sea, but shrouded in ambiguity and nuclear overhang.
- d. Transparency, intensity, net-centricity, dominating firepower and high-tech air warfare will accentuate difficulties of battles, manoeuvres and logistics.
- e. Redress of these continental vulnerabilities in a regular war will only be possible through increased joint and net-centric response.
- f. In view of these thoughts, the developmental challenge lies in utilizing strategic deterrence to avoid an arms race, while skillfully balancing military capabilities to meet the perceived threat spectrum.

Conclusion

57. To end this paper, a quote from Andre Beaufre is offered: "*Preparation is now of more consequence than execution.* In other words, it is useless to spend millions on a defence system, the future effectiveness of which is doubtful, whereas, it is essential to be *well informed* and to *exercise foresight*. These two requirements imply that emphasis and expenditure today should be concentrated upon the creation of highly effective intelligence and research organizations. It is through them that it will be possible to follow developments and to control the process of evolution of force by fully thought-out decisions arrived at in good time (emphasis original).⁶⁴"

⁶⁴ Beaufre, A. *Ibid*, 45-46.

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PART-I

EVOLUTION OF AIR POWER

“In the air all directions lead everywhere”

H. G. Wells, The War in the Air (1908)

Introduction

1. Man has always accorded to his greatest gods the ability to exercise their will through the medium of air. Early chronicles show that man aspired to fly. The winged gods in the ancient legends were a romantic projection of flight, as demonstrated daily in nature by most birds and some insects. However, man remained earth-bound. By the early 19th Century, hot air balloons provided him with relatively uncontrolled means of aerial navigation. Eventually man began his successful conquest of air with the airplane and power balloons, though the pace of progress in aeronautics was greatly prodded by bloody conflicts between nations. Within the memory of living men, the power of nations to exploit the science of flight has emerged as a dominating influence upon the affairs of mankind. Something entirely new and of central importance has been added to human history. There is no end to this development in sight. Progress in aerospace technology spurts on.

Aim

2. To understand the evolution and impact of air power on contemporary military theories and the manner in which air power and its employment became a dominant factor in all future wars, with a view to drawing lessons for own military strategy/doctrines, focussing on the air strategy.

Evolution and Employment of Air Power

Scope

3. In order to introduce the impact of air power in the entire spectrum of wars, members are required to bring out the following aspects during their presentation by highlighting the evolution and employment of air power:-

- a Propeller age.
- b. Jet age up to Cold War era.
- c Impact of precision weapons.
- d Post Cold War era, with special reference to effect-based operation
- e. Impact of Technology and future trends, enhancing air power / aerospace power employment.
- f. Employment option for a small tactical air force.

The Genesis of Air Power

4. One of the greatest foreseers of the ultimate role of aviation in the life of nations was a Jesuit priest of the seventeenth century, Francesco de Lana-Terze. He wrote in vivid detail about the military use of aircrafts to transport troops by air and for the bombing of cities, fortresses and ships. Lana declared: “God would not suffer such an invention to take effect, by reason of the disturbance it could cause to civil government of men. For who sees not that no city can be secure against attack”. Some 265 years later, but only 32 years after an aeroplane was first flown by Orville and Wilbur Wright, the Prime Minister of Britain expressed sentiments identical to those of Lana’s. In March 1935, when the Fuhrer of Nazi Germany claimed destructive parity in the air with Britain, Stanley Baldwin said “I wish for many reasons flying had never been invented ... somehow we have got to Christianize it”.

5. Prior to World War-I, prophetic opinions about aviation and its future did not influence much the major defence policies of governments. In the beginning fragile aeroplane and lighter than air, ships were primarily the play thing of devoted mechanics and wealthy sportsmen. When Santos-Dumont became the first to get off the soil of Europe, in a heavier than aircraft, in the fall of 1906, it was the Britain press magnate, Lord Northcliffe, who fumed: “the news is not that man can fly, but that England is no longer an island”. H.G. Wells in his book, ‘*The War in the Air (1908)*’ foresaw that the air power of nations would revolutionize the conduct, as well as the social consequence of war. Wells considered air war to be a universal guerrilla war, a war inextricably involving civilians and homes and all apparatus of social life. In another book ‘*The World Set Free (1914)*’, Wells even foretold that the power of the nation to use the air would be raised to decisive military role by an atomic bomb.

6. It was also in 1909 that an obscure Major in the Italian Army, Giulio Douhet, for the first time wrote about the forthcoming changes in warfare. He said:

“it must seem strange that the sky too, is about to become another battlefield, no less important than the battlefields of land and sea. But for now on, we had better get accustomed to this idea and prepare ourselves for the new conflict to come... The struggle for the command of the air will be bitter; and so called civilized nations will strive to forge the most telling means to wage the conflict.”

A decade later, Douhet’s theories based upon his reading of the lesson of World War-I provoked considerable debate.

Aviation at the Start of the First World War

7. On the eve of the World War-I, no country was prepared for using an aircraft as a weapon of war. Several countries had experimented with dropping bombs from aircraft, firing guns, and taking off and landing from aircraft carriers, but no country had designed or built an aircraft specifically for war functions. Except a few bombing operations before 1914, most people thought that use of aircraft was limited to reconnaissance or scouting missions. In April 1909, the newly formed Italian aviation club, Club Aviatori, brought Wilbur Wright to Italy to demonstrate his Military Flyer. In 1910, Italy set up its first military flying school at Centocelle.

8. At the start of the Turko-Italian War in 1911, Italy mobilized its Italian Aviation Battalion and aircrafts to Tripoli in Libya, at that time part of the Ottoman Empire. On November 1, Second Lieutenant Giulio Gavotti carried out the first aerial bombardment mission, dropping four bombs on two Turkish-held oases, marking the first true military use of an aircraft.

9. At the same time, other European countries had begun developing military aviation. The French Army bought its first planes in 1910 and began to install armament in its reconnaissance aircrafts in 1911. In Russia, Igor Sikorsky built the first four-engine plane 'air giant', that was the forerunner of the multi-engine strategic bombers of World War-I. The French military began experimenting with aerial bombing in 1912, as did the British in 1913. The United States had also experimented, on a limited basis, with military operations in aircrafts in June 1910.

10. The Great Britain formed the Royal Flying Corps in 1912 and Royal Naval Air Service in 1914. The United States established the Aeronautical Division of the U.S. Army Signal Corps in 1907 and

created the Aviation Section of the Signal Corps in July 1914. The U.S. government generally lagged behind its European counterparts in these efforts and was much late in supporting aviation than the Europeans did.

Aerial Reconnaissance in World War-I

11. The French had first used balloons for reconnaissance during the Napoleonic Wars and later in the Franco-Prussian War. From the first days of World War-I, the airplane demonstrated its ability to be the 'eyes of the army'. As the British Expeditionary Force (BEF) retreated from German invaders in France, roughly two-dozen reconnaissance airplanes of RAF watched from above.

Bombing During World War-I

12. The concept of the bomber aircraft pre-dated the rise of fighter aircraft by several years. Before the outbreak of World War-I in 1914, the French, the Germans, the Russians, and the Austro-Hungarians were developing aircrafts, specifically designed to carry and release bombs on targets. The Great Britain experimented with dropping bombs from aircrafts before the War as well. In addition, the Central Powers built a fearsome bombing force around Zeppelin Airships before 1914 and used them extensively, early in the War.

13. Both the camps used virtually all types of aircrafts, including observation and fighter planes, for bombing operations in World War-I. The first genuine bomber to be used in combat was the French 'Voisin' airplane, which bombed the Zeppelin hangers at Metz-Frascaty. The Imperial Russian Air Service followed the suit with Igor-I. Sikorsky's huge aircraft, the Ilya Mourometz. The Germans were the first to grasp the psychological implications of bombing civilian population. The Italian Caproni CA-2 had the range and reliability to cross the Alps and attack Austro-Hungary.

The British also built an effective bomber force early in the War, concentrating for night bombing of German U-boat bases, railway stations and industrial sites. But it was the German Gotha G.V. bomber that emerged as the most infamous bomber of World War I.

World War-I Aerial Combat

14. On April 1, 1915, a French pilot Roland Garros shot down a German Albatros airplane. Although this was not the first air-to-air kill, Garros' airplane, a Morane Parasol, was the first airplane that was modified specifically for the purpose of aerial combat. Replicating the Parasol, Anthony Fokker built the Fokker E-III Eindecker for the Germans, with a synchronized propeller system with machine gun. Soon after, the British debuted the Sopwith Strutter and the French introduced the Nieuport 17. Germany's loss at the Battle of the Somme proved the necessity to gain air superiority. The French returned to the Front, with the Spad XIII, a plane that became so popular that all the Allied forces flew them.

United States Participation in World War-I

15. The United States entered the first Great War three years after the war in Europe had begun, bringing in the fresh energy and troops. But the most glaring problem was that the United States lacked a good aircraft designer at par with Anthony Fokker or Louis Blériot. Under the leadership of Colonel Mitchell and with the assistance of squadrons from Allied nations, however, they were successful in helping to halt the German advance. In September 1918, Mitchell commanded 1,500 airplanes from all the Allied nations to form the greatest aerial force of the war.

Air Power Developments between the Wars

16. World War-I created a worldwide craze for races, trophies and records in aviation and pilots driving the civilian aviation

industry as well. Developments such as cantilevered wings, metal construction, variable-pitch propellers, retractable landing gear, engine cowls, de-icing systems, gun turrets, air-cooled engines, and bombsights were incorporated into warplane designs throughout the 1930s. New technological developments began to drastically change the appearance of the airplanes. By the mid-1930s, all-metal monoplanes began appearing. The British Hawker Hurricane and the Super Marine Spitfire, the German Messerschmitt ME.109 and JU-87 Junkers all famed their name in air power history throughout. The Polish built the PZL P-11 and Soviet's Polikarpov I-16 and in Asia, the Japanese quietly built up an air force to achieve the dream of an empire, featuring a long-range fighter like Mitsubishi Zero Fighter. The United States introduced the Martin B-10 bomber and Boeing B-17 Flying Fortress, which were destined to become the backbone of the U.S. strategic bombing campaign in the war. The Royal Air Force built a wide array of bombers like Avro Lancaster, the Wellington, the Stirling, and the Halifax. The Soviets built the heavy bomber, the Tupelov TB-3.

The Development of Naval Aviation

17. By the end of the 19th century, the world's navies had already experienced a century of rapid change with the introduction of steam power, ironclads and submarines. Yet the advent of air planes revolutionised sea power. The catapult system, sea planes, flying boats, rigid airships such as blimps and zeppelins changed the naval warfare for good. Billy Mitchell, performed a series of demonstrations to show how effective airplanes were against battleships. Billy Mitchell was staging bombing tests against naval targets to prove that aviation deserved a larger share of the military

budget, but his public crusading was doing more damage to the cause than further it.

Aerial Warfare and the Spanish Civil War

18. During the Inter-Wars period, air power mostly got the theoretical boost, but the Spanish Civil War provided many of the world powers including Germany, France and the Soviet Union invaluable combat experience, which they utilized during the Great War. The German Condor Legion honed and skilled the detailed air support procedure and divided into bomber, fighter, reconnaissance, seaplane, communication, medical, and anti-aircraft battalions, and also included an experimental flight group. The Condor Legion succeeded in evacuating the troops by air—something that had never been done before. U.S. General Hap Arnold later described the Legion's airlift as the most important air power development of the inter-Wars period.

Air Power Theories during Inter-War Period

19. During the inter-wars period, air power theorists like Giulio Douhet and William Billy Mitchell wanted to avoid the devastating trench warfare experienced in World War-I and envisioned the use of air power to achieve operational and strategic effects. Douhet in his book 'Command of Air' advocated creation of an independent air force, made up of fleet of bombers and battle planes. This bomber force would win command of air by attacking enemy aircrafts, factories and flying facilities and would destroy the enemy will to resist by bombing her population centers, thus, giving the concept of strategic bombing. Mitchell also believed in bombing to achieve the desired effect of breaking the enemy's will to fight. Unlike Douhet, he did not believe in bombing the population to achieve this, but identified the enemy's economy, industry transportation

and war-making potential to create paralyzing effect and break the enemy's will to fight. Marshal of the Royal Air Force Renchard's theories on airpower have had a lasting effect on airpower employment. The major premise of his theory was his belief that during war victory could be achieved by bombing enemy's vital centers and, thus, breaking the enemy's will to fight.

Air Power on the Eastern Front in World War-II

20. The war fought between Germany and the Soviet Union became the most dramatic and costly battle front of World War-II. Hitler envisioned an easy six-week campaign to conquer the Soviet Union. During Operation Barbarossa, the Luftwaffe employed four of its five air fleets, equipped with the most recent first-line aircrafts, and including updated Messerschmitt BF-109 F-2. The Soviets on the contrary, had also developed a strong aircraft industry. The MiG-3 high-altitude interceptor and Ilyushin Il-2 Shturmovik, a low-altitude attack aircraft, boasted of easy handling and powerful armament.

The Battle of Britain

21. The Battle of Britain is one of the most significant air battles ever fought. Starting on 10 July 1940 Luftwaffe attacked with almost 2,000 airplanes, the British shipping, airfields, radar stations and later British cities to achieve air superiority as a pre-condition to an amphibious landing on the island country. The RAF valiantly fought back with around 675 aircrafts and denied the German an invasion.

Air Power and World War-II in the Pacific

22. In the Pacific theatre, the only major air capable country was Japan, with a strong aviation industry and a capable naval aviation. The Japanese began the war with a concerted air attack on the US

Battle of Britain – 1940



naval port of Pearl Harbor, the Phillipines and other pacific installations. But Japan lacked the population, industrial base, and strategic vision to match the US might and fight a drawn-out war that the Pacific campaign became. The Pacific campaigns had become carrier-based, and a battleship without air cover was destined to be sunk. In the Battle of Midway, Japan lost most of its aircraft carriers only to air action. Although augmented by the nuclear bomb, industry and the code-breakers, the US Navy knew that air power had been instrumental in winning the Pacific Campaign. But the final attack was dropping of atomic bomb by the USA over two Japanese cities; Hiroshima and Nagashaki on 6 and 8 August 1945.

The German Air Strategy

23. As mentioned earlier, Hitler's Luftwaffe was conditioned as a tactical air force, to support the advances of the ground forces. The Luftwaffe was to act as one arm of the German Strategy called the Blitzkrieg (Lightening War). Blitzkrieg was envisaged as a smashing military assault to overwhelm an enemy in a single military action. The assault was delivered by land and air forces together. Using the Blitzkrieg, the Germans were able to defeat Poland and France in less than a month each and Belgium and Holland in less than a week. The Luftwaffe was used in these campaigns to achieve and maintain complete air superiority, so that the German land forces could advance without interference from the enemy air forces. The light and medium bombers employed by the Luftwaffe destroyed 333 Polish aircrafts on the ground in the first two days of the Polish campaign. During the offensive against France, 3000 German bombers attacked over 70 French airfields and other key installations in repeated raids. Consequently the

The German Air Strategy – Blitzkrieg (Lightening War)

Luftwaffe achieved complete air superiority within 10 days. Similar action was taken by the Luftwaffe at the start of Operation Barbarossa against Russia. 1000 German aircrafts attacked 66 Russian airfields and destroyed 1811 aircrafts on the first day, against the loss of only 32 German aircrafts.

24. After the successful invasion of the Western Europe, Hitler turned his attention towards the British Isles. He very correctly perceived that an assault on England could not be undertaken unless the German gained air superiority over the English Channel and the southern beaches of England. The invasion of England code-named 'Operation Sea Lion' had two distinct phases; the first of which was to achieve air supremacy. This phase commenced on 10 July 1940, with the Luftwaffe attacking British ships in order to bait the RAF aircraft into aerial battles. By the third week of August, the Luftwaffe was able to destroy 1115 RAF aircrafts against a loss of 467 German aircrafts. As a next step to achieve air supremacy, the Luftwaffe concentrated on attacking RAF fighter command airfields and command and control stations, which were located on the airfields. The Luftwaffe was quite successful in achieving its aim and the RAF was close to being defeated. However, during this time, a lost Luftwaffe pilot struck the city of London on August 25, 1940. The British sent a retaliatory bombing strike to Berlin the next night. As a reaction to these attacks, Hitler ordered the Luftwaffe to attack London and other cities with repeated strikes, despite the advice of Goering to continue with the destruction of RAF. The result was that the RAF got a respite from the Luftwaffe attacks and were able to re-group. This turned the tables on the Luftwaffe, after which they were not able to achieve the air superiority required for the invasion of Britain. The switching of objectives before the aims

of the first campaign were achieved, lost the battle of Britain for the Luftwaffe. The Germans were never able to achieve air superiority after that and the invasion plans were abandoned. The Luftwaffe continued to bomb civilian targets in English cities till May 1941, when Hitler shifted his attention to Russia. However, these raids did not break the morale of the civilian population, as some early theorists like Douhet had predicted.

Allied Air Strategy

25. The planners of the Allied air forces believed that the enemy could be broken by destruction of its war-making potential and the morale of its people. The allied air strategy was as follows:-

- (a) Progressive destruction of German war-making potential.
- (b) Demoralization of Germans.

26. Right from the start of the war, the British initiated a strategic bombing campaign against Germany. Initially, the RAF Bomber Command attempted daylight strikes against the Reich, but in the absence of a long-range escort fighter aircrafts, those strikes proved disastrous and the British soon turned to night attacks on urban centres. Throughout 1940 and 1941, the RAF continued to build up its small bomber force. In 1942, the British Air Marshal Sir Arthur 'Bomber' Harris was named as the commander of Bomber Command and he immediately began rallying for a larger bombing force and a more intense and aggressive campaign against the German industrial capacity. Consequently, in May 1942, the bomber command conducted the first of many 'thousand bomber raids' against the German military, industrial and civilian targets. The British bomber raids were conducted at night to minimize aircraft losses, but the accuracy of the nocturnal strikes left much to be

desired. Bomber Command was forced to carpet-bomb urban areas, a strategy that razed parts of German cities but did not effectively target Hitler's industrial complexes. There was minimal effect on the German morale too.

27. During the summer of 1942, the US Army Air Forces reached England to assist in the war. The integration of American and British bombing strategies was formalized in January 1943 at the Casablanca Conference to create the Combined Bomber Offensive, which was later called 'Operation Point-Blank'. The British thus would undertake bombing missions at night and the US during the day time. However, in the absence of a long range escort aircraft the bombing formations took very heavy losses at the hands of the Luftwaffe and German anti-aircraft artillery. On 14 October 1943, the air war over Europe reached a critical turning point. On that day, the US 8th Air Force mounted mission Number-115 against the city of Schweinfurt, the centre of German ball bearing industry. In all 291 B-17 bombers took part in the raid. However, only 197 aircrafts returned to England, due to the heavy toll taken by the Luftwaffe and the ground defences. In the month of October alone 8th Air Force lost 214 heavy bombers. At that rate of attrition, an entirely new bomber force would be required every three months in order to maintain the Allied bomber offensive. After such prohibitive losses, Operation Point-Blank had to be suspended till the availability of a long-range escort fighter.

28. The need for a long range escort fighter was met by the US P-51 Mustang Aircraft. This fighter aircraft had adequate range to escort the heavy bombers all the way to their targets in Germany. This aircraft brought about a change in the strategy in February 1944. Now all bomber formations could be escorted all the way to

their targets. These fighters would protect the bomber formations from the Luftwaffe interceptors and slowly and gradually the tables started to turn against the Luftwaffe. With fighters that could fly beyond the Rhine, bomber formations sweep ahead to engage Luftwaffe interceptors, the allied formations reversed the loss ratio against the Luftwaffe fighters. The Allied bomber losses fell below 10% of each raiding force, while the German pilot losses mounted. In February 1944 alone, the Luftwaffe lost 33% of its single engine fighters and 20% of its fighter pilots including several pilots, who were credited with more than 100 combat kills. In the first four months of 1944, the Luftwaffe had lost 1684 fighter pilots, whose replacements would be unskilled youth, thrust into combat against experienced Allied pilots.

29. During the first six months of 1944, the air battle over occupied Europe continued with unabated ferocity. A primary goal of Operation Point-Blank was achieved, when, on 6 June 1944, the Luftwaffe failed to menace Operation Overlord, the Normandy Invasion, and the Allies enjoyed complete air superiority over the battlefield for the rest of the war. The success of Operation Overlord was in no small part due to the air war waged by the Allied air forces in the first half of 1944.

30. Operation Point-Blank had succeeded but not in the way the Allied planners had initially intended or expected. Round the clock bombing had not smashed the Luftwaffe into oblivion nor had it destroyed the German aircraft production. Attrition had been caused to the Luftwaffe by the Allied fighters in the air to a point where it could not sustain air operations. The greatest assets that the Luftwaffe lost in this war of attrition were its experienced pilots.

Without skilled pilots to meet the Allied threat, the increase in German aircraft production meant nothing.

31. The doctrine of Allied strategic bombing failed because it rested on three premises that would be tested in World War-II.

- (a) The first premise was the belief of the planners that the bomber formations without escorts would always go through the defences and destroy the enemy industry.
- (b) The supporters of the strategic bombing erroneously believed that the civilian population was the weak link in a nation's defence. In practice neither the will nor the morale of the bombed populations approached collapse.
- (c) The supporters of strategic bombing also believed that such use of air power could eliminate an enemy's ability to wage war by destroying its industrial base. German industrial output was not stopped by Allied strategic bombing.

32. The use of air power in World War II brought out a number of lessons. These are:-

- (a) A tactically oriented Luftwaffe was successful as long as it was employed tactically. It failed to produce the desired results when employed for strategic bombing.
- (b) Air superiority emerged as a pre-condition for success of any operation.
- (c) Changing the objective in mid course can lead to defeat.

Evolution and Employment of Air Power

- (d) The absence of strategic bombers in Luftwaffe denied the creation of desired effects over London.
- (e) Strategic bombing had a minimal effect because of poor accuracy.
- (f) The projection of military force through air emerged as the quickest means as compared to land or sea.
- (g) Strategic air campaigns with conventional weapons aimed at destroying a country's war making potential are long drawn out and expensive in terms of resources.
- (h) Exploiting absence of long range bombers in the German inventory, the Soviet Union moved their industry behind the Urals and greatly out-produced Germany in military equipment and numerical superiority which eventually proved overwhelming. In essence, Germany entered the war with doctrine and equipment that were inadequate to the war of this magnitude.
- (j) German military strategy was based on a brief, highly mobile, fast-paced theatre level offensive and Luftwaffe was built around this concept of operation.
- (k) The introduction of Air Defence in the aerial warfare was major milestone. It proved that reaching the targets unchallenged would be a difficult proposition in future conflicts, as was ably demonstrated by the Allies in defence of England.
- (l) Finally, it was the first war in which air power played a significant and decisive role.

Post War / Cold War

33. In the aftermath of the Second World War, the super powers got locked into the rivalry of the Cold War. This led to an arms race, which was a great driving force for military aircraft development. The Jet aircraft became dominant with a focus in the 1950s and 1960s on fast, high flying strategic bombers, with delivery nuclear weapons and fast, big interceptors to counter them. Interceptors became bigger, faster and heavier, such as the Russian MiG-25 Foxbat. Bomber development in the Soviet Union produced some big bombers, which surprisingly had a tendency to be propeller driven such as the Tu-142 'Bear'. In air to air weaponry, the guided missile became dominant with infra-red and radar-guided systems although this took some time as air battles in the Korean war of 1950s were still fought using machine gun and cannons armed jet fighters. Following the American fighter experience in Vietnam the USA looked again at the requirement to teach its fighter pilots dog fighting skills rather than just relying on missile intercepts, thus, the famous 'Top Gun' fighter school was created. Counter measures such as Chaff and Flare became standard on military aircraft.

34. Close air support aircrafts were developed as well during the Cold War, as the West needed a way to counter the massive Soviet tank advantage. The US A-10 Warthog was designed as a tank buster carrying a massive rotary cannon, one of the largest aircraft mounted guns and specifically designed anti-tank weapons, the Russian SU-25 Frogfoot aircraft also took on this role.

35. Korean and Vietnam Wars brought the helicopter to the forefront, as the Korean War showed the importance of the helicopter as a means of transport and medical/evacuation platform, while Vietnam War was often called a helicopter war, as

the US helicopters were so common and vital to the conflict. A new breed of helicopters also appeared, Gunship carrying guided and unguided rockets and cannons and machine guns, taking on the role of close air support and later tank hunting. Helicopters also proved to be the ideal Anti-submarine warfare (ASW) platforms, as the Soviets developed a huge submarine fleet, so the West produced counter measures. The Soviets developed a vast array of military helicopters such as the famous Mi-24 Hind gunships as well as some truly enormous transport helicopters.

36. Air to air weapon systems and Air-delivered nuclear weapons and the air-to-ground weapons rapidly developed. The Vietnam War led to the development of napalm and fuel air explosives as well as the first laser guided bombs, although they were fairly primitive at this point. Anti tank missiles were developed such as the Maverick and Hellfire which were designed to attack armoured vehicle weak top armour. Air field denial weapons appeared, designed to produce a mass of craters in an enemy runway and leave small mines behind to hinder any repairs. At sea, air-launched anti-ship missiles replaced air-launched torpedoes and proved highly destructive, as seen in the Falklands War.

37. The requirements for good photographic reconnaissance led to the development of US spy planes from Lockheed's famous 'Skunk Works'. This pushed aircraft technology higher and in some cases faster with the U-2 spy plane and the famous SR-71 Blackbird, which is still the world's fastest military aircraft. Transport requirements also increased as the super powers wanted the ability to move large pieces of military equipment and troops to the large distances. The bigger jet engined transports capable of carrying a 70 tonn main battle tank appeared. The Cold War focus on planned

destruction of enemy airfields led to the development of vertical or short take-off aircraft such as the British Harrier jump jet and several countries produced Swing wing jet aircrafts in a search for greater performance versatility. Also for the first time large radars were mounted on specifically designed aircrafts for airborne early warning radar such as the AWACS system and the innovation of in flight re-fuelling was perfected to give aircrafts an almost unlimited range. Fly by wire control systems have made aircrafts more manoeuvrable, with powered controlled surfaces and computer assistance.

The Summary

38. Every one had the dream to fly since the beginning of human history. Many courageous people gave their lives for fulfilling their dreams. In the early Chinese history, the Muslim history and more like Leonardo Da Vinci, Sir Cayley and many other had furnished rudimentary ideas on flying. But, it is Wright brothers, who made it a dream comes true to achieve a controlled flight. People started fighting with their flying machines in the late 19th century. As there were many wars in the last century, it boosted the requirement of technological advancement in the aviation industry. The speed of aircrafts increased, hence, it could go to increasingly high altitude, could carry more payloads and also improve the safety of the aircrafts. Those propeller-aircrafts since 1945 continue to fight more wars till todate.

PART-II**IMPACT OF PRECISION WEAPONS ON EMPLOYMENT
OF AIR POWER**

“Victory smiles upon those who anticipate changes in the character of war, not upon those who wait to adapt themselves after the changes occur”.

Giulio Douhet

Introduction

39. The complex security environment of the 21st century challenges those military constructs and methods which are based purely on state-centric conflict. While most of the security threats paradigms are not entirely new, the combination of greater lethality weapon, enhanced mobility, real time communications and media over-watch result in a far more complex security environment. The traditional military responses may not provide adequate solutions to these challenges. Confronting the challenges of this complex environment and its inter-linked elements will require response that is based on a ‘system’s view’. Treating an adversary and the environment as a system will provide greater insights into the non-linear behaviour of complex threats. A ‘system’s approach’, therefore accepts that military force alone is not capable of achieving national security goals. Consequently, a ‘whole of nation’ approach to securing national security goals is required. This is not a new concept perse, as the nations have always sought to employ all elements of their national power to secure policy goals.

“Strategy is the science of making use of space and time. I am more jealous of the latter than the former. We can always recover lost ground, but never lost time”.

August Graf von Gneisenau

Historical Perspective

40. Historically, weapons employment tied bomb quantities to target destruction. During World War II, airmen applied the term *precision* to weapons aimed at the Norden bombsight. In 1943 this definition of precision equated with a circular error probable (CEP) of approximately 1,000 meters, which required more than 1,500 sorties and 9,000 bombs to achieve a single objective.

41. Precision has always been recognized as an important attribute of weapon development. The noted military theorist, strategist and historian, Major-General J. F. C. Fuller, considered 'accuracy of aim' one of the five recognizable attributes of weaponry, together with the range of action, striking power, volume of fire and portability.

42. Colonel Phillip Meilinger, the Commander of the U.S. Air Force's School of Advanced Airpower Studies, has opined:

"Precision air weapons have re-defined the meaning of mass. . . . The result of the trend towards 'airshaft accuracy' in air war is a denigration in the importance of mass. PGMs provide density, mass per unit volume, which is a more efficient measurement of force. In short, targets are no longer massive, and neither are the aerial weapons used to neutralize them."

43. Seeking precision through accurate aim remains an important aspect of military power projection, but the historical record indicates that the best combination is not surprisingly the trained operator on a smart platform, with smart sensors dispensing a smart weapon. Precision, it must be remembered, is a relative word, relative to the time period about which one is concerned. For example, in the summer of 1944, 47 B-29s raided the Yawata steel works from bases in China; only one plane actually

hit the target area, and only with one of its bombs. This single 500 pounds general purpose bomb represented one quarter of one percent of the 376 bombs dropped over Yawata on that mission. It took 108 B-17 bombers, crewed by 1,080 airmen, dropping 648 bombs to guarantee a 96 percent chance of getting just two hits inside approximately 500 square feet. German power-generation plant; in the Gulf War, a single strike aircraft with one or two crewmen, dropping two laser-guided bombs, could achieve the same results with essentially a 100 percent expectation of hitting the target, short of a material failure of the bombs themselves.

Post Cold War Era

44. With the end of the Cold War the requirements of the world's military aviation have changed. The need for large nuclear bombers and big fast interceptors has gone, instead systems need to be simple and versatile. Towards the end of the Cold War stealth technologies were developed to make an aircraft difficult to detect with radar and other sensors. This led to some expensive aircrafts such as the B-2 Stealth Bomber, designed for a threat that no longer existed to a large extent. For the Western powers, the focus is on reducing the number of different airframes in service. Due to the need to reduce the cost of military expenditure many western powers are going for high-tech low man power, low number systems like the US F-22 Raptor and the Euro Fighter in Europe. The JAST strike aircraft project will replace many types of aircrafts in the US and Britain. Most of modern combat aircrafts are moving towards a single pilot, with more computer automated systems rather than pilot plus navigator / weapon officer. Flying by light fibre optic control system also offers increased agility for combat aircraft and tilt rotor aircraft which have long been experimented since the

1960s, are finally seeing a real application with the American Osprey, offering the flexibility of a helicopter with the greater range and speed of a fixed wing aircraft. Western militaries, in particular the US and UK, are committed in the long term to pilotless combat aircraft. Drone technology has steadily developed since the 1990s and armed remote drones are now a realistic combat system. Such pilotless planes are likely to be decades away but are clearly the future of the combat aircraft, where the most expensive component is the human pilot. It is also clear that although the fire power and accuracy of air power has increased, it alone cannot win wars and this was illustrated by the Gulf War of 1991, where air superiority was quickly achieved but despite a massive bombing offensive, ground operations were still required.

Precision Weapon and Decision Making

45. One of the greatest advantages of the precision weapon is the confidence that it can offer to a decision-maker confronted with a situation where he has to take the decision for using force, in circumstances where the so-called "collateral damage" would be either unacceptable or called into question on account of the viability of continued military action. Even in high-tempo, high-level-of-violence conflicts, attitudes towards both 'enemy' and 'friendly' or 'neutral' casualties have undergone a remarkable transformation since the days of the Second World War, when for example, a single air raid could kill tens of thousands of individuals and not raise any significant moral outcry. Increasingly, conflict scenarios involve the use of force in dense populated-environments, where the negative publicity of misplaced weaponry could have profound implications for public opinion and policy.

Effect and Precision

46. Effects rather than destruction have become the template for war planning. The difficulty in extracting the maximum potential from earlier theories of strategic attack, was a shortcoming in execution. Even when control of the air was wrested from the Luftwaffe in the spring of 1944 and Allied aircrafts were free to roam around the Axis skies, the level of 'precision' bombing still required a thousand aircrafts to succeed against a single target. Only a very small percentage of bombs usually hit their targets. Over the entire war, only about 20 percent of the bombs aimed at targets designated for precision attack, fell within 1,000 feet of their aim point. The large number of aircrafts needed to achieve success, made simultaneous attack technically impossible. Generally, target sets were attacked in sequence, even after control of air was secured, because large number of aircrafts had to be massed repeatedly to debilitate just one target set. The World War-II campaigns against the German ball bearing and aircraft production industries took seven months, though partially impeded by the lack of air superiority over Germany. Even with air superiority, the transportation campaign took five months and the oil campaign took six months. These relatively long periods of focusing against one target gave the enemy time to recover in other target systems, making it impossible to paralyze more than one target system at a time. Post-War analysis reflected that to knock out a single industry with the available weapons in 1943 and early 1944, was a formidable enterprise, demanding continuous attacks to effect complete results.' In World War-II, air commanders were compelled to substitute sheer tonnage for precision. However, World War-II also witnessed the first combat use of precision guided munitions

(PGMs). The first such Allied guided bomb, the Azon Bomb, achieved excellent results against bridges in Burma in late 1944 and 1945. The challenge of dropping bridges spurred the further development of PGMs, and the last year of the Vietnam War saw the first large-scale use of Laser Guided Bombs (LGBs). By the time of the Gulf War, PGMs overcame the necessity to mass aircrafts for successful attack. During the Gulf War over 9,000 LGBs were used, out of a total of approximately 220,000 bombs. This seemingly small portion of the total number of weapons dropped, understates the consequence of their effect. In some cases, a single aircraft and one PGM during the Gulf War achieved the same result as a 1000-plane raid with over 9000 bombs in World War-II did and that too without the associated collateral damage. PGMs can offset the need for mass attacks to achieve a high probability of success, a reality evidenced with the dramatic increase of their use in the air war over Serbia, where nearly 7000 of the 16,500 munitions were PGMs, while number of the sorties required for delivering them decreased considerably.

Precision Attack in the Gulf War

47. On 21 February 1991, the US Chairman of the Joint Chiefs of Staff, General Colin Powell, made this observation to the Senate Armed Services Committee, *“Air Power has been the decisive arm so far, and I expect it will be the decisive arm through to the end of the campaign, even if the ground forces and amphibious forces are added to the equation..., I expect the air power to be even more decisive in the days and weeks ahead.”*

48. The Gulf War showed, how radically precision attack had transformed the traditional notion of running a military campaign, particularly an air campaign. On opening night of the War, attacks

by strike aircrafts and cruise missiles against air defence, command and control facilities essentially opened up Iraq for subsequent conventional attacks. Precision attacks against the Iraqi air force destroyed it in its hangars and precipitated an attempted mass exodus of aircrafts to Iran. Key precision weapon attacks against bridges served to 'channelize' the movement of Iraqi forces and create fatal bottle necks and many Iraqis, in frustration, simply abandoned their vehicles and walked away. Overall, post war analysis indicated that Iraq's ability to move supplies from Baghdad to the Kuwaiti theatre of operations had dropped from a total potential capacity of 216,000 metric tonnes per day over a total of six main routes, including a rail line, to only 20,000 metric tonnes per day over only two routes, a nearly 91 percent reduction in capacity; all others including the railroad had essentially been destroyed. What ever shipments were done, had been done in haphazard and slow manner and that too in single vehicles that were themselves so often destroyed as many Iraqi drivers simply refused to drive them to the theatre of war. This destruction had taken place in an astonishingly short time; whereas, in previous non-precision interdiction campaigns, it often took hundreds of sorties to destroy a bridge, in the Gulf War precision weapons destroyed 41 out of 54 key Iraqi bridges as well as 31 pontoon bridges, hastily constructed by the Iraqis in response to the anti-bridge strikes, in approximately four weeks.

49. The Gulf War ushered in a new paradigm for the application of air power: operational planners targeted the key nodes of a system to achieve desired objectives rather than target an entire system for destruction. For example, in targeting the Iraqi Integrated Air Defence System (IADS), the planners designated the

desired mean points of impact (DMPI) that, when struck, would disable the command and control functions of the sector operations centres (SOC). As a result, war fighters met the operational objective of disabling the sector IADS without having to destroy an entire SOC. The planners were able to reduce from eight to two the number of 2,000-pound PGMs, directed at each SOC on the first night of the war. Not only did this achieve the desired effect, but it also released an enormous amount of firepower to concentrate on other critical systems.

PART-III**EFFECT BASED OPERATIONS**

“War is, thus, an act of force to compel our enemy to do our will”.

Carl von Clausewitz

Introduction

50. Effect-Based Operations (EBO) has been a buzzword and a part of Air Force jargon since the overwhelming success of the air campaign in Operation Desert Storm in 1991. Even though EBO was not coined in military operational terms until the last decade of the twentieth century, thinking in effects has existed in the military profession for ages. Within the last two decades, technology has reached a level that has shifted the perception of EBO to a more practical utilization rather than being mere thoughts on paper. Air power and technology have always been close, thus, it is no surprise that air power advocates embrace the concept of EBO. To the air power advocate, operations like Desert Storm, Deliberate Force, Allied Air Force (AAF), and Enduring Freedom (EF) all confirm the effectiveness of air power.

51. EBO is not only about air power. Joint Forces Command’s (JFCOM) definition of EBO describes, *“Operations that are planned, executed, assessed, and adopted based on a holistic understanding of the operational environment, in order to influence or change system behaviour or capabilities using the integrated application of selected instruments of power to achieve directed policy aims”*. The integrated application of selected instruments of power forms the basis of EBO.

52. EBO continues to evolve as an organizing concept for military endeavours. EBO retains identity more as a mind-set, a way of thinking or as an organizing framework rather than an intricately

designed and lock-step planning cycle. EBO is certainly not a checklist. Rather, it is a flexible and loosely adaptable process of affecting linkages within a system to achieve a predictable new behaviour or condition.

Historical Perspective

53. In order to enhance the comprehension of EBO and how it has affected the employment of air power through time, it is necessary to study history. Following paragraphs will address how well-known thinkers and air power theorists have been thinking about effects rather than mere destruction.

54. EBO is not a new revelation in warfare; it is, in fact, older than air power itself. In the early nineteenth century, Antoine-Henri Jomini and Carl von Clausewitz, each had their own perception of warfare and associated terms that one could interpret as an effects-based approach.

55. Jomini looked upon warfare as a science, controlled by scientific principles combined through strategy. Jomini's approach to warfare was very simple and revolved around decisive points (DP). He defined a decisive point as "*a point whose attack or capture would imperil or seriously weaken the enemy.*" By using mass and manoeuvre, Jomini would use all available forces to attack a fraction of the enemy forces, defending the decisive point. The decisive points would be objects of direct military importance like supply lines, exposed flanks of the enemy or vital river crossings.

56. Clausewitz believed that warfare was an art and encapsulated EBO with his definition of a Centre of Gravity (CoG). He defined a CoG as "the hub of all power and movement". In contrast to Jomini's definition of decisive point, Clausewitz proceeded beyond the military realm, by identifying the capital

(representing the will of the people) and allies (the political aspect) as possible CoGs. Additionally, Clausewitz realized that CoGs only exist in relation to objectives and may change, when adversaries change. The CoG is the point at which all of one's energy must be aimed, in order to impose one's will on the enemy. Clausewitz mainly focused on using CoGs as an analytical tool to analyze one's adversary's and one's own weaknesses.

57. During the Inter-Wars period, air power theorists like Giulio Douhet and William Billy Mitchell developed ideas about air power's role in EBO. Both wanted to avoid the devastating trench warfare experienced in World War-I and envisioned the use of air power to achieve operational and strategic effects.

58. Douhet developed a Jominian approach that would mass bomber aircrafts against an enemy's decisive point. However, Douhet believed that bombing of enemy population centres ultimately would result in a greater effect than neutralizing enemy forces and their logistics directly. Victory would come in breaking the enemy's will to fight by breaking his morale, hence, there was a need to bomb civilian population centers.

59. Mitchell also believed in bombing to achieve the desired effect of breaking the enemy's will to fight. Unlike Douhet, he did not believe in bombing the population to achieve this, but identified the enemy's economy, industry and transportation as CoGs. However, most industry was located in population centres, which meant that in reality population centres would still be bombed because of an insufficient level of technology that allowed precise bombing.

60. Air Corps Tactical School (ACTS) US Air Force, established in 1920, was a locus of firm believers in the potential of air power to

conduct EBO. Confidence in over-rated emerging technology made ACTS conclude that air power could destroy the enemy's ability to wage war by penetrating any known air defences and destroy enemy industries. This evolved into the doctrine of high altitude precision daylight bombing, which dominated US bombing doctrine, until the end of the Vietnam War.

61. In 1989, Col John A. Warden proposed a way of translating strategic military objectives into a theatre air campaign in his book *'The Air Campaign: Planning for Combat'*. Based on the book, he established a model of systems thinking, with the enemy system pictured as a five-ring model. From the centre outward the rings are leadership, organic essentials, infrastructure, population, and the fighting mechanism. The rings are organized in order of importance to functioning of the overall system, with leadership being the most important and the fighting mechanism the least important.

62. Warden used an analogy of the human body when explaining the five-ring model. The body can't function without the brain represented by the center ring (leadership). Conversely, if an opponent neutralizes the body's organic essentials (food/water), infrastructure (vascular system), population (cells), and fighting mechanism (white blood cells), this will paralyze the brain.

63. Warden aimed at achieving strategic paralysis with the use of air power by targeting CoGs within the five rings. Ideally, the CoGs are located in the centre ring, aimed directly at the leadership. However, if these target sets are unavailable, Warden suggested the indirect method of targeting CoGs, within the other four rings to put pressure that might also result in paralysis on the leadership.

64. Lieutenant General David A. Deptula is a practitioner and a scholar of Warden's air power theory. Deptula emphasizes for the

effects-based approach, as opposed to mere destruction, which he believes is only a means of achieving the desired effect. Deptula perceives technological innovations like stealth and precision-guided munitions (PGM) as a substitute for the weapons of mass destruction and in 2001 even suggested a draw-down of conventional land and sea forces, because of air power's ability to project power. Finally, Deptula recognizes the critical requirement for adequate intelligence analysis of one's opponent, in order to conduct successful EBO.

Effect Based Operations-The Concept

65. In order to understand clearly how a warrior can utilize effects-based operations, a fundamental understanding of the concept of 'effects' is necessary. First, effects must be defined in the context of military operations; however, a simple definition is not sufficient to understand the various issues at hand. Indeed, effects must be categorized in many ways to include their intended purpose, their relationship to the attacked target and whether or not they are desired. Therefore, reviewing these categories will establish a solid foundation for assessing how effects-based operations actually work. By definition, "*effects consist of a full range of outcomes, events or consequences that result from a specific action*".

66. **Categorization of Effects.** Two means are used to categorize effects, according to their relationship to specific action:-

- (a) **Direct / Indirect Effects.** This is a simpler method to categorize effects. Direct effects are the results of actions, with no intervening effect or mechanism between the act and the outcome. Conversely, indirect effects are the broad range of

results, created through an intermediate effect or mechanism to produce the final outcome. While direct effects are normally immediate and identifiable, indirect effects are typically delayed and difficult to recognize. By examining a hypothetical aerial attack on a power station, the relationship between direct and indirect effects is easily seen. When the aircraft delivers a laser-guided bomb (LGB) onto its intended target; the munitions explode and destroy the transformer station. In this case, the direct effect is the destruction of the power station; however, the desired indirect effect is, the power interruption to the command and control facility, that is crucial to the enemy's integrated air defence system. Consequently, the indirect outcomes of disrupted command and control and degraded air defence capability are achieved by directly attacking the power station.

- (b) **Order of the Effect.** The other more detailed manner of categorizing effects is by the distance from the original action that the effect occurs. This distance is called the 'order of the effect'. First-order effects are the direct outcomes of the specific action, while second-order effects would be the next most immediate indirect effects, resulting from the first-order effect. Third-order and higher effects ripple down the line and tie back to the original action. Once again, looking at the example of attack on the power station, the destruction of the power station is

the first-order effect, while the power interruption to the city and the command post would be considered second-order effects. The consequence of the power loss to the command post would, therefore, result in interrupted communication with the missile batteries—a third-order effect. Finally, the resulting degradation of the integrated air defence system (IADS) would be the resultant fourth-order effect. One advantage of looking at the different effects in this way is that linkages can be drawn between actions and subsequent effects, which will enhance probability and predictability outcomes and assessment. An important phenomenon of effects-based operations is that the higher the order of effects, the less certainty exists that an individual action will achieve the desired effect.

67. **Defining Effect Based Operations.** Current discussions of effects-based operations involve various definitions and descriptions of the concept. Effects-based operations are “a process for obtaining a desired strategic outcome or effect on the enemy through the synergistic and cumulative application of the full range of military and non-military capabilities at all levels of conflict.” Furthermore, an ‘effect’ is the physical, functional or psychological outcome, event or consequence that results from specific military or non-military actions. The defining elements and description include emphasis on effects-based operations, as a process, beginning with developing knowledge of the adversary, viewed as a complex adaptive system, the environment and own capabilities. Knowledge of the enemy will enable the commander to determine the effects,

he needs to achieve, to convince or compel the enemy to change his behaviour. The commander's intent plays a central and critical role in the determination and explicit linking of tactical actions to operational objectives and desired strategic outcomes. Execution of the plan follows, the aim or task being the use of all applicable and available capabilities, including diplomatic, information, military and economic.

68. The purpose, then, is to create a coordinated and synergistic operation that will produce the desired effects. Continuous assessment must measure and evaluate the impact of the desired effects. Assessment includes to determine whether military actions achieved the desired effects, produced unintended effects, the overall impact of the effort, and whether tactical actions contributed to the achievement of the desired outcome. Finally, continuous assessment of the enemy, U.S. military and political actions as well as the friendly situation will enable the commander to adjust his course of action to reach his desired end state efficiently and rapidly. In the words of Clausewitz:

“The first, the supreme, the most far-reaching act of judgment that the statesman and commander have to make is to establish . . . the kind of war on which they are embarking; neither mistaking it for, nor trying to turn it into, something that is alien to its nature. This is the first of all strategic question and the most comprehensive”.

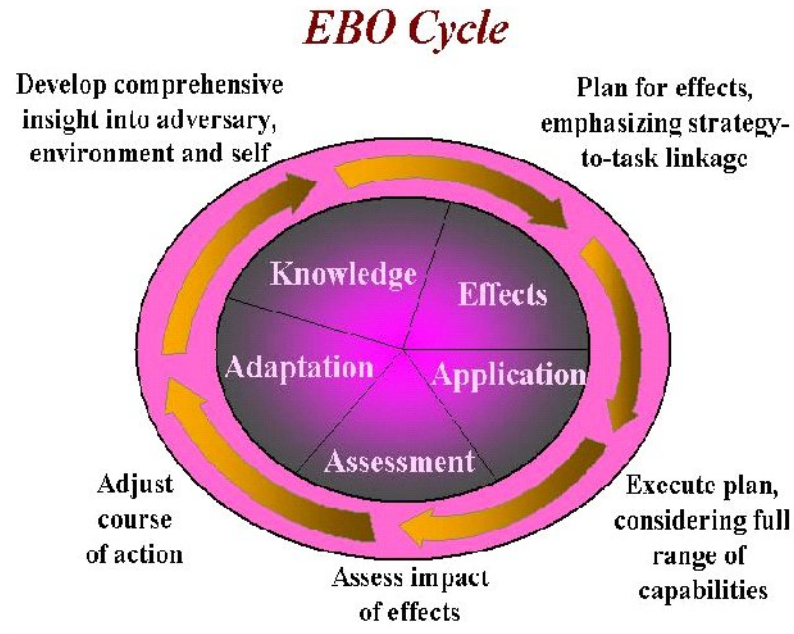


Figure-1 Effects-Based Operations Cycle

69. Effects-based operations, according to Air Force Major General David Deptula, a prominent advocate, reflect a fundamental change in the nature of warfare. He asserts that the conduct of warfare has changed from campaigns designed to achieve objectives through sequential attack to, what he describes as parallel warfare or simultaneous attack against all the enemy's vital systems. In Deptula's concept, executing parallel warfare requires precision weapons, the ability to suppress enemy air defences, and an operational concept that focuses principally on effects rather than only on aggregate destruction to achieve military objectives.

Network Centric Warfare & Effect Based Operations

70. Successful EBO hinges, to a great degree on technologies and network-centric operations that provide the four key ingredients for its execution: options, agility, coordination and knowledge mobilization. These are briefly explained as follow:-

- a. **Options.** The ability to link diverse and geographically separated capabilities offers decision makers a wide range of options to tailor their actions precisely accordingly to a situation and set of observers, so as to increase their impact. In a sense, networking permits the attrition based metric of probability of kill (Pk) to be replaced by an effects-based metric 'Po', in which the 'o' is the probability of a given capability producing a useful option to deal with a given situation.
- b. **Agility.** The responsiveness of net-worked forces with shared awareness and speed of command provides the agility to adapt to an intelligent adversary's actions by enabling the force to shape and re-shape its options and actions amid the give-and-take of battle and crisis operations.
- c. **Coordination.** Shared situational awareness and understanding of command intent, coupled with the capacity for synchronization and self-synchronization, enable the force to coordinate complex actions and effects that will produce a unity of effect across levels and arenas, in which diverse actions build on each other synergistically.
- d. **Knowledge Mobilization.** Finally and most importantly, success in effects-based operations will hinge on how well one mobilizes knowledge and expertise to bear, so as to provide timely and relevant support to decision makers at all levels. Flexible, responsive net-working can bring this breadth of

knowledge to bear. In brief, net-work-centric operations are, indeed, a means to an end, and effects-based operations are that end.

Warfare Based on Control

71. As Clausewitz often quoted dictum poignantly states, all war is ultimately about producing an effect, the question, however, is how exactly one gets from the act of force to the effect of compliance. If a battle were described as two armies squaring off against each other, it would seem that a commander had two reasonable options to achieve victory: annihilation or attrition. Deptula wrote that both these two concepts of warfare are based on destruction, but there was another approach that is not based on it. When an army campaigned to completely destroy its opponent, as Gylippus did at Syracuse, ‘annihilation’ was the mechanism for victory. However, this approach often proves pyrrhic or impractical, so the alternative means often taken is to exhaust the enemy, before he can do likewise to you. Deptula postulated that these two approaches focus the commander’s effort on destruction of the enemy’s fielded forces because the forces are seen as his centre of gravity and the seat of his power.

72. Carl von Clausewitz introduced the concept of centre of gravity by calling it “the hub of all power and movement, on which everything depends”. He wrote that the first task of a strategist was to determine the centre of gravity and the second was to ensure that the concentration of forces was against this point, in the main offensive. Clausewitz was not alone in this belief, because another theorist of his time, Baron Antoine Henri de Jomini, wrote that both strategically and tactically the mass of one’s army should be thrown against the decisive point. In modern times, Colonel Warden

modified the concept, when he wrote that the centre of gravity “is quite useful in planning war operations because it describes the point in which the enemy is the most vulnerable and in which the attack has the best chances of being decisive”.

Rapid Decisive Operations and Parallel Warfare

73. ‘Control concept’ is the central theme of this approach, Deptula wrote that effects-based operations are the enabler of ‘Parallel Warfare’ and ‘Rapid Decisive Operations’, which makes control warfare possible. The concept of Rapid Decisive Operations is nothing new in essence; it simply embodies the notion of achieving victory by defeating the enemy quickly at the decisive point. One early proponent of rapid decisive operations was Sun Tzu, who wrote that “no country has ever benefited from protracted warfare”. What Deptula proposed, is a different way of defeating the enemy that does not focus on ‘destruction but on control’. He wrote that control is derived from “the idea that an enemy organization’s ability to operate as desired is ultimately more important than destruction of its forces”. Destruction is a mechanism for achieving effects upon the systems that an adversary relies upon to conduct operations. The goal is not to destroy the systems but to set conditions that prevent the enemy from using his assets, the way he desires. Optimally, control over enemy systems would marginalize the use of his fielded force and lead to victory, without an attrition campaign on the ground. What makes the concept of control warfare so attractive is that it not only promises quicker victory, but perhaps, also with limited casualties on both sides. The first task, therefore, becomes to ascertain the proper centres of gravity to attack, in order to achieve the desired effects. The strategist must

now look more broadly, then, at the enemy's fielded forces, for the true centre of gravity.

74. An effects-based approach to warfare based on control, allows a force to impede the enemy's means to conduct war; weaken the will of the people to continue war; and most importantly, erode the enemy's very ability to control its vital functions. Therefore, destruction at all levels of war, spanning targets from leadership to fielded forces, should be done to achieve control over the enemy, not just to attrite his resources. By definition, "EBO is a process of obtaining a desired strategic outcome or 'effect' on the enemy, through the synergistic, multiplicative and cumulative application of the full range of military and non-military capabilities, at the tactical, operational and strategic levels".

75. Effects Based Planning (EBP) is an operational planning process to conduct effects based operations within rapid decisive operations. EBP is results-based rather than attrition-based planning. EBP focuses upon the linkage of actions to effects and then to objectives. EBP changes the way, one views the adversary, own self, and what is included and emphasized in the planning process. EBP uses a flexibly-structured battle rhythm that leverages a collaborative knowledge environment and capitalizes on the use of fewer formal joint boards. It employs virtual, near-simultaneous planning at all echelons of command. The process of planning for effects is complex. In conjunction with intelligence, planners must determine which effects on each enemy system can best contribute to the fulfilment of military and political objectives of the theatre campaign. This depends upon the specific political and military objectives, enemy vulnerabilities, the target systems themselves, and weapon systems capabilities. Since a campaign plan is highly

dependent on the weapon systems available, an effective plan must extract maximum impact from those systems— not in terms of absolute destruction of a list of targets, but in terms of effects desired from target systems. A key requirement to an effects-based operation is a feedback process that will incorporate the observation of the actual effects into the ever-developing plan. This continuous ‘plan—execute—assess’ process is the cornerstone of running an effects-based operation.

Operation Desert Storm - the Birth of EBO

76. The Coalition Air Force in a single 24 hours period flew some 1300 offensive sorties against 152 target sets. The war began with strikes against more targets than were hit by the English Air Force in 1942-43. It was not just the sheer number of sorties that made the day-1 so unusual. The specific effects produced by this bombing activity were just as important. The war’s first night demonstrated that the conduct of war had changed. It marked the birth of effect based operations as a principal means of conducting warfare. This air campaign was built around a highly adaptive attack plan to:-

- a. Paralyze Iraqi President Saddam’s ability to control his forces.
- b. Neutralize the ability of Iraqi forces to fight.
- c. Undermine their will to fight.
- d. Reduce the size of Iraq’s military production base.
- e. Create conditions needed to control Iraq’s capacity to build weapons of mass destruction, as it was claimed by the coalition forces that Iraq possessed the weapons of mass destruction.

77. Colonel John Warden who was the architect of this campaign established a theory of strategic attack, based on five levels of system attributes, which included, Leadership, Organic/System Essentials, Infrastructure, Population and Fielded military forces. Each level of system or "ring" was considered one of the enemy's centres of gravity. The idea behind Warden's five rings was to attack each of the rings to paralyze their forces, an objective also known as '*physical paralysis*'. To optimize a strike attack, the attacker would engage as many rings as possible with special emphasis on taking out the centre ring, which is the enemy's leadership. This would result in total physical paralysis.

78. **Parallel Warfare.** Campaign plan was the concept that comes to be known as '*parallel warfare*', based upon the coalitions ability to achieve specific effects and not just the simple destruction of targets. The objective of parallel war is to achieve effective control over the set of systems of power, relied upon by the adversary and influence his leadership, population, essential industry, transportation and forces. Parallel war entails more than compressing sequential attacks into a single multi-faceted attack. Parallel war exploits time, space and level of war vigorously to achieve rapid dominance, which is just the essence of EBO. Effective control of enough of adversary's enabling operational-level systems will paralyse his ability to function at the strategic level. The enemy will be compelled to acquiesce to the will of the controlling forces. Iraq was attacked at several places at a time with such a high speed that it had essentially no chance to repair lost assets or find alternatives.

79. **Effects-Based Targeting Approach.** Not all nodes of the system have to be destroyed. Attacks are needed only to make them

ineffective and unable to conduct operations during specific period. Planning for effects raises complex issues. Planners working with intelligence officers must determine which effect on each enemy system will contribute the most to the attainment of political and military objectives of the theatre campaign. This depends upon the specific political and military objectives, enemy vulnerabilities, individual target systems and weapon system's capabilities. Assigning certain air assets (means) to a certain target system to achieve specific effects (ends) is the basis of the new style of air campaign.

80. The design of the air campaign grew out of thinking about how to hit an enemy's systems to achieve specific effects, contributing to the military and political objectives of the coalition. Planning was based on the 'centre of gravity' (COG) approach. It began with a critical examination of potential COGs and their constituent operational systems and led to identifying the set of individual targets making up each system. The decision about whether to stop or continue an attack, depended on whether the coalition had achieved a specific effect.

Time: A Critical Factor in Effects Based Operations

81. For effects-based operations to work properly, components of the force must be prepared to take advantage of the achieved effects, when they happen at the risk of the window of opportunity closing and the effect disappearing. Therefore, time becomes a critical element in effects-based operations. Because the goal of these operations is a desired effect at a desired time, in order to attain desired objectives, unlike target-based operations, effects are not always seen as permanent. What makes the effects methodology

so powerful, is the use of time as a critical element, allowing the commanders to utilize forces more efficiently.

Jointness is Critical to Effects Based Approach

82. The Gulf War was a joint endeavour, as were US military operations in Haiti, Bosnia-Herzegovina and Kosovo. It is important to recognize that the meaning of 'jointness' does not imply the equal or obligatory use of each Service in every contingency or war. Jointness is the use of the most effective force for a given situation. Too often 'jointness' is interpreted as a 'federated', rather than 'integrated' or 'unified' application of Service components. To former US President George W. Bush, jointness is the use of the right force, at the right place at the right time, and one could add, for the right purpose. Jointness is a means for ensuring success, not an end in itself. Parallel war through effects-based operations does not exclude any force component in time, space, or level of war at the outset of any political-military challenge. However, that is not equal to each force always participating in every operation or to a degree in some proportion to their size or presence. Whoever can perform the operations to achieve the desired effects in the best at time, should have it assigned to them.

83. In the Gulf War of 1991, aerospace power from all the services proved its potential as a definitive military instrument. Aerospace power did not act in isolation, however, it worked in conjunction with support from surface forces. Sea forces conducted a maritime interdiction campaign throughout the application of aerospace power. Ground forces helped to protect Saudi Arabia and re-occupied Kuwait, after the air campaign had paralyzed Iraqi

systems, allowing coalition ground forces to operate with minimal casualties.

84. Nearly a decade later, aerospace power assumed the predominant role in Operation Allied Force. Combining global attack and parallel, precision engagements, aerospace forces demonstrated a step in the maturation of new concepts of warfare, once they were allowed to be employed. Because of political and military challenges and limitations, the Allied Force was by no means a pure example of parallel warfare. Nonetheless, the air war over Serbia evidenced the potential of advanced technologies with effects-based warfare.

Organizational Shift - Mandatory for EBO

85. We are in a transitional phase of the ongoing revolution in military affairs. Parallel war, achieved through effects-based operations, departs from traditional strategies, but we fight with the tools available today. We must carefully manage the transition to the new instruments of war, to ensure that their development is not restricted by the theories of the past, and to adapt current systems to more productive strategies. The Effects-based methodology requires changes in the force employment concepts. The changes include refining the thinking as well as the force structure. The major areas include:-

- a. Effect Based Approach.
- b. Effect Based Planning.
- c. Effect Based Targeting.
- d. Effect Based Training.
- e. Effect Based Intelligence.
- f. High level of integration through Network Centricity.

Limitations of the EBO Concept

86. The criticism of EBO is focused on three areas: (1) the possibility of predicting indirect effects, particularly concerning the will of a population and the decisions leaders make; (2) there is no explanation of how the different national powers are supposed to work together, in order to achieve a common goal; and most importantly, (3) the lack of substantive methodology used to reach the ultimate goal of EBO: behavioural change of the adversary. Positive behavioural change cannot be achieved through military means, and EBO does not address this problem in a sufficient way.

Analysis

87. Considering the enemy as a system, presents many complications and basing decisions purely on it presents many challenges. The effects-based approach to warfare is heavily dependent on mathematical methods for predicting and measuring effects. This increasing trend towards using various metrics to assess essentially unquantifiable aspects of warfare, only reinforces the unrealistic views of many, that warfare is a science rather than both an art and a science.

88. EBO, once viewed in the reality of contemporary World, points to numerous limitations as well as potential vulnerabilities:-

a. **Technology is a Conditional Characteristic.**

Modern warfare is sensitive to technological change. Relatively small innovations have consequences on the efficacy of modern weapons. Dual use technology and miniaturisation facilitates weaken the force by dispersion and adds to resilience. The over reliance of EBO on technology necessitates the availability of necessary wherewithal, such as precision weapons, advanced intelligence mechanism, command and

control infrastructure and network centrality. Vulnerabilities, in any of the facets can be a potential weaknesses.

- b. **Precise Knowledge is An Imprecise Notion.** Complete knowledge of enemy, as a system as well as its intentions, is an imprecise notion. Therefore, there would always be unforeseen consequences. Over reliance of parallel attack methodology on pre-hand knowledge posits an inherent vulnerability. Faulty intelligence can lead to misplaced preferences, with undesired results as well as consequences. Additionally, post attack analysis is central to an accurate assessment and subsequent decision making, however, the cumulative and cascading nature of effects, makes precise assessment difficult, if not impossible.

89. Warden's five rings model pre-supposes a well-defined enemy with an established infrastructure, therefore, the dependence of people on it. This may not be always true. The variations could be found where:-

- a. **The Rings may be Less and Ill Defined,** as was the case in Afghanistan.
- b. **A Case of an Irrational Enemy.** The model assumes a rational enemy and leadership. However, in reality, an enemy might react irrationally to a situation; the assumption that denial of any organic essential should have a predictable effect on population, may not hold true. Conversely, irrational leadership may respond in an unpredictable manner with unconventional means.

Based on these two reasons, the scope was limited earlier to conventional war only, as the effectiveness of Air Power under such situations is not fully understood and is the subject of current debate.

- c. **A Case of an Adaptive Enemy.** The enemy is a complex adaptive system and may adapt to methods being applied necessitating constant re-adjustments. Re-location of industry or command centres to population centres is one such example. The consequence of bombing Al-Firdaus bunker during Gulf War and the subsequent fall, is a case in point. However, the complexities involved in re-location process make this option least effective in the overall context of the war.
- d. **A Case of Strong Outer Ring.** A case where enemy forces are equally strong, will challenge the concept, as the application will necessarily be force specific. Warden assumes the presence of certain degree of control of air for the conduct of these operations, thus, nullifying parity in surface forces. The pre-requisite of achieving reasonable degree of control of air, while confronting an equal or a stronger opponent, restricts applicability of the concept in entirety, to a very few nations, perhaps, the United States only.
- e. **Human Being are not Machines.** Warden admits that the moral factor is unpredictable due to differences in human nature. Thus, Warden justifies ignoring the 'intangible' factors, by saying that if one can destroy the physical side, all the moral factors combined will not

change the outcome. In doing so, Warden makes a flawed assumption that the physical aspects can be completely destroyed. As North Vietnam proved, physical destruction may not guarantee ultimate victory, especially when the spirit of an adversary's society is united and the domestic morale is divided. Therefore, if one is truly going to analyze an adversary, the 'moral' factors, as Clausewitz warns, cannot be ignored. Additionally, predicting precise outcome of an imprecise or non-linear action is self-contradictory; the enemy may react irrationally, which could be counter productive.

- f. **Leadership as Centre of Gravity.** As described earlier, Warden's theory also posits that the most critical and important 'ring' is leadership. Therefore, by eliminating or neutralizing leadership, the rest of the system becomes 'useless appendages' incapable of functioning. Not all systems, however, have leadership as the most critical CoG. Take the United States for example, where political and military organizational structure is well defined and redundant. The Commander's intent allows, in fact requires execution of operations without direct control of one's superior. Further, leadership may decide one thing and the population another—what matters most may actually be what society decides, thus, becoming the true strategic CoG. As proven by the Vietnam War, American society was the CoG targeted by the North Vietnamese, which

demanded and ultimately forced the withdrawal of US troops.

- g. **Parallel Attack may not be Parallel.** Due to stronger opposition, lack of accurate intelligence, unintended actions and results, the frequency of attacks may not be sustainable. Therefore, force may have to be applied sequentially – contrary to the essence of Parallel attack concept.

90. Notwithstanding the limitations, Warden's theory does provide a starting point in evaluating an adversary. Critical analysis, however, must also include the 'intangibles', when determining as to where the airpower's application will have decisive results. Furthermore, attacking the leadership should be the primary objective of air power; thereby, compelling the decision-making entity to comply with one's will.

Summary

91. Enemy is a complex adaptive system, therefore, the ability to influence behaviour based on actions is not an easy undertaking. EBO is one such approach which builds on this concept with Air power being the critical enabler. The concept is not new, however, due to the technological advancements only the means are being realized now. Technology has enabled concentration of force with precision and surprise in a new form of war called 'Parallel War'. Dictates of parallel war demand sound planning and judgment in application. The concept of EBO is not without shortfalls, but these can be countered to an extent, with sound planning and changes at the organizational level. Every nation may not have the necessary means to implement the concept in totality; however, limited application must be considered. Therefore, the concept should not

be embraced nor discarded in totality. Airpower is offensive in nature and has resident potential to carry out any type of operation. The limitation, at times, lie in the lack of resolve by the intended user. Therefore, effectual employment of airpower is not only the prerogative of super powers; any right-minded nation can do it. EBO is futuristic in nature, with immense complexities and it points towards future not past; therefore, it is not science rather an Art or an Operational Art.

PART-IV**IMPACT OF TECHNOLOGY AND FUTURE TRENDS****Introduction**

92. Rarely in the history of mankind, has a technical innovation altered human affairs with greater rapidity or with wider significance than has the science of Air Power. From the Bi-plane of the 'Wright Brothers to the 'Sputnik' and onwards till the 'Daisy Cutters', a century has passed; a century of immense changes. Today, airpower can do far more than destroying a particular target; it can profoundly influence the human condition. Through selective engagement, airpower can support a recovering population, encourage one element while discouraging another; monitor, deter, transport, connect and assist in establishing the conditions for a safe and secure future. These applications are not limitless in number, but there are literally dozens of potential uses for airpower, that involve a broad operational spectrum, including every thing from kill and destroy to build and sustain. Stealth and long-range, unmanned systems are increasingly dominating air operations today. The traditional munitions-based operations, employing kinetic weapons are increasingly sharing airspace with information-based non-kinetic measures, that may soon result in an air strike, neutralizing an adversary with only minor damage, if any, to enemy assets. It seems no exaggeration to state that the clout of the lone Super Power; the United States, is balanced precariously upon a fulcrum, which can be termed as 'Air' and 'Space control'. To date, a lot of research has been conducted on the startling and novel aspects of aeronautics, since the 'Kitty Hawk', 'Spirit of St Louis', 'Battle of Britain', 'Pearl Harbor', 'Hiroshima', 'Nagasaki', 'Apollo', 'Vietnam' and the two 'Gulf Wars'. But Air Power is not only an

exclusive story of balloons, airplanes, missiles or the rockets; nor spacecraft or of their actual past or possible influence upon the strategy and statecraft of nations. It is also the story of the men, who drove mini to mighty machines and helped fulfil a once distant dream of mankind.

Impact of Technology

“The political objective is the goal, war is the means of reaching it, and means can never be considered in isolation from their purpose.”

Carl von Clausewitz

93. Across the globe, the quantum developments in Air Power competencies bore logical fruition in the skies over Kuwait and Iraq nearly two decades ago, in the Gulf War of 1991. The war saw bombing raised to a new and mind-boggling level. Science and Arts merged the Air and Space warfare into an entirely new discipline; one that in fact was to be, what the most ardent bomber advocates had always promised: “a decisive solution to both military and political problems”.

94. The war also highlighted maturing of Air and Space Power and the emergence of precision era: Joint Service Air Power forces dominated the war, and space provided intelligence, communications, weather, navigation and defensive cueing that benefited the entire coalition. The leverage of ‘Precision Air Attack’ proved so significant that it triggered a post-war debate on the nature of conflict and introduced to the public, the concept of a ‘Revolution in Military Affairs’, which in fact, had been under way for nearly 50 years.

95. Military capabilities are now being transformed because of more challenging and competitive environment that is likely to

emerge in future because of the rapid changes in the technology. The military competition in the coming decade would certainly be very different and perhaps more formidable. The environment in which stealthy, long range and weaponized unmanned systems would increasingly dominate the air operations and the airpower would be more diffused among the military services. Achieving information dominance would be the most critical mission early in the conflict. Moreover, other, relatively new key missions such as long-range precision strikes and space control may start to emerge; in that space may be transformed from a supporting medium to an independent theatre of operations. However, “nuclear overhang” would continue to exert dampening effect, in which perhaps smaller nuclear power would probably be accorded sanctuary status from attack.

96. The adaption to a dramatically different conflict environment is being reflected in the force structure and technological changes of the world’s most advanced militaries. These trends include, seeking greater precision in positioning and weapons, greater fusion and integration of intelligence with command and control, efforts to reduce sensor-to-shooter times, and increased emphasis upon Unmanned Aerial Vehicles, (commonly known as UAVs). Certainly, the Air campaign over Afghanistan and Iraq demonstrated how dramatically such developments since the Gulf War have transformed the super power’s ability to project power through the Air and Space medium, whether it was the effectiveness of satellite-guided bombs, or the linkage of special operators designating and controlling targets for B-52s or the Predators furnishing Close Air Support from over 30,000 feet. What this implies is that it is possible to control a UAV

from Headquarters in Saudi Arabia. The decision could be taken in Tampa-Florida, while the UAV operates from Afghanistan. The time taken from detection of a target to its engagement has reduced to less than 20 minutes. The earlier questions of 'how many aircrafts are required to neutralize a target', now changes to 'how many targets can be neutralized by a single aircraft'. Thus, a dramatic increase in the use of precision munitions, exponential increases in information volume and variety, and a corresponding decrease in sensor-to-shooter decision cycles are among the technical advances of the state of the revolution in military affairs.

97. What do these advances mean for the air power? Basically following are the major areas in which these technical advances are affecting air power:-

The future information-driven Air Force likely will have "robust and ubiquitous network services". There will be awareness, at all levels of command, of non-kinetic options and capabilities available to us. In network warfare, electronic warfare and influence operations, commanders will be able to define their intent in terms of both kinetic and non-kinetic effects.

Gen John W Maluda, HQ ACC USAF

- a. **Information.** The importance of timely information about the enemy cannot be over emphasized. Commanders at all levels need information on which to base their actions. The technological advancements in this field relate to collection, analysis and communication. The mastery over sensors and satellite technology has enabled man to obtain information from any part of the world to a

resolution up to 3 cm. This means that today nothing is hidden in the world from those who have this technology. In addition other sensors like radars and infra-red sensors add to the capabilities of information gathering. All the information gathered in the real time-frame can be processed through computers, which today are capable of processing three trillion functions per second. In military affairs the important thing is the application of processing /analysis for discrimination of information. This integration of satellite and computer technology has greatly enhanced and facilitated command and control and reduced the time and space dimension to an extent, that it is now real time information gathering, processing and dissemination. This has been possible due to the enormous storage and processing capability, which has drastically cut down rummage. The battle commanders of today can rely on real time information, on which to base their battle plans. This may manifest into an environment that space would almost certainly be transformed from a supporting medium to an independent theatre of operations. The rapid rate of growth in information technologies suggests a rapidly increasing potential to detect, identify and track a far greater number of targets, over a far greater area, and for a far longer period of time than ever before, and to order, transmit, and present this targeting data to those who need it far more rapidly and

effectively than ever before. Furthermore, there is the potential to engage a much greater number of targets, over a much broader area, at extended range, in much less time and with far greater lethality, precision and discrimination than ever before. However, there are still issues regarding interoperability to achieve integration of sensors data at one platform. The systems like Joint Tactical Radio System (JTRS) are under trials to bring in real network-centricity and pass machine to machine, actionable information between the war fighting elements.

- b. **Precision Strike.** Having received the correct information at the correct time, commanders can opt to engage targets with precision, with minimum possible collateral damage. The progress in the field of precision guided munitions has been very rapid. It has become a trend, to speak increasingly not of numbers of sorties per target killed, but rather of number of kills per combat sortie. What it means is that a million dollar cruise missile may not be required; instead, a 27,000 dollar Daisy Cutter could shake the earth under the enemy. Precise targeting is now possible through advances in precision navigation, Satellite guided munitions and Laser guided technology. In today's warfare, 48 hours of precision strikes can cut supplies, ground the Air Force and neutralize Air Defences. In fact, the precision aspect of Aerial warfare has also modified

the concept of mass, which has profoundly affected the traditional targeting theory. As a more contemporary thought - we should be looking for 'massing of effects' – rather than 'massing of force'.

- c. **Stealth.** Stealth technology has had a great impact on air power. It is based on the concept of being invisible to the enemy till it is too late for him to take counter measures. Though stealth technology is a blend of shape and material used on the aircraft to make electronically low observable system; but the advancement in technology plasma stealth using ionized gas (plasma) still in its theoretical phase, may pave the way for an overall cost reduction.
- d. **UAVs.** Dr. Edward Teller, father of the nuclear weaponry, told a small group of reporters in 1981 that in his opinion, "The Unmanned Aerial Vehicle (UAV) today is a technology akin to the importance of radars and computers in 1935". UAVs and Unmanned Combat Aerial Vehicles (UCAVs) are playing a crucial role in the transformation of air power. In a time of declining defence budgets, UAVs have transformed into an effective force multipliers. They provide the air power, new platforms that exploit the advances in information and communications technologies (ICT). UAVs and UCAVs are integral to the concept of network centric warfare. The Afghan war highlighted the growing role of UAVs because it was in that war that UAVs were used to actually attack targets, in

Precision Strike Capability



Stealth Technology



Unmanned Aerial Vehicle

addition to the primary roles of intelligence gathering and weapon guidance.

- e. **Space.** However, the next frontier may well be the 'Space'; the most intensely contested piece of real estate in the world right now. In the short span of four decades, since man ventured into the infinite expanse of vacuum, the challenge of Space has become one of the great paradigm shifts surrounding Air power arena today. No doubt, the Gulf war has provided a glimpse of what the future holds for Space. Indeed, space is becoming inextricably linked to war on land, sea and in the air. The migration of key military functions into space is almost certain to continue. Moreover, despite strong inhibitions on the part of the contemporary nations, and the existence

of agreements banning the deployment of weapons in space, if historical patterns are any guide, the coming military revolution will witness the militarization or, perhaps, more accurately, the weaponization of space, with warfare occurring in space, as well as on land, at sea, and in the air. This will occur as military organizations seek to deny each other the benefits of operating in this fourth medium.

98. Therefore, with the advent of new technology, military organizations would likely increase their emphasis on:-
- a. Long-range strikes relative to direct-fire engagements.
 - b. Precision strikes relative to strikes employing traditional ('dumb') munitions.
 - c. Electronic strikes relative to kinetic strikes.
 - d. Stealth and mobility relative to armour and other physical forms of protection.
 - e. Unmanned relative to manned airborne platforms.
 - f. 'Lean logistics' relative to large stockpiles.
 - g. Highly integrated systems architectures or 'systems of systems' relative to individual platforms.
 - h. 'Off-shore' systems relative to land-based systems to influence operations on land.
 - i. Land- and space-based systems relative to sea-based systems to influence operations at sea.
 - j. New mission capabilities such as 'space control', 'information dominance', 'missile defence' and 'long-

range precision strike' operations relative to traditional missions.

Future Scenario

99. Dramatic improvements in the ability to see and strike at extended ranges are likely to produce a growing preference for long-range precision strikes (LRPS). A reconnaissance architecture, comprising satellites, unmanned aerial vehicles (UAVs), unattended (and often remotely emplaced) sensors, manned aircrafts, reconnaissance helicopters and long-range reconnaissance teams will inform these strikes. These elements will weave together a web of information and data links into a system's architecture, connecting the forces of all military services as well as the forces of allies and coalition partners. This architecture will provide units operating at the tactical, operational and strategic levels, with data on fixed and mobile targets within the area of operations, along with positioning and terminal guidance data, and information on Battle Damage Assessment (BDA).

100. Establishing information dominance will likely be crucial for effective military operations, in most future conflict environments. Information dominance would be relevant to all levels of conflict, from the grand strategic to the tactical. At the theatre or operational level, this will involve identifying and neutralizing those enemy assets, so as to maintain or widen the information 'gap' between friendly and enemy forces. In a conflict environment, in which information plays a crucial role in determining the effectiveness of military forces, information dominance will act to minimize the 'friction' of war for the side that holds it, while 'shovelling sand in the gears' of the enemy's war machine. Operations to achieve information dominance could be conducted first at the outset of

war. Military operations might begin with information strikes, conducted to disable, actively (e.g., through destruction) or passively (through modification), key elements of the enemy's information network. These strikes could employ computer viruses, high-powered microwaves (HPM), electro-magnetic pulse (EMP), anti-satellite weapons (ASAT) or more traditional means, such as bombardment or jamming. Electronic strikes may also be conducted, to overload or saturate an adversary's sensors or data/information fusion systems, with the objective of inducing a 'nervous breakdown' of his ISR (Intelligence, Reconnaissance and Surveillance) and C4I (command, control, communications, computers, and intelligence) architectures.

101. The conduct of LRPS seems likely to be the subject of intense competition among the four military organizations, both because they increasingly have the ability to infringe upon one another's traditional 'battle space', and because these strikes will probably be seen as indispensable for success in theatre campaign operations. Ground forces will likely employ improved, extended-range versions of the Army Tactical Missile System (ATACMS), Weaponized UAVs (WUAVs) and, perhaps, long-range attack helicopters for extended-range strikes. Air forces will likely employ a mix of manned and (increasingly) unmanned combat air vehicles in carrying out long-range precision strikes. Naval forces could support strike operations far inland, principally through long-range missile attacks from a 'distributed' capital ship. Finally, space platforms, which are rapidly increasing their contribution to the overall effectiveness of terrestrial-based forces, may themselves become both the target and, perhaps, the initiator of LRPS.

102. Another area requiring attention would be strategic and theatre defence against ballistic missiles and air-breathing systems, such as cruise missiles, manned aircraft and unmanned aerial vehicles. Given the characteristics of non-nuclear munitions, defences will almost certainly focus on protecting point targets (satellite networks, data fusion centres, key military industries, senior political and military leaders, etc.). As states exploit the advanced technologies that appear likely to move the world into a new military regime, strategic and theatre defences will not only have to contend with weapons of mass destruction, but with extended-range non-nuclear strikes, employing precision munitions as well. If nuclear weapons are withheld as a threat of the last resort, then, defence against LRPS in conjunction with efforts to achieve information dominance, is likely to be among the severest challenges confronting military organizations.

103. Under such an environment, Air power would be transformed by the increasing substitution of unmanned for manned systems and the wide application of signature management techniques. As it passes through this transformation, the Air Force will have to transcend the essence of its founding identity i.e. the manned flight. This will pose challenges, not only to its core institutional culture, but also to its warrior ethos. Broadly conceived, air power will be fundamental to the operations of almost all military organizations in the new military regime. The organizational challenge of this new regime will be to ensure that increased diffusion does not result in a less focused military instrument.

104. Notwithstanding the foregone assertions, a few would dispute that the nuclear revolution holds a special place in the

annals of military revolutions, and nuclear weapons seem likely to exert a strong and enduring influence on warfare, even after the emerging technological revolution reaches its mature stage, in the coming decades of the this century. In short, the future conflict environment, while radically different from what is being experienced after the Gulf War period, will still find military forces operating under a 'nuclear overhang'. The following are a few explanations why a nuclear over hang will persist:-

- a Nuclear weapons would likely prove irreplaceable, as instruments of assured destruction of the enemy homeland. As such, nuclear weapons would continue to exert a 'dampening' effect on military operations, particularly strategic strikes. Those states, possessing a robust nuclear deterrent, will probaly see their homeland accorded status as a strategic sanctuary, not only from nuclear strikes, but perhaps from all forms of strategic strikes. Indeed, even forces highly capable in conducting operations to achieve information dominance or LRPS operations, may find themselves severely limited in their ability to employ these capabilities directly against a state possessing even the modest nuclear arsenal.
- b Nuclear weapons will remain a relatively 'cheap', albeit 'primitive' counter to a non-nuclear precision strategic strike operation. This will make them attractive to less competitive nations. As more states develop nuclear weapons arsenals, this strategic strike capability of the last resort, will retain an

important deterrent and war fighting role, even for peer competitor states.

- c Resource constraints may lead some nations to adopt a 'high-low mix' of non-nuclear and nuclear strategic strike systems. If the stakes are high enough and if, through miscalculation, the supply of non-nuclear strategic-strike munitions proves insufficient to achieve the military objective, nuclear weapons employment may be seen by some as an acceptable 'supplement' to non-nuclear strategic strike operations.

PART-V**EMPLOYMENT STRATEGY FOR SMALL NATIONS'****AIR POWER****Large and Small Nations Air Power - Fundamental Difference**

105. Before embarking upon the discussion of how small nation air force (generally termed as Tactical Air Force) could be employed, it would be pertinent to understand what features generically distinguish small nation air power and, as such, influence its employment. But before that, it has become a misnomer that small airpower is unable to undertake strategic strikes; partly because of mass and partly due to repetitive assertions by studies and doctrines available that generally address and are undertaken keeping in view large airpower(s). The main limitations that distinguish a small airpower nation can be termed as economy based. Small nation afflictions include low mass, low sustainability, limited technology, low tolerance to casualties and low capacity for platform attrition. It could be further characterized as follows:-

- a. Mass equates, effectively, with platform and weapon numbers. The inability of small nations to achieve high levels of air power mass is obvious. In general, most nations tend to spend around two to three percent of their gross domestic product on defence. Two per cent of a superpower's budget provides for a great deal more in weapons systems than does two per cent of a tiny Pacific Island economy.
- b. Sustainability of war effort is also a significant impediment to small nations. Large nations tend to have large amounts of 'hi-tech' industry, often

supported by high levels of self-sufficiency in raw materials and accompanied by extensive research and development infrastructures. The ability to indigenously produce war materiel, coupled with an efficient logistics infrastructure, can produce a war-fighting system, capable of operating at high intensities for indefinite periods. Small nations, on the other hand, depend on the peace-time storage rather than wartime production of military stocks and the size of this stockholding is constrained by economics. With less of an organic war production capability and limited stockholdings, small nations are logistically dependent on external sources and, therefore, more vulnerable to interruptions in supply. Unsupported, a small nation, with finite resources and known contingency parameters, can calculate uptill the day when the first critical provisions will run out. Except where small nations can secure substantial and reliable third party support or alternatively dictate the pace of the conflict, war may be a critically finite affair. As a result of sustainability questions, small nations within war will generally expect difficulty in reaching and maintaining the kind of operational tempo seen in the major 20th century air campaigns. Operations are more likely to be sustainable, when conducted on a selective and regulated rather than continuous and intense basis.

- c. Limits in technology again result from defence budget limitations and means that small nations tend to carry, at the best, the earlier marks of newer generation equipments. Certain relatively complex or expensive capabilities including space-based systems, active electronic warfare (EW) and the suppression of enemy air defences (SEAD), may not be carried by small nations at all. They may also lack the sophistication in C4I (command, control, communications, computing and intelligence) systems, that the larger nations have achieved, and are, therefore, bound in terms of pure management capacity to simpler, lower intensity operations. The coordination of complex, high tempo campaigns may be beyond small nations, but then, so are the numbers of aircrafts and the sustainability demands for such a mode of operation.
- d. Sensitivity to casualties and equipment attrition is certainly not unique to small nations. However, extra to the moral, media and mandate concerns of large nations, attrition for small nations more critically affects sustainability. The loss of one small nation strike pilot represents a greater than two percent loss in strike capability for some small nations. If the loss involves one of a few experienced senior pilots, then the effect on combat potential may be even greater than the figure alone suggests. Each individual aircraft lost would similarly represent a much larger percentage of the total force than for large nations.

To further exacerbate the problem, small nations may lack the large nation capacity to create and maintain reserves for the replacement of losses in wartime. Whatever the air strategy adopted by small nations in conflict, it must observe the imperative to preserve precious resources. Risk must be managed with special care. While avoidance of attrition is important for all military forces, it is critical for small air forces.

Importance of Having Exclusive Employment Strategy

106. The emerging suggestion from the foregoing discussion can be, that small nation airpower within the limitations described should maintain the employment strategy of supporting role for the surface forces, due to its inability to generate strategic strikes. Two factors have led small nation's air power to concentrate on the support of surface forces, instead of higher strategic aims. The first factor is a history of sub-ordination to larger partners within colonial empires, super-power alliances and UN coalitions which has created a reliance on other parties for strategy formulation and employment. Small nations have dedicated themselves to becoming tactically proficient, doing what they are told, rather than seeking to understand and directly address enemy policy-makers as the true source of conflict. The second and, perhaps, more significant factor is the long-standing tacit assumption that strategic bombing requires mass beyond small nation means. This falsehood has been reinforced by the major, so-called, strategic air campaigns of the 20th and initial 21st century, each involving many hundreds and even thousands of aircrafts, and weapons delivery in the order of 40,000 tonnes per month.

107. Does it imply that small nations need not to build air strategies of their own, and that there are definite peculiarities of the generic small nation's condition that hampers the process? The problem is that most of the world's celebrated air strategies are written by and for large nations. The source material for small nation air strategy is somewhat limited. Strategic strike, that can actually lead to strategic paralysis, as planned and executed by super-powers, may offer limited advice to small nations, contemplating their own potential in strategic strike. In order to understand, whether a high order strategic orientation to air strike, that could lead the enemy in his decision loop and cause a virtual paralysis in his decision-making, could be beneficial to small nations, thus, it will be useful to first clarify and explain on some basics regarding small nations in war.

108. It is the large nation quest for total victory, through the complete collapse of the enemy state, which has seen strategic air power used on such a massive scale. Whether the large number of aircrafts available begets the strategy or the strategy begets the acquisition of large numbers of aircrafts, is beside the point to small nations. The business or the aim of collapsing enemy states is simply not one for the small nation. Such collapse, in any case, may be the only means of achieving the end state required. War, when distilled to its essence, is about achieving the abandonment of the enemy's political aims. The collapse of his war effort is only one means to that end. If that be the case, *the specific aim, then, becomes the enemy's resolve rather than the whole nation's ability to function and support war*. If the aim of employment of airpower in strategic air attack, is essentially to coerce the enemy leadership to make a decision or a behaviour change or otherwise a

relinquishment or modification of policy, which serves the interests of the air attacker, then, this presents a much more precise target and a viable proposition for the guidance of small nations in war.

109. All individual nations have their unique sets of national interests. These interests tend to fall into four general categories: defence of the homeland, economic well-being, favourable world order and the promotion of values. The pursuit of national interests pervades all interactions between nations on the international playing field. Each nation bids with its own specific agenda and each acts to dominate those parties whose interests are pursued in conflict or competition with its own. This process is continuous; as active in peace-time as in war. The ability of any one nation to have its own way, is a function of its 'national power'; otherwise, usefully considered to be the capacity of a nation to either influence or force other nations to act in a manner desired by it. The instruments of national power have been variously described, but these can be considered to exist in three basic categories: political/diplomatic, economic and military.

110. It is much simpler to discuss national power in qualitative rather than quantitative terms. However, the magnitude of any one nation's power might be considered to be determined by two interacting factors. The first factor involves the actual assets and capabilities of a given nation. The vast array of these includes gross national product, population, education system, industrial development and weapons sophistication. The second factor acknowledges the importance of relations between governments and involves the techniques by which the assets and capabilities are brought to bear in pursuit of national interest. That is, the orchestration and application of the elements or the strategy. Thus,

capabilities alone constitute only half the picture. What is equally important is the way in which those capabilities are mobilised in support of the act of influencing. National power, then, is ‘a product of capability and strategy’.

111. The military element of national power cannot be isolated from the peacetime processes of inter-governmental manipulation and coercion which make up international politics. The perceived military power of a nation is a silent but ever-present factor in the way it behaves, and in the way other nations respond to it in peacetime. However, war can be distinguished as the point at which violence becomes a legitimate form of conflict resolution; at which the military element of national power is brought physically into play. When peaceful options for influencing an opponent have been exhausted, war becomes the final arbiter. In Clausewitz's words, “War is, thus, an act of force to compel our enemy to do our will”.

Proposed Strategy for Small Nations

112. Small nations have small assets and capabilities: small GDP, small populations, small industrial bases, small air forces etc. Where such limitations are reasonably fixed, the obvious route to the enhancement of national power is through a superior strategy. This means, using the resources in hand to the most potent effect. It is true for all elements of national power, but especially true in the application of military power. It is here that small nations need to be able to build air strategies of their own and that their limitations of being the generic small nations, have to be accommodated in the process.

113. There had been many sets of concepts, which dominated super-power strategic bombing doctrine, but the ones that are most common include: high mass, high speed, high tempo and high

sustainability: all brought together in-parallel to achieve the unconditional surrender of enemy, through the single-handed application of air power. The evolution of this paradigm has been visible through the major conflicts of the past and has culminated in the air campaigns of this decade. It is, perhaps, now commonly accepted as being a classical representative of 'strategic bombing', as was the World War-II Allied bomber offensive in its time. The recent model being presented by Col Warden through the famous five rings. The model has become popular among both large and small nations since its inception. What is sometimes overlooked by small nations, however, is that the theory presumes a super-power or super-power coalition level of resourcing. It centres around achieving strategic paralysis - the large scale destruction of critical functionality within the enemy war-making machine, through the incapacitating of entire sub-systems. In doing so, it assumes military capability and capacity well beyond the normal means of small nations.

114. Small air forces do not have the capacity to create strategic paralysis; in the same way, the small nations do not go for an invasion. The efforts customarily required to cause the collapse of (and keep collapsed) the entire enemy system makes it large-nation's or large-coalition's business. The approach requires an immense quantity and concentration of resources (military and economic), for often indefinite periods of time. It is further suggested that conflict termination is now a great deal more sophisticated than the traditional expectation of simple and total victory. This particular area of war termination is worthy of more attention. With respect to small nations, the only point that needs to be highlighted is that, war is often ultimately fought for limited

objectives; that war termination does not, necessarily, involve forcing of surrender; and that the collapse of the enemy regime need not be aspired to or achieved. The significance of this is, that it effectively lowers the threshold of viability for size-limited strategic air forces. Small nations can anticipate productive employment of strategic air power, without envisaging the ownership of adequate resources to completely destroy an enemy nation. A small air power nation is in no position to bid for enemy annihilation, but once it is realised that this is not actually what is required to satisfy national security requirements, then, the small nations will inherit the justification to become fully participant in the business of strategic air strike. Recognising the adequacy of a limited task elevates the potential significance of small nation's capability.

“The underlying difference of aim between an aggressor and those he attacks, offers the latter a potential advantage for economy of force and, thus, for superior power of ‘staying the course’. For him to succeed, he has to conquer. For them to succeed, they have only to convince him that he cannot conquer, and that continued effort will bring more loss than gain. They are, thus, able to wage a far less exhausting kind of war”.

Liddell Hart: (April 1939)

115. Limited means, such as those characteristic of small nations, demand limited objectives. As Clausewitz notes, “If the enemy is to be coerced, you must put him in a situation that is even more unpleasant than the sacrifice you call on him to make”. There are two parts to this equation. The first involves the amount of force or stress you can bring to bear on him, but the second recognises that this force is only relevant in its relativity to the size of your own objectives. 'The smaller the penalty you demand of your opponent,

the less you can expect him to try and deny it to you. Thus, the limitation of objectives in a small nation's war can be an important compensator for a lack of mass and sustainability. What is required, is the ability to apply sufficient force, as directly as possible, to the party who makes the decisions and concessions.

116. However, it does not imply that within the destructive use of air power, the specific utilities of counter-air operations, (CAOs), battlefield air interdiction (BAI), maritime strike or any operational role in direct support of the surface situation, should be compromised. The indispensability of these air strike applications in modern combat, is well understood and documented. The option of strategic strike is promoted simply, as an extra dimension to the existing air power applications, offering choice to the grand strategist - a potent extra device to variously employ in manoeuvres for peace. The 'optionality' is important, as coercion opportunities against the enemy leadership, may not always be apparent, and in low level conflict, a strategic bombing approach may not be warranted. In such cases, small-nation air power should simply revert to or remain with the lower orders of strike currently preferred. Therefore, the challenge that has been put to small nations is, to raise the strategic order of air strike operations, to prepare not just for the direct and indirect support of fielded battle, but also for the exploitation of opportunity, to more directly influence the ultimate strategic aims in conflict. There is a very large pool of small nation air power that is employed in offensive air support activities and little formal methodology is apparent for the achievement of higher order tasks. PAF is no exception as it focuses on the battlefield with little direct attention to the political/strategic level applications of the air power.

117. The large nation paradigm for strategic air power application would quickly erase small nations hopes, if accepted as the standard. The degree to which a strategic air power might be single-handedly decisive, is a distraction to the small nations, who contemplate its utility. It is important to recognise that air power does not win wars alone, especially when applied on a small scale, but alone it can contribute towards a significant influence on the overall outcome. The strategic air offensive may be contributory or leading in a joint campaign, but the doctrine of its independence is fundamentally problematic. A strategic air offensive may be an indispensable collaborator in the final solution, but to argue for the 'independence' and 'decisiveness' of any one element of national power denies the true joint nature of influence.

118. Therefore, basic qualities of offensive air power can be moulded into other styles, perhaps, to the benefit of small nations. Small nations should not necessarily aspire to a simultaneous bombing of the targets across the strategic spectrum; they should not fixate on achieving an autonomous air power result and they need not to be obsessed with pursuing unconditional surrender. While surrender may be the ambit claim, small defenders need to understand their own bottom line and shape their strategy accordingly. Instead, small nations might focus their limited resources on the supreme enemy decision-maker in all planning; design strategic air campaigns to coincide with supplementing, complementing and achieving leverage off other military and political instruments of coercion and focus on coercing simple mind-changes in the offending leadership, rather than attempting to physically cause collapse of the entire regime. The aim of strategic air attack should essentially be to coerce the enemy

leadership to make a decision or undergo a behaviour change which serves the interests of the air attacker.

119. As a more practical illustration of the concept, consider a fictitious scenario involving Argentine's success in sinking either of the British Task Force carriers, Hermes or Invincible in the 1982 Falklands War. At first, such an action may appear purely military in nature. Eventually, perhaps, within days, the reduced British capability in the war zone would have led to further losses and ultimately to the physical overpowering of landed military forces by Argentina. However, the consequences of such an air strike on the resolve of the British decision-makers would have been much more critical and instantaneous than on the military campaign itself. Almost without doubt, the British leaders, with the mainstay of their military effort destroyed, would have withdrawn forces from the region, thus, relinquishing (at least temporarily) their strategic objectives. Such an air strike would have been of extremely high strategic order. It would have had both military and political ramifications, but the direct political influence i.e. the one on the supreme British decision-making body would have been so dominant as to render military consequences obsolete.

120. In our region too, 'coercion' has gained relevance as it has become more acceptable and has, therefore, replaced to an extent conquering spaces as a strategy, especially under nuclear umbrella. India, therefore, out of compulsion of the global, regional, and physical factors, is adopting the strategy to be able to coerce Pakistan into conformity according to her stated politico-military objectives. Internationally too, the permitted currency of strategy is coercion. It is pertinent to appreciate that coercion has attained an overarching wide strategy, which encompasses the application of

psychological, physical and diplomatic nuances of the total national capability including war, which will be the ultimate means of coercing the other side through damage or destruction, so as to achieve national politico-military objectives.

121. Since coercion is a psycho-political message, its military manifestation resides in delivering the message in an escalatory ladder of pain and damage, which at a certain point becomes unbearable to the intended protagonists. This, therefore, needs to be undertaken with an absolute assurance of damage or destruction with least collateral or unwanted damage, so as to avoid a wider or an irrational escalation, and also with the least expense of force. What essentially we are looking for is 'Reach', 'Lethality' (firepower + accuracy), and minimum application of force with maximum returns and this is enhanced with a more assured element of surprise and safety of own forces. All recent campaigns; Bosnia, Kosovo, Gulf Wars 1&2, Afghanistan have availed of these attributes of Air Power to coerce the enemy into submission. Additionally, in our own regional scenarios too, the element of air continues to weigh heavily on our minds. Air power today is the tool of choice for application of politico-military strategy, and enables nations to execute and resolve conflicts with minimum application of force.

122. Today, Air Power is being increasingly called upon to break the resistance of the opposing forces, so that friendly or allied land and naval forces can walk or sail in. Pakistan's recent military operations against terrorists in Swat and Waziristan have benefited considerably through use of air force to target militant hide-outs and eliminate known strongholds. Analysis of Air warfare in the recent times, points to the concepts of Air and Space control, Information Warfare and Global Attacks through precision

engagements etc, providing accuracy, reach and immense destructive power to any Air Force. Consequently, post Cold War era is quite different from the earlier eras, making comprehension of contemporary strategic thought and concepts a necessity for small air powers.

123. The 'Five Ring Targeting Philosophy' put forward by Colonel Warden, proved the dominance of Air Power to attack, with precision, the centres of power and political will by bypassing the traditional 'fight to the centre' concept. With the superior command structure accessible, a direct attack can now be used to influence the leadership. This aspect of targeting has also changed the concept of strategic and tactical attacks, causing the two to merge, with emphasis on 'desired effects' rather than reined, leaned or dedicated concept of air power. Air power today is capable of an early achievement of the objectives of war. It is further highlighted here, that mere possession of this capacity, that equips a nation with capability, would not work alone, it must be supported by a well-deliberated doctrine, leading to a well-thought-out strategy of targeting, with innovative boldness in application, that will accrue the desired effects. A mere possession of a capability is latent coercion, but only an active application will accrue the high-end objectives of coercion.

Applied Lessons for Small Nations

124. A small nation's air force should follow a developmental strategy, to enhance her potential peculiar to its own existing environment with capability to generate limited strategic effects and must be equipped to undertake air operations spread over the entire spectrum and levels of war.

125. The key to successful employment in operations would be a bold and innovative application. When applying offensively, small air power should do it on selective basis, but with effect and assured success. Precision engagement and strategic effect, relevant to the environment must be within the capability of a small air force. Only correct employment of modern technologies would bring about beneficial dividends.

126. Precision also compensates for the requirement of mass and favourably reduces over-the-target requirement, thus, minimizing attrition. Selective and precision targeting, therefore, becomes a vital factor for the small air force. As of today, joint operations, especially targeting, should be a common theme of joint planning.

127. With limited resources at the disposal of small nation armed forces, true synergistic effects can only be achieved through combined efforts. The concept of joint operations through integrated employment, therefore, would be extremely important to gain higher order strategic effects. With joint planning among all forces, along with other military and political instruments of coercion, a parallel attack concept can be applied, especially in a sectoral conflict. Additionally, striking critical targets could help mould public and political opinion more quickly at the international level and, consequently, affect the outcome of battles indirectly.

Conclusion

128. The concept of air power is just over a century young, but has demonstrated and established itself as a decisive one. Air power cannot win wars alone, but no war can be won without air power. The complex security environment of the 21st century challenges those military constructs and methods, based purely on state-based conventional conflict. The combination of greater weapon lethality,

enhanced mobility, real-time communications and targeting and media over-watch, results in a far more complex security environment. It, therefore, becomes imperative that small nation air power must continue to evolve and train, while staying ahead of the challenges posed. Air Power is inherently offensive and, when employed in harmony with other services, has the ability to produce synergetic and decisive effects.

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EVOLUTION OF MARITIME STRATEGY AND EMPLOYMENT OF NAVAL POWER

“Whosoever commands the sea, commands the trade; whosoever commands the trade of the world, commands the riches of the world, and consequently world itself.”

Sir Walter Raleigh

Introduction

1. The water covers seventy percent of the earth’s surface and over two-third of the world’s population lives within 100 miles of the seas.¹ The oceans connect the nations of the world, even those countries which are landlocked. The world economy is tightly interconnected. Total sea borne trade has more than quadrupled over the past four decade, 90% of the world’s trade and two third of its petroleum are transported by sea.² The sea lanes of communication are supporting shore infrastructure, the lifelines of the modern global economy, which are visible and vulnerable symbols of the modern distribution system that relies on free transit through increasingly urbanized littoral regions.

2. Through the historical review, it is clear that sea has been playing an important role for the prosperity and well being of mankind. The sea serves as a great economic and trade highway, it allows nations to maintain uninterrupted link for exerting their political influence. As a reference it can be mentioned here that the Indian Ocean can only be accessed from some of the world’s crucially important strategic choke points, including Strait of Hormuz, Straits of Malacca, Cape of Good Hope and Bab-ul-Mandeb. It serves as a zone for economic and cultural exchange, including hosting traffic of half of the world’s containerized cargo, one third of its bulk cargo and two third of its oil shipment. About 100,000 ships criss-cross Indian Ocean annually. On the average,

¹ British Maritime Doctrine, 3rd Ed. (London: HMSO, 2004),p.17.

² A Cooperative Strategy for 21st Century Seapower, (USN, Oct 2007), p.1.

about 80 tankers pass through the Strait of Hormuz, almost 170 ships each day through the Malacca Straits and around 90 ships from Bab-ul-Mandeb, making these the vital trade lifelines of the world. The concept of use of sea power and the maritime strategy played significant role in shaping the world order. As we see today, it was realized much earlier by the thinkers and strategists that the control of the sea would be extremely essential for a country vying for economic strength and global influence. This urge for influence led to the formulation of the maritime strategy and development of naval power. However, over the years the maritime strategies and the development of naval power have been greatly influenced by the Industrial Revolution and the advent of nuclear age. These developments have brought additional attributes to naval power, thus, making it an effective tool to pursue national aims and objectives.

3. The term maritime strategy and naval strategy are often considered similar. However, it is important to understand the difference between the two. Maritime strategy is defined as 'the art of directing maritime assets to achieve the required political objectives'. It uses the sea to exploit geography to the advantage of a littoral state and seek to deny its advantage to the enemy. The word maritime encompasses everything related to the sea and includes elements like ocean resources, mercantile marine, fishing fleet, ports and harbours, coastal infrastructure, maritime industry, exclusive economic zones and naval forces etc.

4. Maritime strategy also encompasses all the means, measures and the policy tools required to harness, exploit, develop, safeguard and support these maritime resources and assets. On the other hand the term 'naval strategy' pertains to the means and the measures employed to develop and deploy naval forces as a tool of defence policy. The naval strategy entails development and employment of the forces. It does not relate to some of the elements which have been mentioned earlier. Maritime strategy of a country flows from

the National Maritime Policy. Naval forces constitute part of both the policies i.e defence and maritime policies.

Aim

5. The aim of this study was to evaluate the impact of naval power on contemporary naval theories and the manner in which naval power and its employment is likely to emerge as an important factor in the future. It also aimed at drawing lessons for own naval strategy and doctrine.

6. For the ease of assimilation, the study report has been divided into following parts:

a. **Part – I: Evolution of Maritime Warfare**

- (1) Maritime Strategy – A Historical Perspective
- (2) Elements of Maritime strategy and their basic concepts, including economic dimension, political dimension, legal, military, scientific and technological, physical and socio-cultural dimensions.

b. **Part – II: Maritime Notions**

- (1) Maritime Notions such as command of the sea, sea control, sea denial, fleet in being, cover, maritime power projection and maritime manoeuvre.
- (2) Naval strategy and related concepts such as; blockade, containment, embargo, economic sanctions and quarantine enforcement.

c. **Part – III: Maritime Strategic Thought**

- (1) Maritime Strategic Thoughts - Mahan and Corbett.
- (2) Maritime strategies of World Wars.
- (3) Maritime strategies – Cold War era.
- (4) Maritime strategies – Post Cold War.
- (5) Co-operative strategy for 21st century seapower.

- d. **Part – IV: Employment of Naval Power**
 - (1) Employment of naval power, like constabulary policing, benign conflict prevention, peace-making, peace enforcement, peace-keeping, peace building, humanitarian assistance and disaster relief and military.
 - (2) Influence of technology on maritime warfare.
 - (3) Employment of naval forces under nuclear environment.
 - (4) Low intensity conflict at sea.
 - (5) Future trends such as influence of technology, effect based operations and network enabled capability.
 - (6) Regional maritime strategies.
- e. **Part – IV: Analysis, Lessons learnt for Pakistan and Conclusion.**

Part-I**EVOLUTION OF MARITIME WARFARE**

7. **Age of Galley (Upto 16th Century).** In ancient **Mesopotamia**, **Ancient Persia**, **Greece** and the **Roman Empire**, the most common type of warship was the **galley**, a long, narrow vessel, powered by banks of oarsmen and designed to ram and sink enemy vessels or come alongside the enemy so its occupants could be attacked hand-to-hand. However, the development of catapults in the 4th century B.C. and the subsequent refinement of its technology, enabled the first fleets of artillery equipped warships by the Hellenistic age. Until the 16th century, naval warfare relied on the ship itself, which was used to ram into other vessels along with the swords of the crew, various missiles such as bows and arrows and bolts from heavy crossbows fixed on a ship's bulwarks. Naval warfare primarily involved ramming and boarding actions, so warships did not need to be particularly specialized.

8. **The Age of Sail (16th to Mid 19th Century).** Naval artillery was re-developed in the 14th century, but cannon did not become common at sea until the guns were capable of being re-loaded quickly enough to be re-used in the same battle. The size of a ship required to carry a large number of cannons made oar-based propulsion impossible, and warships came to rely primarily on sails. The sailing man-of-war emerged during the 16th century. By the middle of the 17th Century, warships were carrying increasing number of cannons on their broadsides and tactics evolved to bring each ship's firepower to bear in a line of battle. The man-of-war now evolved into the ship of the line. In the 18th century, the frigate was considered too small to stand in the line of battle. These were also required to convoy trade, act as scout for enemy ships and carry out blockade of enemy coasts.

9. **The Age of Steam (Mid 19th Century to World War-II).** During the 19th century a revolution took place in the means of

Age of Galley



Age of Sail



propulsion, armament and construction of ships. Steam engines were introduced, at first as an auxiliary force, in the second quarter of the 19th century. From the 1850s, the sailing ships of the line were replaced by steam-powered battleships, while the sailing frigates were replaced by steam-powered cruisers. The armament of warships also changed with the invention of the rotating turrets, which allowed the guns to be aimed independently of the direction of the ship and allowed a smaller number of larger guns to be carried. The final innovation during the 19th century was the development of the torpedo and the torpedo boat. Small, fast torpedo boats seemed to offer an alternative to building expensive fleets of battleships. Germans deployed U-boats for anti-commerce warfare during World War-I. Use of submarines and seaborne air power during World War-II transformed the concept of naval operations (i.e a fleet is required to destroy a fleet) and significantly undermined the dominated state of battleships towards the outcome of a naval battle.

Maritime Strategy – A Historical Perspective

10. The concept of maritime strategy and use of maritime power in the emergence of great power; status of countries as we see today, has its roots deep in the history. Maritime awareness, of mankind as per available historical records was first realized in 5th century B.C, when sea battles were fought as an extension to the land battles, making military use of Galleys.

11. The significance of sea control for prosperity was realized much earlier by the thinkers from ancient Greeks to early Muslims and later by the West and others. When Europe was going through the dark ages, Arabs embarked upon developing their maritime assets in the middle of 7th century, which included ship-building industry along the North African coast, building of merchant ships and fighting fleet. Muslims enjoyed complete mastery of the Mediterranean in the century from 850 A.D to 950 A.D. Under the leadership of famous Muslim Admiral, Khair-ud-Din Barbarossa

during the 16th century, when entrusted with the command of the fleet by the Turkish Sultan Suleiman Muhammad-II, the Turks enjoyed complete supremacy in the Ionian Sea. Superior naval strategy in the age of Galleys by Admiral Barbarossa ensured dominance of Ottoman Empire in the Mediterranean.

12. The 16th century saw the advent of sail ships armed with cannons. The Muslims under the Ottoman Empire failed to grasp these technological innovations and this coupled with a land oriented mindset resulted in the weakening of their naval power, which was taken over by the Europeans. From this time onwards the Europeans spread their dominion eastwards into the Indian Ocean, South East Asia and the China seas to exploit the riches and then, they went by sea to outflank the Muslim dominance of the land routes. Period from 16th to 19th centuries witnessed a race between European powers to acquire new colonies and control the new found riches. In the 19th century the Great Britain was the only naval power in the world. Her power was so overwhelming that no nation or combination of nations contested her authority. English strategists like Sir Walter Ralieggh and Sir Francis Bacon were taking tentative steps towards evolving a maritime strategy for the age of sails. They were anxious to show, among other things the advantages of a maritime rather than a Continental strategy. Sir Bacon said that “England should not waste her energies on wars on land, but should make the most of her maritime resources. *“Who so commands the sea is at great liberty, and may take as much and as little of the war as he will”.*

13. Industrial Revolution in Europe and advent of steam engine also revolutionised defence hardware and fairly implicated the maritime strategic thoughts as well. European powers realised the fact that the sea power and the prosperity advanced side by side, and the sea power received recognition as an independent force having three basic functions:

- a. It was an effective means of acquiring colonies, dominating trade and becoming prosperous.
 - b. It helped its possessor to keep what he held.
 - c. It was a decisive means of prevailing in conflict.
14. Captain Sir John Colomb, a respected naval strategist of the time, analysed the tactics of decisive battle, developed the notion of the fleet in being and identified various types of blockades. He argued that command of the sea was still essential for all things. In his book 'Naval Warfare' he said that "The real role of the army was to garrison bases at home and abroad, to defend India and to be used for expeditions overseas. Once the Navy had secured command of the sea, then the army could be set for action. The Navy would provide the necessary maritime conditions for such enterprises and would act as a shield to guard the army."

Elements of Maritime Strategy and Their Basic Concepts³

15 The Economic Dimension

- a. Economically, the traditional use of the sea is as a medium for transport. Ships still account for 99.5% of trans-oceanic trade, the volume of which has increased by a factor of eight since 1945; and it continues to increase. Maritime trade will certainly remain the principal means by which raw materials and manufactured goods are transported between supplier and customer nations. One third of that trade is in oil and petroleum products, about half of that is originating in the Middle East and mostly going to either Western Europe or Japan. Other cargoes of significance are iron ore (9% of seaborne trade), coal (8%) and grain (5%). The remainder can be classified as 'other cargoes' (fruit, meat and manufactured goods).

³ British Maritime Doctrine, 3rd ed. (London: HMSO, 2004),p.18.

- b. Maritime trade reflects the increasingly interdependent and complex nature of the modern world and the operation of an intense free-market environment. Ships belonging to a company registered in one nation, may be registered under the flag of another; they may also have multi-national crews with conflicting loyalties. Shipping companies themselves may be components of international conglomerates, as may the owners of the cargo being carried. As a consequence, the identification of beneficial ownership and appropriate state responsibility for protection of shipping, together with interest in its employment and safety are often complex matters. However, they are also relevant, when it comes to applying economic sanctions, through embargo operations.
- c. Fish provides about 25% of the world supply of animal protein. The bulk of the world catch is taken in the relatively shallow waters of the continental shelf, within 200 miles exclusive economic zones (EEZs). About 75% of the total catch comes from the North Atlantic and Arctic, North Pacific and the west coasts of Africa and the Americas. The control of fishing and the management of fish stocks is problematic, with most fishing nations deploying fleets to grounds within other states' EEZs. For some states, fishing can represent a substantial proportion of their economic activity. Over-fishing is today a major feature of almost all world fisheries, with stocks declining, as technology makes fleets more efficient. Scarcity of fish and over-fishing result in the risk for dispute. To prevent over-fishing, more rigid and better policed regimes are required.

- d. Nothing has motivated coastal states to extend jurisdiction more than the prospect of hydro-carbon riches on the Continental shelf. This has also created potential for disputes. While maritime boundary disputes are generally resolved peacefully, there are some whose political, legal and economic complexities defy negotiated resolution. The reason for tension in the South China Sea between China, and Vietnam, Burundi, Malaysia and Indonesia, for example, is related (though not exclusively) to the prospect of substantial oil or gas fields in the region. Oil is a diminishing resource and will continue to be a highly attractive commodity of which states will wish to take full advantage.
 - e. Also within the economic dimension are the illicit activities that can undermine the security of coastal regions. Human trafficking and illegal narcotics are, perhaps, the greatest criminal threats to our security in the long term and piracy remains a threat in a number of regions around the world.
16. **The Political Dimension**
- a. The modern political dimension of the maritime environment took shape largely during the 1970s. For a great many coastal states, especially those in the developing world, the waters adjacent to their coasts represented the only prospect for expansion. The extension of sovereignty was often a political act that happened to have some economic consequences, rather than something that was done for the objective calculated economic benefit. Many states, especially small island territories, having asserted their rights to claim sovereignty over offshore resources, now find themselves without the

wherewithal to police their maritime domains and manage their maritime resources effectively. Disputes over boundaries may be motivated more by political symbolism than by pragmatic calculation of costs and benefits.

- b. Some states increasingly regard their maritime domains as part of their territory when, legally, territorial sovereignty is both restricted to a maximum of 12 nautical miles from the coast and limited by the rights of other states to exercise innocent passage. This is especially important in the context of international straits and archipelagic waters that define strategic choke points in which the coastal states have no right to suspend innocent passage.

17. **The Legal Dimension**

- a. The UNCLOS process has transformed the maritime environment, which has become far more complex in the legal sense. This provides guidance on both the rights and obligations of all states enshrined in 1982 UNCLOS, including precisely what is and is not permitted in the various jurisdictional zones that coastal states may now claim as elements of their maritime domains. Commanders of maritime forces cannot function legally without an instinctive feel for the restrictions imposed on them in internal waters, territorial seas, contiguous zones, exclusive economic zones and on the continental shelves claimed by coastal states. They will not be able to take full advantage of maritime mobility without a similar understanding of the rights of innocent passage, straits transit passage and archipelagic sea lanes passage.

- b. International law provides free and legal access for ships up to the territorial seas of states and rights of innocent passage for the purpose of either traversing territorial seas, without entering internal waters or proceeding in either direction between the high seas and internal waters. There is also the right of unimpeded transit passage through territorial seas that comprise an international strait.
- c. Any law has a tendency to breed more law and there is little doubt that the legal dimension will continue to develop. Pressure for more law is currently focused on environmental concerns, which may further restrict ship movements and undermine flag state rights. There is a need for more effective policing of the existing regime, in particular in relation to fisheries and drug interdiction, but this has to be balanced against the need to retain freedom of navigation.

18. **The Military Dimension.** The seas have had a military dimension to them for well over 2500 years. This is not changing and shows no sign of doing so, despite marginal attempts to demilitarise the oceans. However, with the bulk of maritime military operations likely to be concentrated in the littorals, small, fast vessels armed with relatively unsophisticated surface to surface missiles can complicate sea control calculations. Once open hostilities break out, this type of threat can be dealt with effectively by a competent and well packaged maritime force. However, it is in those periods of rising tension, when states are flexing their muscles and the atmosphere is one of ambiguity and caution mixed with firm assertion of rights, that the presence of such vessels generates most concern. If a conventional submarine threat is also added to this scenario, the maintenance of adequate sea control would become considerably more complex.

19. Scientific and Technological Dimension

- a. The military dimension of the oceans has a technological perspective. Navies are equipment intensive and modern warships are sophisticated weapons platforms linked to one another by equally sophisticated command and control systems. However, technology is no panacea, as relatively unsophisticated vessels may seriously threaten the mission of the most sophisticated task group.
- b. At the other end of the scale is the problem associated with highly sophisticated navies trying to operate with the less well provided. This is highlighted by the increasing need for individual navies to operate together in multi-national forces. They are made even more complex when the multi-national forces are coalitions of willing nations whose navies operate with different doctrines, procedures, equipment and capabilities.

20. The Physical Dimension

- a. Geographic, oceanographic and meteorological conditions will affect the ability of maritime forces to conduct operations. Oceans provide access to all parts of the globe, with the exception of those regions at the core of the large continents (85% of states have a coastline). The operating areas of maritime forces range from the deep waters of the open oceans (known colloquially as blue water) to the more confined and often – although not invariably – shallower waters of littoral regions, estuaries and rivers (frequently, though misleadingly, referred to as ‘brown water’). Perhaps the most significant physical characteristic, however, is the disposition of land bordering the sea. Maritime choke points are

one manifestation of this factor. The Straits of Gibraltar, Bab-ul-Mandeb, Hormuz, Malacca and Formosa, are but five of the seventeen or eighteen strategically most significant in the world. The greatest cluster is in and around Indonesia, the Philippines and the South China Sea. The closure of significant straits in that region could increase deployment distance and times for ships.

- b. Weather can have a significant tactical or operational impact and can influence military-strategic decision-making. Seasonal fluctuations in weather can have strategic significance. Flying operations, amphibious landings and sonar performance may be made more difficult by high sea states and extreme high and low temperatures.

21. **Socio-Cultural Dimension.** The socio-cultural dimension is principally concerned with the major socio-cultural cleavages during combined operations at theatre level. Some societies and cultures may apply significant central control, which will have an effect on their command and control, down to the tactical level. This can have an impact on the way that operations are conducted to the lowest levels. To achieve inter-operability, we need to know the difference in ROEs and their applications.

Part-II**MARITIME NOTIONS**

22. **Maritime Notions.** The maritime notions which were pondered over by the strategists of the 18th century are still very much relevant today, which are as under:

- a. **Command of the Sea.** It has always been the desire of any maritime nation and the concept was, thus, considered to be the principal objective of any naval force. This is defined as the possession of such degree of superiority that one's own operations are unchallenged by the adversary, while the latter is incapable of utilizing the sea to any degree. That actually tentamounts to having a total control of the sea.
- b. **Sea Control.** Sea control is the ability in which one has freedom of action to use the sea for one's own purposes in specified areas and for specified periods of time and, where necessary, to deny or limit its use to the enemy.⁴ The duration and extent of such sea control is the function of the resources, which are available to enforce it and the requirement of tasks to be performed. Sea control depends on the resources, time, strengths of the enemy and so on it has thus, seen many shades as limited sea control, geographical sea control and many others used in the naval strategy. The ability to operate freely at sea is one of the most important enablers of joint and inter-agency operations and sea control requires capabilities in all aspects of the maritime domain, including space and cyberspace. There are many challenges to the ability to exercise sea control, perhaps, none as significant as the growing number

⁴ British Maritime Doctrine, 3rd ed. (London: HMSO, 2004), 41.

of nations operating submarines, both advanced diesel, electric and nuclear propelled.

- c. **Sea Denial.** Sea Denial is exercised when one party denies another the ability to control a maritime area without either wishing or being able to control that area himself. It can take many forms ranging from mining to the sub-marine and air operations to threaten enemy naval surface forces. It is a tool which can help the weaker force. If one cannot seize the sea then the other option is that one denies the sea, one does not let the adversary to enjoy sea control. The ability of a country, where it does not allow the adversary to use the sea, can be termed as Sea Control. This capability is very common, because ever-since the advent of the missile, the smaller navies have been able to acquire this capability against the superior forces.
- d. **Fleet in Being.** A nation deprived of maritime superiority might choose or be forced to adopt a strategy of Fleet in Being, by avoiding confrontation with superior enemy, thus, preserving own maritime forces, while continuing to threaten those of the enemy. In the 20th century, the most obvious of the conduct of a Fleet in Being Strategy was that was adopted by Germany through most of the 1st World War, when by keeping their major surface combatants away from decisive battle, they kept the British Fleet tied down. The threat from a Fleet in Being can prevent superior opposing forces from establishing their desired levels of sea control by diverting forces to other tasks such as blockade or containment and such a method is termed as of sea denial.

- e. **Cover.** An important function for the major elements of a maritime force is to provide 'cover'. This is the provision of support, if required, to less powerful units or detached elements of the force that are engaged in operations of their own, taking advantage of the wider sea control that the main force has achieved. An example of cover would be air defence provided to mine counter-measures units, operating independently in an area of high air threat, but needing to do so in order to prepare a route into a landing for an amphibious task force. It is vital for the commander of a maritime force to recognise his responsibilities to provide cover for detached units.
- f. **Maritime Power Projection.** Maritime Power Projection is the threat or use of maritime combat capabilities at global range to achieve effects in support of national policy objectives; usually to influence events on land directly. It exploits sea control to achieve access to littoral waters from where force can be threatened or projected ashore using amphibious forces, organic aircraft, land attack weapons and special forces.
- g. **Maritime Manoeuvre.** Maritime manoeuvre is the ability to use the unique access provided by the sea to apply force or influence at a time or place of political choice. As an element of joint operations, such use enables movement, concentration of fire-power, surprise or overt presence, to gain an advantageous position - the central precept of manoeuvre warfare.

Naval Strategy and Related Concepts⁵

23. **Blockade.** Blockade is a combat operation to prevent access to or departure from a defined area of an enemy's coast and waters.

⁵ Ibid, p. 71.

It can be used operationally as a method of achieving sea control or sea denial through containment. Strategically, it may also be used as an extreme form of sanctions enforcement and as an operation against the will of a nation or regime, although it should be recognised that it may be less effective against nations that do not rely heavily on maritime imports and, to a lesser extent on exports. During full hostilities, it can prevent reinforcement, re-supply, and maritime trade and, thus, deprive an enemy of the national material and moral resources necessary to continue hostilities.

24. **Containment.** Containment is achieved by posing a threat to an enemy's critical interests so that he must retain maritime forces in their defence. The threat to these enemy interests may take the form of a direct challenge to his sea control or power projection forces.

25. **Embargo, Economic Sanctions and Quarantine Enforcement.** These operations are normally carried out under international mandate, usually from the UN Security Council, using Chapter VII of the UN Charter. As with other constabulary tasks, the level of force that may be used in enforcement must be mandated to ensure legality. Forces involved may be subject to counter-attack, so a level of overall local sea control may be required to ensure the protection of enforcement forces. These operations are normally used to restrict the ingress of certain categories of cargo, with embargoes on arms entering states being of particular relevance in many cases. These tasks are distinct from blockade, which is a full military application employed in war and which must fulfil the requirements of international law.

Part-III**MARITIME STRATEGIC THOUGHTS - ALFRED THAYER MAHAN**

26. In the late nineteenth and early twentieth centuries the two classical theorists and the founding fathers of naval strategy, the American Alfred Thayer Mahan and the British Sir Julian Stafford Corbett, laid down the principles of modern Maritime Strategy. It was Alfred Thayer Mahan, who pointed out the role of sea power in wartime national policy. Likewise, Sir Julian Corbett was the first to provide a more complete theoretical statement of the principles for establishing control of the sea in wartime.

27. In his book, 'The Rise and Fall of British Naval Mastery', Paul Kennedy writes about Mahan as:⁶

"Mahan is and will always remain, the point of reference and departure for any work upon sea power."

28. Alfred Thayer Mahan, pointed out the role of Sea Power in wartime national policy. His famous work, 'The Influence of Sea Power upon History (1890)', marked a turning point in US Naval thinking and was enthusiastically received in the West and Japan. He discovered that British possession of the sea was the major factor, allowing that nation to remain undefeated by its Continental opponents. Mahan explained the British success by developing a simple deduction: "greatness and strength is the product of wealth derived from the trade and navies protect the trade". The ability to produce a navy, capable of maintaining this accumulated wealth, was the result of certain maritime characteristics or elements that Britain possessed, which as per analysis of Mahan, included geography, physical conformation, extent of territory, population, character of the people and character of government.

29. As per Mahan's thesis, commerce was fundamental to maritime power and that the best way to threaten or defend it was

⁶ Kennedy, Paul. Rise and fall of British Naval Mastery, p. 9.

to engage the enemy's most powerful forces in decisive battle. Mahan was strong advocate of 'Command of the Sea' and was against the concept of 'Coastal Defence'.

30. In the context of quickly changing geo-political realities for the United States in that era, Mahan:

- a. Argued for a large fleet of capital ships, whose purpose would be to destroy the enemy battle fleet in a decisive fleet engagement, thus, achieving total command of the sea.
- b. Assumed that there was no foreign enemy capable of attacking Continental US with a large land army.
- c. Advocated that the United States should acquire key overseas possessions to act as coaling stations for America's large fleet of capital ships.

31. It was, perhaps, his influence that the US Navy eventually moved from a 'Coastal Defence' outfit to a level in Second World War, when Admiral Nimitz stated that "US Navy now possesses control of the seas more absolute than ever possessed by the British". It can be seen in the historical perspective that wealth and great power status of US continued to improve along with improvement in her Navy, as enjoyed by the Great Britain, when she commanded the seas.

32. Mahan laid out his basic elements of sea power. In his view commercial trade was the essence of maritime activity and *raisondetre* of navies. For much of the history Mahan reviewed, he found three key factors supporting commercial trade:⁷

- a. Production, with the need to exchange goods.
- b. Shipping, by which the exchange is carried on.
- c. Colonies, which enlarge shipping operations and provide additional points of safety for shipping.

⁷ Mahan, Alfred Thayer. *The Influence of Sea Power on History, 1660-1783*, p.28.

33. For a nation to be successful in such commercial maritime endeavours, Mahan laid out his six fundamental factors as discussed below:⁸

- a. **Geographical Position.** While describing geographical position, Mahan said, “If a nation be so situated that it is neither forced to defend itself by land nor induced to seek an extension of its territory by way of the land, it can gain more advantage on the seas as compared to a nation whose boundaries are continental”. This has been a great advantage to England over both France and Holland as a sea power. He analysed that this fact relieved Britain to maintain a huge army and invest in the Navy. While France’s policy was constantly diverted from the sea to projects of Continental expansion, she also had to divide her navy between the Atlantic and Mediterranean coastlines.
- b. **Physical Conformation.** The peculiar feature of the coastline of a country has an important bearing on the tendency of its people to seek and achieve sea power. Thus, to a nation with a coastline, the sea is a frontier and national power will largely be determined by the manner in which it extends that frontier.
- c. **Extent of Territory.** According to Mahan, for the development of sea power, it is not the total number of square miles, which a country contains, but the length of its coastline and the character of its harbours that are to be considered. The extent of territory may be a weakness rather than a strength depending upon the degree to which the land itself is

⁸ Ibid

supported by population, resources and other factors of power.

- d. **Population.** Size and character of population must both be considered in the measurement of sea power. It is not only the grand total but the percentage of people following the sea or at least readily available for employment onboard ships and for the maintenance both in time of peace and war. A nation's peacetime commerce is an index of its 'Staying Power' in naval war. With regard to population, Mahan emphasized that potential power and actual power are not the same and must be kept in rational balance.
 - e. **National Character.** The corresponding national character and aptitudes are essential factors in the success of a sea sharing people. The desire to trade and the ability to produce the commodities which enter into trade, together constitute 'the national characteristic, the most important to the development of sea power'.
 - f. **Character of the Government.** Particular forms of government with their accompanying institutions and the character of rulers, at one time or another, have a marked influence upon the development of sea power. The most brilliant successes have been achieved, when a government has intelligently and persistently fostered and directed a national interest in and aptitude for the sea.
34. **Mahan's Principles of Grand Strategy.** Mahan maintains that the study of Naval History gives insight into the nature of naval strategy. According to him, unlike tactics, strategy was much less affected by technological change. The following are the principles of strategy enunciated by Mahan:-

- a. **Concentration of Force.** Mahan borrowed the concept of concentration of force from Jomini. He applied this concept widely and in different guises. In addition to its pure forms – ‘numbers annihilate’ or ‘never divide the fleet’ – these were first and second order derivative propositions, relating to the desirability of taking the offensive, decisive battle, and the relative ineffectiveness of commerce – raiding by cruisers as substitute for control of the sea by battleships. The fundamental flaw of British strategy in the American Revolution was a failure to concentrate naval forces and use them to pursue a vigorous offensive.
- b. **Conclusive Engagement.** Mahan held up conclusive engagement with the main force of the enemy, as an ideal to counter-act what he perceived as a tendency towards excessive caution. Mahan, thus, praised aggressiveness and disproved defensive attitudes that promoted inactivity.
- c. **Amphibious and Combined Operations.** Mahan disliked amphibious operations on the grounds that they did not produce significant benefits and were dangerous to the forces involved, thus, should be avoided as a waste of resources.
- d. **Commerce Raiding.** Mahan’s fundamental position was that the very existence of navies was justified primarily by their ability to defend their own commerce and to attack that of their opponent. Mahan favoured blockade of the enemy coasts and ports over attacks on the high seas, because he believed that it was ‘the beginnings and endings of commercial routes, rather than the intermediate stretch’.

- e. **Naval Administration and Logistics.** Mahan maintained that logistic efficiency was essential to naval success. Logistic problems could also serve as a pretext for inactivity that could compromise operations. He, thus, insisted that depots of supplies that were always near at hand were essential to a fleet. He also recognized the fact that logistics could determine where and how long fleets could operate. With the advent of steam power for ships, Mahan laid emphasis on the importance of distance between coaling. He also pointed out that availability of dry docks was of the first importance to the fleet.
- f. **Offensive-Defensive Actions.** Mahan offered a full explanation of the confusing association of grand-strategic defensive and strategic offensive. His main argument was that offensive and defensive actions were complements rather than opposites. The 'best and sure form of defence is to take offensive', adding that 'the fundamental principle of maritime war is that defence is only ensured by offence'.
- g. **Coastal Defences.** Mahan argued that provision of adequate military coastal defences was necessary to free the battle fleet for offensive action in distant waters. At this time he also briefly mentioned the use of surface torpedo craft and sub-marines in coastal defence with his offensive principles. He said that the "chief role of the torpedo vessels is in attack upon a hostile fleet, which is trying to maintain its ground near the port."
- h. **Intelligence in Naval Operations.** In the 'Influence of Sea Power' series, Mahan made brief references to the critical role played by intelligence in

certain important operations during the Napoleonic Wars. In 1899, Mahan went further by formulating the general observation that “accurate intelligence is one of the very first desiderata of war”.

- i. **Preservation of Battle Fleet.** In 1904, about the ongoing Russo-Japanese War, he observed that the Japanese might be advised to “throw the weight of the destruction of the enemy’s squadron upon his torpedo vessels and upon the army than to critically damage their battle fleet”. He concluded that, “If control of the sea could be attained equally well by other means, the battle fleet should be preserved both as a political and military factor of first importance.”

Strategic Thoughts of Julian Stafford Corbett

35. Sir Julian Stafford Corbett, having a legal and academic background, based his ideas on a wide view of the history, applicable to any nation, island or continent, but his strategic concern was essentially Britain. His book ‘Some Principles of Maritime Strategy’ received wide acclaim. He argued that commerce-warfare was no longer appropriate for his time. He did not fancy seeking decisive battles and modified the notion of ‘Command of the Sea’ to rather the restricted ‘Control of the Sea’ concept, which is limited in both time and space. He further advocated, “Success will only come from the achievement of the right balance and appropriate use of armies and navies. The most fruitful use of maritime power is in limited wars”.

36. Corbett drew a clear distinction between maritime strategy and naval strategy. By maritime strategy he meant “the principles governing a war, in which the sea is a substantial factor. Naval strategy is what determined the movement of the fleet after maritime strategy had determined what part the fleet should play in relation to land forces.”

37. Corbett described the two categories of war; Limited War and Unlimited War. Depending upon the material nature of the object, the war is either limited or unlimited.

- a. **Limited War.** In limited war the objective is limited and has limited value. In limited war complete destruction of forces is not necessary. One could seize the object and, then, hold it in defense e.g Spanish American War, when the objective was liberation of Cuba.
- b. **Unlimited War.** Unlimited wars are for a very high value object, for which enemy will rely on entire national power. In such a war strategic objective must be directed against enemy's armed forces to overthrow them completely.

38. In his main strategic thought concerning maritime power, Corbett maintained "the real importance of maritime power is its influence on military operations." Hence, sea power was limited in what it may accomplish. As powerful and important as maritime power is, it takes military (land) power to finalize and solidify any gains accomplished by sea power.

39. From his basic concept that maritime strategy required both military and naval power, Corbett explained his theories in detail. He described what he viewed as Command of the Sea. He stated, "The object of naval warfare must always be directly or indirectly either to secure Command of the Sea or to prevent the enemy from securing it".⁹ Command of the Sea is not a twofold entity, which implies that the loss of Command of the Sea does not automatically mean that the opponent gains command. As Corbett pointed out, Command of the Sea is usually in dispute with neither party to a conflict in absolute control. It is in the dispute of Command of the Sea that Naval Strategy is primarily concerned, while overall Maritime Strategy is tied directly to National Strategy.

⁹ Corbett, Sir Julian. *Some Principles of Maritime Strategy*, p.87.

40. Having possession of the sea is a physical impossibility, since to do so, would require the stationing of ships in every square mile of ocean throughout the world and no nation can do this. Even today with satellite observation of the whole world, no nation can prevent the passage upon every ocean. Only control of choke points or control of specific areas can be accomplished by those in Command of the Sea. This was Corbett's idea and it is still valid today. In war, Command of the Sea can mean control for only some limited period of time or of specific small areas (Sea Control). Only when one opponent or the other is militarily defeated, can Command of the Sea be absolute. Thus, showing that Command of the Sea was not absolute Corbett stated, "Command of the Sea, therefore, means nothing but the control of maritime communications, whether for commercial or military purposes. The object of naval warfare is the control of communications and not as in land warfare the conquest of territory". He also pointed out that Command of the sea can be general or local and it may be permanent or temporary. General command may be permanent or temporary, but mere local command, except in every favourable geographical conditions should scarcely ever be regarded as more than temporary, as normally it is always liable to interruption from other theatres, so long as the enemy possesses effective naval force.¹⁰

Maritime Strategies of the World Wars

41. The theories of both strategists were applied by the leading maritime powers and their first real test came in the form of World Wars. Both the First and Second World Wars primarily shared similar maritime strategies that required providing critical logistical support for armies from one continent to another, and the long tedious process of enforcing economic blockades of the enemy.

World War-I (1914-1918)

42. **General.** The main theatres of the war included:

¹⁰ Ibid, p.102.

Evolution of Maritime Strategy and Employment of Naval Power

- a. **North Sea**¹¹. Major battles included the Battle of Heligoland Bight, the Battle of Dogger Bank, the Battle of Jutland and the Second Battle of Heligoland Bight. In general, British Grand Fleet, though not always tactically successful, was able to maintain the blockade and kept the German High Seas Fleet in port, although the High Seas Fleet remained a threat that kept the vast majority of Britain's capital ships in the North Sea. Germans followed the strategy of Fleet in Being.
- b. **Atlantic**¹². While Germany was greatly perturbed by Britain's blockade, Britain, as an island nation, was heavily dependent on resources imported by sea. German submarines (U-boats) were of limited effectiveness against surface warships on their guard, but were greatly effective against merchant ships. In 1915, Germany declared a naval blockade of Britain, to be enforced by its U-boats. Concept of commerce raiding and blockade was effectively utilized during the campaign.
- c. **Mediterranean**¹³. Some limited sea combat took place between the navies of Austria-Hungary and Germany and the Allied navies of France, Britain, Italy and Japan. Limited commerce warfare and protection of SLOCs were exercised in Mediterranean.
- d. **Black Sea**¹⁴. The war in the Black Sea started when the Ottoman Fleet bombarded several Russian cities

¹¹ Matrix, Evans Martin (2004). Battles of World War I Wiltshire: The Crowood Press, Ltd, p.104.

¹² Ibid p.103.

¹³ Halpern G Paul, The Naval War in the Mediterranean 1914-18 (London: Allen & Unwin, 1987), p.1-10.

¹⁴ Naval battles in Black Sea World war-I - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

in October 1914. The most advanced ships in the Ottoman fleet consisted of two ships of the German Mediterranean Fleet: the powerful battle cruiser SMS Goeben and the speedy light cruiser SMS Breslau, both under the command of the skilled German Admiral Wilhelm Souchon. Goeben was a modern design, and with its well-drilled, crack crew, could easily outfight or outrun any single Russian ship in their fleet. However, it was often out-gunned by the superior numbers of its slower opponent and would be forced to flee when the Russian battleship fleet was able to unite in pursuit. A continual series of cat and mouse operations ensued for the first two years, with both sides' admirals trying to capitalize on their particular tactical strengths in a surprise ambush. The predominant aspect of Black Sea campaign was gain of Sea Control by capitalizing on anti-surface warfare.

- e. **Baltic Sea**¹⁵. In the Baltic Sea, Germany and Russia were the main combatants, with a number of British submarines sailing through the Kattegat to assist the Russians. German fleet was larger and more modern, while the Russians mainly played a defensive role. In the Baltic Sea Russian achieved Sea denial by mining the coastal waters as well as contested for Sea Control through anti-surface warfare.

43. **North Sea and Atlantic Theatres**

- a. **Employment Strategy**
 - (1) **Great Britain**. Soon after the outbreak of hostilities, Britain initiated a '**naval blockade**' of Germany. The strategy proved

¹⁵ Naval battles in Baltic Sea World War-I - Wikipedia, the Free Encyclopedia. Accessed 20/12/2010.

effective, cutting off vital military and civilian supplies, although this blockade violated generally accepted international law codified by several international agreements of the past two centuries. Britain mined international waters to prevent any ships from entering entire sections of ocean, causing danger to even neutral ships. Since there was limited response to this tactic, Germany expected a similar response to its unrestricted submarine warfare. The overall strategy of Great Britain was to achieve Sea Control, while denying the same to the German Navy for protection of own SLOCs.

- (2) **Germany.** German Naval surface fleet was relatively a weaker force that followed '*Fleet in Being Strategy*' and, therefore, was kept in the North Sea close to German ports to contest blockade by UK and attack on allies' merchant fleets. Whereas, for elsewhere operations to destroy/disrupt logistic of enemy on the open sea, there was more reliance on submarine warfare and commerce raiders.

b. **Conduct**

- (1) **Sea Control – British Desire to Fight Decisive Battles (Battle of Jutland)**
- (a) The Battle of Jutland (1916) developed into the largest naval battle of the War, the only full-scale clash of battleships during the War, and one of the largest in history. It took place on

31 May– 1 June 1916, in the North Sea off Jutland.¹⁶

- (b) The German fleet's intention was to entice, trap and destroy a portion of the Grand Fleet, as the German numbers were insufficient to engage the entire British fleet at one time. This formed part of a larger strategy to break the British blockade of Germany and to allow German mercantile shipping to operate. Meanwhile, the Royal Navy pursued a strategy to engage and destroy the High Seas Fleet or keep the German force contained and away from Britain's own shipping lanes.
 - (c) The engagement was a standoff, as the Germans outmanoeuvred by the larger British fleet, managed to escape and inflicted more damage to the British fleet than they received. Strategically, however, the British asserted their control of the sea, and the bulk of the German surface fleet remained confined to port for the duration of the war.
- (2) **Unrestricted Submarine Warfare** The German U-boat fleet:
- (a) Initially, was tasked for '**Attrition Warfare**', in the North sea and British Isles but.

¹⁶Evans Martin Marix , Battles of World War I (Wiltshire: The Crowood Press Ltd,2004), p.106.

- (b) Later, was most effectively used in '**Commerce Warfare/Raiding**¹⁷' against merchant ships and convoys, bringing raw material, trade and food supplies to Great Britain.
 - (c) German U-boats attempted to cut the supply lines between North America and Britain. The nature of submarine warfare meant that attacks often came without warning, giving the crews of the merchant ships little hope of survival. The United States launched a protest and Germany modified its rules of engagement. Finally, in early 1917, Germany adopted a policy of unrestricted submarine warfare, realizing the Americans would eventually enter the war. Germany sought to strangle Allied Sea Lanes before the US could transport a large army overseas, but were only able to maintain five long range U-boats on station, to limited effect. During World War-I more than 5,000 Allied ships had been sunk by U-boats.
- (3) **Convoy Escorting.** The U-boat threat lessened in 1917, when merchant ships entered '**Convoys Escorted**' by destroyers. This tactic made it difficult for U-boats to find targets, which significantly lessened losses;

¹⁷Commerce Raiding. - Wikipedia, the Free Encyclopedia. Accessed 20/12/2010.

after the introduction of '**Hydrophones**' and '**Depth Charges**', accompanying destroyers. The convoy system slowed the flow of supplies, since ships had to wait as convoys were assembled. The solution to the delays was an extensive program to build new freighters. Troop ships were too fast for the submarines and did not travel the North Atlantic in convoys. The U-boats had sunk almost 5,000 Allied ships, at a cost of 178 submarines.

- (4) **Projection of Air Power at Sea.** Aviation was primarily focused on reconnaissance, with the aircraft carrier being developed over the course of the war, and bomber aircraft capable of lifting only relatively light loads. The first use of aircraft carriers in combat included the following:-
- (a) In Battle of Tsingtao¹⁸ in 1914, the Imperial Japanese Navy seaplane carrier Wakamiya conducted the world's first naval-launched air raids from Kiaochow Bay. It launched four Maurice Farman seaplanes, which bombarded German communication centers and command centers and damaged a German minelayer.
 - (b) HMS Furious launching Sopwith Camels¹⁹ in a successful raid against

¹⁸ Battle of Tsingtao - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

¹⁹ Sopwith Camels - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

the Zeppelin Hangars²⁰ at Tondem in July 1918, as well as blimps for anti-submarine patrol.

(5) **Sea Denial through Laying of Mines.**

During World War-I, mines were used extensively to defend coasts, coastal shipping, ports and naval bases around the globe. The first battleship sinking in the war - that of HMS Audacious - was the result of her striking a naval mine on 27 October 1914. The Germans laid mines in shipping lanes to sink merchant and naval vessels serving Britain. The Allies targeted the German U-boats in the Strait of Dover and the Hebrides. In an attempt to seal up the northern exits of the North Sea, the Allies developed the Northern Barrages. During a period of five months from June onwards almost 70,000 mines were laid, spanning the North Sea's northern exits. The total number of mines laid in the North Sea, the British East Coast, Straits of Dover, and Heligoland Bight is estimated at 190,000 and the total number during the whole of World War-I was 235,000 sea mines.

(6) **Technological Developments**

(a) Radio was in early use, with naval ships commonly equipped with radio telegraph and the merchant ships were less so.

²⁰ Zeppelin hangars - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

- (b) Sonar was in its infancy by the end of the War.

44. **Mediterranean Theatre**

- a. **French Navy**²¹. Although the French nations' contribution to the Allied effort lay mainly with their vast Army on the Western Front, they also played their part in the war at sea:-

- (1) **French Naval Operations.** A few salient events included:-

- (a) The first task of the Mediterranean battle squadrons was to escort troop transports, carrying North African divisions to France in time for the Battle of the Marne.
- (b) By the end of August 1914, fourteen battleships, six armoured cruisers, destroyers and submarines were based at Malta and patrolling the southern Adriatic Sea to prevent any attack by the Austrian Fleet.
- (c) In September 1914, two French pre-dreadnoughts joined the British squadron, watching the Turkish Dardanelles to prevent the German battle cruiser 'Goeben' breaking out.
- (d) By December 1915, the Serbs had been defeated and the Army retreated across the mountains to the Albanian coast. From here, the French Navy evacuated the Serbs first to Corfu, then to Bizerta in northern Tunisia,

²¹ French Navy in WW-I- Wikipedia, the Free Encyclopedia. Accessed 20/12/2010.

and once reformed to Salonika in north east Greece. An eventual total of 270,000 men were evacuated by mainly French forces without loss.

- (e) In December 1916, French warships arrived off Athens, and after landing sailors and bombarding, forced the pro-German Greek government to support Allied policies. A number of Greek warships were seized, commissioned into the French Navy and later made a valuable contribution to Allied anti-U-boat measures.
 - (f) By 1918, the French Navy was active against the U-boats in Mediterranean.
 - (g) French Naval losses during World War-I included one semi-dreadnought and three pre-dreadnought battleships, four armoured and one protected cruiser, twelve destroyers and fourteen submarines.
- (2) **Admiral Raoul Castex**²². Following World War-I, the French Navy came under the influence of the writings of Admiral Raoul Castex. The essence of Castex's work can be summarized as the following:-
- (a) Decisive battles were rare in history.
 - (b) Enemy battle fleet was not always the main objective of an operation or battle.

²² (Castex, Kiesling, 1937, 1994)- Strategic Theories Wikipedia, the free encyclopedia. Accessed 20/12/2010.

- (c) Strategic manoeuvre and not the battle determine the outcome of war.
- (3) Castex recognized that his task was to provide doctrine for a second-ranking navy and not the one that would ever hope to challenge the British. Thus, he formulated the concept of la force-organisée, i.e the main force which could be mustered for a limited counter-offensive against a superior enemy. He also gave significant attention to commerce raiding, raids, blockade, mine, and amphibious warfare.
- b. **Ottoman Empire**
 - (1) The navy of the Ottoman Empire left out of the Dardanelles, being late in the war during the ***Battle of Imbros***, preferring to focus its operations in the Black Sea.
 - (2) The main fleet action was the Allied attempt to knock the Ottoman Empire out of the war, by an attack on Istanbul in 1915. This attempt turned into the ***Battle of Gallipoli***²³, which was an Allied defeat.

45. **Baltic and Black Sea Theatres.** Russia²⁴ was the main Allied combatant against the Germans in Baltic and the Ottoman Empire in the Black Sea. As far as, Russian naval activities are concerned, these were inconsequential in World War-I. Mostly, the naval focus remained as follows:

- a. Limited attacks in the coastal waters.
- b. Concerted actions by submarines, mines and aircrafts.
- c. Provision of direct support to the army.

²³ Battle of Gallipoli- Wikipedia, the free encyclopedia. Accessed 20/12/2010.

²⁴ Russian Navy- Wikipedia, the free encyclopedia. Accessed 20/12/2010.

46. **Analysis**a. **British**

- (1) Royal Navy (RN), being superior in number and having experience (operating across the world oceans) had an edge on German Navy. Hence, the British had a lot of expectations from their Grand Fleet.
- (2) Consequent to the superiority in Surface warfare, RN hoped to engage Germans in the decisive battle.
- (3) German U-boats presented a formidable threat to British war and merchant ships. In other words, Britain was late in realizing the submarine threat and, therefore, lacked appropriate measures to respond to such type of a threat.
- (4) British strategy of 'convoy escorting', provided some protection against German U-boats. The Britian, therefore, resorted to convoys with reluctance. However, it was a very important lesson learned from the War and, thus, led to electronic and acoustic detection means to negotiate U-boat threat.
- (5) Britain's larger fleet could maintain a blockade of Germany, cutting it off from overseas trade and resources. It was the blockade of German commerce through the North Sea, which ultimately starved the German people and industries and contributed to Germany, seeking the Armistice of 1918²⁵.
- (6) British naval action alone was a key factor in determining outcome of the War.

²⁵ World War I - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

- (7) Royal Navy could not maintain Command of the Sea throughout World War-I. However, the strategic gains were made by achieving Sea Control

b. **Germans**

- (1) The Germans pursued 'Fleet in Being' strategy.
- (2) The German strategy to sever British SLOCs in North Sea and Atlantic by submarine warfare worked well, till the time sufficient platforms were available to accomplish this task.
- (3) Commerce warfare by U-boats and commerce raiders was preferred by Germans over attrition warfare, as a priority choice.
- (4) U-boats though were able to contest naval blockade of German boats but were not able to institute a typical naval blockage of British ports.

c. **Miscellaneous**

- (1) Air power at sea was at a nascent stage and, therefore, did not significantly influence the maritime warfare.
- (2) Naval mines proved to be a very effective '**Sea denial**' equipment and instrument. Defensive mines along coasts made it much more difficult for capital ships to get close enough to conduct coastal bombardment or support attacks. Suitably placed mines also served to restrict the freedom of movement of submarines.

World War-II (1939 – 1945)

49. **General.** The main theatres of the war included:

- a. **European Theatre – Battle of Atlantic**²⁶. The name ‘Battle of the Atlantic’, coined by Winston Churchill in 1941, covers a campaign that began on the first day of the European war and lasted for six years, involved thousands of ships and stretched over hundreds of miles of the vast ocean and seas in a succession of more than 100 convoy battles and, perhaps, 1,000 single-ship encounters. Tactical advantage switched back and forth over the six years as new weapons, tactics and counter-measures were developed by both sides. The British and their allies gradually gained the upper hand, driving the German surface raiders from the ocean by the end of 1942 and decisively defeating the U-boats in a series of convoy battles between March and May 1943. New German submarines arrived in 1945, but they were too late to affect the course of the war.
- b. **Asia Pacific Theatre**²⁷. The Pacific War was the largest naval conflict in history. Across the huge expanses of the Pacific, the two most powerful navies in the world i.e. US and Imperial Japanese navies found themselves locked in a death struggle. The war was fought in every possible climate, from Arctic conditions in the Aleutians, to the appalling heat and swelter of the South Pacific. Every conceivable type of naval activity was represented: carrier aviation battles, surface engagements, bitterly fought night-fights, the largest amphibious landings of the entire

²⁶ Battle of Atlantic during World War-II - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

²⁷ Asia Pacific theatre during World War II - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

War, and the stealthy, brutal battles waged by and against submarines.

48. In continuation to the World War-I, the salient new developments that were observed in World War-II will be discussed in the ensuing paragraphs:-

a. In the European theatre, the most significant development was in the field of Anti-submarine warfare that virtually transcended the submarine warfare.

(1) **Heavy German Reliance on Submarine Force.** Germany had the largest submarine fleet during World War II. Expecting to be able to defeat the Royal Navy through underwater warfare, the German High Command pursued commerce raiding and immediately stopped all construction on capital surface ships. More than a thousand submarines were built by the end of the war. Germany put submarines to devastating effect in the Second Battle of the Atlantic in World War-II, attempting but ultimately failing to cut off Britain's supply routes by sinking more merchant ships than Britain could replace.

(2) **Allied Developments for Anti-Submarine Warfare**²⁸. Allied came up with strong measures for anti-submarine warfare. Some of the developments included the following:-

(a) Introduction of Air ASW, as a crippling blow to submarine operations.

²⁸ World War II - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

- (b) Increased numbers of convoy escorts nullified the efficacy of U-boats.
 - (c) Technical advances like radar and sonar make U-boats detection easier. Huff-Duff (HF/DF system) and Ultra (SIGINT for 'breaking' high-level encrypted enemy radio and tele-print communications) allowed the Allies to route convoys around wolf-packs, when they detected them from their radio transmissions.
- (3) The results were devastating: from March to July of that year, over 130 U-boats were lost, 41 in May alone. Concurrent Allied losses dropped dramatically from 750,000 tons in March to only 188,000 in July. By the end of the War, almost 3,000 Allied ships (175 warships; 2,825 merchant ships) were sunk by U-boat torpedoes. Of the 40,000 men in the U-boat service, 28,000 (or 70%) lost their lives.
- (4) **Normandy Landing**²⁹. Normandy, France was selected for invasion of Northwest Europe by Allied forces in June 1944. The assault phase of 'Operation Overlord' was known as 'Operation Neptune', which ended on 30 June 1944. By this time, the Allies had established a firm foothold on Normandy. Normandy landing helped Allied forces to cross the River Seine on 19 August 1944.

²⁹ Normandy Landing - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

- b. **Asia - Pacific Theatre**³⁰
- (1) **Emergence of Two Sea Powers other than Great Britain.** The most significant development in the Asia –Pacific Theatre was the rising great maritime powers i.e US Navy (USN) and Imperial Japanese Navy (IJN). Both the navies were inspired by the concept of ‘Sea Power’ of Mahan.
 - (2) **Projection of Air Power at Sea.** The change, a part of the growth of air power as a significant factor in warfare, took place during World War-II. This change was driven by the superior range, flexibility and effectiveness of **carrier-launched aircraft**. Carrier forces became the back of the US, British and Japanese navies. Asia-Pacific theatre witnessed intense air battle at sea. Merchant ships (such as MV Empire Mac Alphine) were converted into **escort-carrier** as a stop-gap measure to provide **air support for convoys** and **amphibious invasions**. As an emergency measure, cargo-carrying merchant ships were modified to launch, but did not retrieve fighter aircraft from a catapult. Cruiser converted into lighter light carriers. Battle carriers were created by the Imperial Japanese Navy to partially compensate for the loss of carrier strength at Midway. Submarine aircraft carriers, such as the French Surcouf and the Japanese I-400 class submarine, which was capable of

³⁰ World War II - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

carrying three Aichi M6A Seiran aircraft, were first built in the 1920s, but were generally unsuccessful at War.

- (3) **Employment of Submarine Warfare.** Despite technical prowess, Japan had chosen to utilize its submarines for fleet warfare, and consequently were relatively unsuccessful, as warships were fast, manoeuvrable and well-defended, compared to merchant ships. On the contrary, USN used its submarine force to attack both warships and merchant shipping; and destroyed more Japanese shipping than all other weapons combined.
- (4) **Protection of Own Merchant Shipping by Japan for Sustained War Stamina.** Japan heavily relied on the oil and war supplies from external sources to fight the war. However, it was unable to provide adequate escort forces for the nation's merchant fleet. US naval submarine force sank 1,560 enemy vessels, a total tonnage of 5.3 million tons, including 8 aircraft carriers and over 200 warships.
- (5) **Amphibious Warfare.** Amphibious operations to gain control of strategic bases provided impetus to US success.
- (6) **Intel Based Operations by USN.** USN laid a lot of emphasis on intercepting and decoding IJN's message, to have fore warning and accordingly revise own plan of actions. A few examples include pre-hand knowledge of Battle of Midway, Battle of Leyte Gulf and

Admiral Yamamoto proceeding to Papua New Guinea.

- (7) **Japanese Thinking of a Limited War.** Japanese intended to fight a limited war in Asia–Pacific region and on a few occasions were cautious of escalation of the situation. However, after the attack on Pearl Harbour, the option to fight a limited war did not rest solely with the Japanese.

49. **Analysis**

- a. World War-II was an innovative and a unique aspect of a modern war at sea for:-
- (1) Carrier-to carrier battles, which the Japanese and Americans launched waves of fighter planes and bombers.
 - (2) Amphibious landings, assault against defended beachheads and the creation of the modern Marine Corps.
 - (3) Island-hopping campaigns that transformed tiny patches of land into critically important bases in places like the Philippines, the Solomon islands, the Mariana islands and New Guinea.
 - (4) U-boat attacks on merchant shipping in Atlantic.
 - (5) US Submarine, an ideal platform for commerce raiding and blockade of Japan.
 - (6) Newly released Ultra intelligence gained by the Allies from deciphering coded messages passed by their enemies which helped them win the war.
 - (7) Battleships which were considered the primary naval weapons at the start of the

conflict, were pushed aside by the submarines and aircraft carriers during the battle of supremacy of the oceans and the skies.

- (8) Construction of oilers, ammunition ships, supply ships, repair ships, floating dry docks to support the striking force with logistical mobility by USA.
- (9) Importance of navies in power projection and protection of SLOCs.
- (10) Vindication of success of sea power and maritime strategy.

b. **Miscellaneous.** Some of other important aspects of World War-II are highlighted as under:-

- (1) For US World War-I, and the European Theater in World War-II, sea power was '**trans-oceanic**' in nature, because transporting troops and supplies was the primary strategic focus of the Navy, and sea transport was the only viable option. With the emergence of an effective enemy submarine threat, protection of convoys became a significant mission for the allied naval forces.
- (2) The Pacific Theater in World War-II was fought by US as an '**oceanic**' campaign, where victory was achieved through amphibious operations to gain control of strategic bases, significant naval battles to destroy the Japanese Navy, naval interdiction of Japanese SLOCs, isolation of the home Islands and preparations to invade, if necessary
- (3) 80% of Japanese supplies were transported from sea. However, the failure of Imperial

Japanese Navy to protect own shipping was well exploited by US Navy, to generate effects of blockade of Japanese ports. This brought the Japanese economy and war efforts to a grinding halt.

- (4) The naval strategy was decisively successful, largely because the Axis Powers, particularly the Japanese, were unable to recover from losses, while the United States after rebuilding and expanding its force, was able to exploit the maritime manoeuvre space, control the tempo of operations and take the fight to the enemy along multiple lines of operations.
- (5) Second World War's end state was the destruction of Axis forces on a global scale. The means of naval war were provided by an unprecedented industrial surge in the United States manufacture war-fighting equipment. The means were applied through naval battles and a succession of amphibious operations, transport of equipment and supplies, and protection of sea lines of communication.

Cold War Era- Maritime Strategies

50. **US Strategy.** Immediately following the World War II, a debate emerged, concerning the need for a Navy, particularly aircraft carriers. The Army and Air Forces argued that their new, long range, United States based aircrafts with nuclear weapons could replace the aircraft carrier's strike capability. Many believed that the next war would be against the Soviet Union, with no need for amphibious operations, and that the Navy would play a supporting role. In addition, there was a strong argument that

future wars would quickly escalate to a nuclear conflict and that large conventional forces were no longer needed. These arguments were used to justify a significant reduction in naval forces, pending the development of a post war military strategy. In 1947, Vice Admiral Forrest Sherman created a maritime strategy, based on the notion that the next war would look much like the last one. For force structure, “he kept carriers at the core of his planning and proposed that they be given the option of delivering conventional or atomic weapons.”

51. **Lessons from Korean War.** The Korean War supported Sherman’s belief that conventional wars remained a threat, and the Navy was employed as an integral part of a balanced military force. North Korea had a small Navy, so control of the seas was not a major factor and the United States Navy conducted carrier strike operations throughout the war. Sea control also allowed the United States Navy to move troops and supply friendly forces. In fact, ‘six of every seven men who landed in Korea came by sea’. The ratio of sea to air transport of freight into the theater was 270 to 1.

52. **Containment of Soviet Navy by US Navy.** As the Soviet Union became a more significant threat, the maritime strategy for the bipolar Cold War world required significant naval power for forward presence and to project the national influence of the United States. ‘The NATO alliance prepared for the struggle for control of the sea and containment of the Soviet Navy, as well as the ability to protect sea lines of communication for extended periods’.

53. The focus of Maritime strategy³¹ was on:

- a. **A Large Navy.** Equipped for optimum power projection against the enemy (primarily the Soviet Union) and capable of sea control, sea denial and maintaining the SLOCs.

³¹ US Maritime Strategy- Wikipedia, the free encyclopedia. Accessed 20/12/2010.

- b. **Projection of 2nd Strike Capability from the Sea.** Navy ballistic missile submarines also provided one leg of the nuclear deterrent tirade in the event of nuclear warfare against the Soviet Union. Nuclear Propulsion Submarines ie SSN and SSBN were constructed to have a trans-oceanic reach, while carrying nuclear tipped warheads for second strike capability. At present USA, Russia, France and UK, China are operating Nuclear Powered Submarines with SLBM & SLCM nuclear tipped capability. India is also envying to join this elite club of nuclear powered submarines.
- c. **Control of Regional Events.** Vietnam War further confirmed that the Navy required a strategy to handle contingencies across the spectrum of conflict.
- d. **Technological Edge over Russia.** USN procurement programmes were developed almost exclusively against the emerging Soviet Navy. This required high cost systems and platforms. In mid 1960s, the Navy was building the Nimitz Class nuclear aircraft carrier, the large Spruance Class destroyer, and was planning to build very expensive nuclear powered frigates as carrier escorts. However, the plan to construct nuclear powered frigates was cancelled by Admiral Zumwalt, in early 1970s.

USS *Enterprise* (CVN-65) - World's first and the longest nuclear-powered aircraft carrier



54. **Sea Strike Strategy**³². As the Soviet Union continued to develop a formidable naval threat, maintaining a sound maritime strategy became increasingly important. In 1977, Admiral (Adm) Thomas B. Hayward, then Commander in Chief of United States Pacific Fleet, developed 'Sea Strike, a strategy that envisioned a carrier task group offensive against Soviet Far Eastern bases in the event of war'. Hayward's strategy assumed an offensive bias and called for the 'integration of the other services and the nation's allies' into a theater strategy.

55. **Maritime Strategy - 1986**. The Maritime Strategy was first made available in an unclassified 1986 publication. It provided a convincing overview of world events to highlight the necessity to support forward defense, alliance solidarity and deterrence. It also emphasized emerging issues, such as state sponsored terrorism and the proliferation of weapons of mass destruction. A real strength of 'The Maritime Strategy' was a detailed overview of the Navy's role in peacetime presence, crisis response, and war fighting.

56. **Blue Water and Littoral Warfare against Soviet Union**. It also included an offensive framework to defeat the Soviets both in blue waters and in the littorals, by maintaining an '**Over-whelming Force**', including both carrier and amphibious task forces. The Navy was structured to fight large scale blue water naval battles, either conventional or nuclear, against a Soviet force of nearly equal size. Carrier battle groups and Amphibious Ready Groups would have been employed to defeat the Soviet Navy, strike their supporting infrastructure, and to support amphibious operations to 're-take conquered territory and to seize key objectives in the Soviet rear'.

³² US Sea strike Strategy - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

57. **Analysis**

- a. US maintained psychological ascendancy over Soviet Union.
- b. USN maintained a significant nuclear arsenal to serve as a deterrent to the Soviet Union.
- c. The revamped United States military doctrine of the 1980s restored the primacy of combat engagements and decisive military victory to American Military Strategy.
- d. The cost to maintain military forces, necessary to counter the United States forces (*arms race*), was too high, thus, contributing to the collapse of Soviet Union and change in the balance of world military power.
- e. 'The Maritime Strategy', the most fully articulated modern maritime strategy, met Mahan's strategic criteria for addressing ends, ways and means.

58. **Admiral Sergei Gorshkov and Russian Strategy**³³

"Every potentate, who has only ground forces has only one hand; yet whoever has a navy too, has both hands." Admiral Sergei Gorshkov.

59. **General.** In the Cold War era, Russian strategy was influenced by the work of Admiral Sergei Gorshkov, whose ingenuity was in his ability to promote the belief that Russia's future lay at sea. Calling his navy 'the Faithful Helper of the Army', Gorshkov began the process of convincing the Communist Party of the necessity of building a large fleet. These ideas were soon reinforced when in 1962 the United States Navy imposed blockade on Cuba, denying Russian an access. After this, more and more Soviet military funds found their way into naval development. With

³³ Admiral Sergei Gorshkov and Russian Strategy - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

Gorshkov's help, the Soviet military suddenly developed a keen desire to dominate the maritime frontier. As a result in the 1960s and 1970s, the Soviets underwrote an aggressive ship construction programme and began deploying their navy to the far corners of the world. Every month new submarines, destroyers and frigates joined the Soviet Navy, while aircraft carriers, cruisers and vessels of all types continued to roll out of the Russian shipyards.

60. **Key Russian Naval Constraints. *Ice, Chokepoints, and distance*** comprised the basic constraints that Admiral Gorshkov identified in relation to the deployment of ships in Atlantic and Pacific oceans. Icebreakers were made to help open the winter ports, and ships of the Berezina class (40,000-ton multi-purpose ship with six replenishment stations and helicopter capabilities) offer ways to circumvent the effects of choke points and long distance cruises. To overcome replenishment problem, oversea ports were acquired for this purpose. For instance, Russian can replenish their ships in Cuba, Angola, South Yemen and in one of the finest harbors in all of the Pacific Ocean, Camranh Bay.

61. **Missions of Russian Maritime Strategy.** As the Soviets moved farther from their coasts, there was a subsequent shift in mission priorities. There were four basic types of Soviet naval missions:

- a. **Sea Presence.** It accounted for the peaceful use of naval ships in foreign areas. A significant part of the sea presence mission was fulfilled by Soviet merchant ships. With more than 1700 merchant ships, most of which were relatively new, the Soviets had opened trade with many other countries. One of the unique features of the merchant ships was their ability to convert to a wartime mission quickly. Fishing trawlers comprised another element of the sea presence mission. The Soviets had one of the

world's largest fishing fleets, with approximately 4000 ocean-going vessels.

- b. **Sea Control.** The sea control mission was based on broad Soviet military doctrine and foreign policy objectives. These involved, first of all, the avoidance of war, but if war comes, the Soviets planned to win. Thus, Gorshkov promoted a more assertive navy, one that would move out from the coastlines and into the oceans to challenge the West. The mission of these forward-deploying Soviet ships was to counter the West's sea-based strike force and interdict SLOCs.
- c. **Power Projection.** The power projection mission was a function of the naval infantry's capabilities. As a student of history, Admiral Gorshkov was impressed by the United States Marine Corps assaults at Saipan, Guadalcanal, Okinawa, and Iwo Jima. Complementing the Soviet Naval Infantry were the amphibious assault ships.
- d. **Deterrence.** Of all the Soviet naval missions, deterrence was by far the most important. According to Gorshkov deterrence mission was "fleets against shore". He further stated that "The traditional operations of fleet against fleet which, since ancient times, had been characteristic of the struggle against sea communications of the opposing sides were then being used in a new, decisive sphere—operations of a fleet against shore". For deterrence, total reliance is on the submarine-launched ballistic missile (SLBM) began in earnest during the early 1960s. In a sense, the rapid build-up of the Soviet ballistic missile fleet began as a reaction to the deployment of Polaris submarines by the United States.

62. Analysis

- a. Admiral Gorskov promoted belief that Russia's future laid at sea.
- b. Navy reached eminence under Admiral Gorshkov.
- c. Geographical disadvantages were overcome by:
 - (1) Construction of ice breakers.
 - (2) Organization of naval fleets.
 - (3) Oversea bases.
 - (4) Expansion of merchant marines and exploitation of sea resources.
- d. Soviets changed their naval strategy from a basically defensive one to a more assertive forward deployment posture.
- e. Soviet Navy moved away from a coastal navy to Blue waters of the oceans.
- f. Russian ships operated across the globe and influenced US military strategy.

Post Cold War Maritime Strategy

63. Shift from Sea Control to Assure Political Stability on the Economically Vibrant Rim Land. Following the Cold War, the maritime warfare was dominated by the US maritime strategy. Emphasis of the Navy shifted from Sea Control 'to assure political stability on the economically vibrant rim lands of Europe and Pacific Asia, thereby, ensuring access to consequent world markets'. Strategists were faced with an entirely new world order and it became important to re-define the mission, capabilities and requirements to operate in this dimension. The end of the Cold War could also be characterized as the re-ignition of many small scales regional conflicts. The fall of the Soviet Empire and dramatic shifting of power was reflected in many regions throughout the world. The United States as the sole superpower influenced the new world order. The Gulf War tested existing United States military strategies against a vastly different threat than the Soviet Union.

For the US Navy, 'Operation Desert Storm' conducted in 1991 was a totally different situation to fight a technological war.

64. **Lessons Learnt from Gulf War – 1991.** In this war the US and Allied forces demonstrated an unparalleled capability to win decisively, but there were areas that needed improvement, primarily in joint warfare. The confined areas of operation, and the need to conduct overlapping and supporting missions among services proved very challenging, primarily due to the incompatibility of command and control systems. As a result, joint warfare in the Gulf War in some respects proved to be more de-confliction than synchronization. The means procured to conduct joint warfare as envisioned in 'The Maritime Strategy' were unequal to the command and control requirements for modern joint and combined operations. The Gulf War illustrated that United States military services needed to develop more compatible systems and procedures to more effectively synchronize operations.

65. **"From the Sea" Strategy - 1992**³⁴. It was a strategy to incorporate *requirements of the new world order* and reflected a *shift from Blue waters to Brown waters*. This new strategy maintained Mahan's timeless theory that *national policy was best influenced by a powerful navy*. The focus of strategy reflected a shift from one global threat to a multiple regional threats. As expected, based on the challenges identified with joint warfare during the Gulf War, 'From the Sea' called for a 'far greater emphasis on joint and combined operations'. The strategy provided:

- a. Employment concept using existing forces and capabilities to more effectively operate in the littoral regions.

³⁴ "From the Sea" Strategy- Wikipedia, the free encyclopedia. Accessed 20/12/2010.

- b. An overview of expected operating environments and mission requirements, and described the force structure and organizational changes necessary to accomplish them.
- c. Retaining dominance at sea, while expanding the maritime role in joint operations
- d. Increasing the integration of expeditionary naval forces in land warfare, while stressing the continuing need for sea-based forcible entry.
- e. A concept of capitalizing forces to meet national needs and tailoring and task organizing them to respond with more flexibility to crises.

66. **“Forward...From the Sea” Strategy -1996**³⁵. It was published as an expansion of the concepts in ‘From the Sea’. It restated the requirement to fight and win wars and maintain ‘strategic deterrence, sea control, maritime supremacy, and strategic sealift’. 2003 Iraq War (Operation Enduring Freedom) became the test ground for this strategy. In addition, it developed the concept that ‘the most important role of naval forces in situations short of war is to be engaged in forward areas, with the objectives of preventing conflicts and controlling crises’. Peacetime forward presence, interoperability and engagement were developed and added to the existing maritime strategy. ‘Forward...From the Sea’ required naval forces to incorporate ‘the ability to operate in concert with friendly and allied forces, so that in the future we can easily participate fully as part of a formal multi-national response or as part of a coalition’. For littoral warfare corresponding emphasis was given on expeditionary forces to maintain forward presence. ARG (Amphibious Ready Group) and embarked Marine Air Ground Task Forces were configured and positioned to provide regional influence complementing the CBG. The ARG apparently had the

³⁵ “Forward...From the Sea” Strategy - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

potential to respond to lesser regional conflicts which did not require the full firepower of the CBGs.

67. **‘Sea Power 21’- 2003**³⁶. North Arabian Sea and Gulf region witnessed increase in maritime terrorism incidents after the Gulf Wars, mostly confined to attacks on pipelines, oil refineries, oil terminals and attacks from the sea on coastal military targets etc. However, the Al Qaeda attacks on the US Naval ship, USS Cole, in October, 2000 in Bahrain and on the French oil tanker Limberg in October, 2002-off Aden-were significant, indicating that nature of attacks in future may have an objective of mass casualty or mass destruction or mass damage terrorism. But, it was the September 11, 2001 terrorist attacks against the US that brought a paradigm shift in the international security calculus with renewed emphasis for military evolution to counter asymmetric threat. These events led to revise the US Strategy published in 2003. It was intended as a continuation in the evolution of the two earlier post Cold War maritime strategies with a fundamentally future focus to attack an enemy with precision and short time. It was designed to generate response to oversea contingencies, maritime security challenges, requirement of force generation in various parts of the world. Sea Power -21 naval strategy is based on three concepts:

- a. **Sea Shield.** It is future-technology dependent and is focused on the detection, tracking, interception and neutralization of threats, before they reach the United States. Moreover, the envisioned ‘shield’ will have a much greater capability to extend over land in support of expeditionary ground forces. Key technologies for sea shield include theatre missile defense, sea-based unmanned vehicles, enhanced self

³⁶ “Sea Power 21” Strategy - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

defense capabilities, improved mine counter-measures, and an improved network for a better common operating picture between forces.

- b. **Sea Strike.** It is the offensive arm of 'Sea Power 21', and is designed to project combat power against an adversary in a decisive and persistent manner. It is a joint and integrated combat strategy designed and tailored for effects based warfare. 'Information gathering and management are at the heart of this revolution in striking power. Networked, long-dwellt naval sensors will be integrated with national and joint systems to penetrate all types of cover and weather, assembling vast amounts of information, to tailor joint strike packages that deliver calibrated effects at precise times and places'.
- c. **Sea Basing.** Sea Basing will reduce the vulnerabilities inherent in expeditionary warfare and is a priority for both the Navy and Marine Corps in the evolution of littoral warfare capabilities.

68. **Thousand Ships Navy**³⁷ Admiral Mike Mullen in 2006 gave the concept that Fleet is a global maritime partnership that unites maritime forces, port operators, commercial shippers and international, governmental and non-governmental agencies to address mutual concerns. The name itself captures the scope of the efforts. It was not actually about having 1,000 ships at sea but was more about capabilities. Every nation brings what they can, when they can, for as long they can. 'Membership in the 'navy' was purely voluntary; without any legal obligation. A free-form, self organizing network of maritime partners interested in using the power of the

³⁷ "1000 ship Navy" by Admiral Mullen - Wikipedia, the free encyclopedia. Accessed 20/12/2010.

sea, to unite, rather than to divide, and to counter ‘extremist ideologies, pirates, proliferators, criminals and terrorists’.

69. **Collaborative Strategy for 21st Century Sea Power.** It is the United States’ newest maritime strategy and was introduced in October 2007. The new strategy explains the comprehensive role of the sea services in an era marked by globalization and uncertainty. It acknowledges that there is a global system of connected economies, which depends on the freedom of movement across the maritime commons. Any interference to this system caused by regional conflicts, terrorist attacks, natural disasters and war, have potential global impact. The strategy states that U.S. vital interests are best served by having forward positioned maritime forces around the globe, postured in a way to prevent, deter, limit and localize conflicts, wars, and disruptions to the global system that all rely upon. This strategy describes the necessity to forge global partnerships to establish a resilient peace, as explained by Adm Mullen:

“Where the old Maritime Strategy focused on sea control, the new one must recognize that the economic tide of all nations rises —not when the seas are controlled by one—but rather when they are made safe and free for all.”

Part-IV**EMPLOYMENT OF NAVAL POWER**

70. Maritime forces can be employed in a variety of roles both in times of peace and war, as they are governed by the military as well as maritime strategies. The naval strategy linkage gives naval forces the military role, whereas, the maritime strategy linkage gives them the Constabulary and Benign Roles.

71. **Military.**³⁸ A military application is one in which combat is used or threatened or which pre-supposes a combat capability. All war-fighting tasks require the military use of force. Less obvious, perhaps, are the uses of military force in support of diplomacy and in which forces are used to coerce, persuade or signal a message. Although, under these circumstances combat may not be used or even envisaged, it is the capability of the forces to win in combat that underpins their use.

72. **Constabulary.** Constabulary application is where forces are employed to enforce law or to implement a regime established by international mandate. Force is only employed in either self-defence or to the minimum level necessary to enforce the law. The ways in which force can be used will normally be prescribed in the law or mandate that is being enforced and reflected in the ROE promulgated for the law enforcement operation being conducted.

73. **Benign.** Military forces can contribute organized and self-supporting formations with specific capabilities and specialist knowledge to a range of tasks in which violence has no part to play in their execution, nor is the potential to apply force a necessary backdrop. Tasks such as humanitarian assistance, disaster relief, search and rescue and ordnance disposal, whilst they may occur as a result of conflict, generally take place in a benign or permissive environment.

Attributes of Maritime Forces

³⁸ British Maritime Doctrine, 3rd ed. London: HMSO, 2004,p.58.

74. The success in a major operation will usually require the joint integration of maritime, land, air and special forces. Individual military units need to cooperate and complement each other to achieve the common aim. Commanders of joint forces must recognise the distinctive attributes of each of the components, in order to play each to its strengths, especially important in the conduct of a manoeuvrist campaign. Maritime forces have distinctive operational attributes.³⁹

- a. **Access.** Over two-thirds of the world is covered by the sea and this allows maritime forces to exploit the oceans as a strategic medium for their relatively unhindered deployment to the most significant areas of interest and threat. Not only does this access allow intervention at a time and place of political choosing, but maritime forces may often be close to crises as they are developing. 85% of all states have a coastline and even many of those that are landlocked will be accessible from the sea with the co-operation of neighbouring coastal states.
- b. **Mobility.** Maritime forces can move hundreds of miles per day. Mobility enables maritime forces to respond from over the horizon, becoming selectively visible and threatening to potential adversaries. It also adds a critical dimension to all joint operations.
- c. **Versatility.** Warships can easily change their military posture, undertake several tasks concurrently and be available for rapid re-tasking. They can present a range of flexible and well-calibrated political signals. Furthermore, maritime command, control and information systems at the strategic, operational and tactical levels offer uniquely sensitive, flexible opportunities to co-

³⁹ Ibid, page 28.

ordinate maritime activity with diplomacy. The elements of versatility can be summarised as:

- (1) **Flexibility in Response.** Ships at high readiness are always manned and provisioned for hostilities and their systems and crews can respond rapidly to contingencies by progressing quickly from peacetime cruising, through enhanced readiness, to a more combative posture. This is important, as periods of high intensity can occur in scenarios considered to be low intensity.
- (2) **Adaptability in Roles.** An individual warship of frigate size and above will have defensive and offensive capabilities in all dimensions (air, surface, sub-surface and the electro-magnetic spectrum). It can, therefore, operate in a variety of operational settings. Warships can be formed into task forces and task groups in which their individual characteristics combine to provide a mutually supportive, powerful and versatile combination of offensive and defensive capabilities. This, in turn, allows the group to operate at higher threat levels, where conditions might be beyond the capability of a single ship.
- (3) **Joint and Multi-national Attributes.** Maritime forces have traditionally taken part in operations involving other services and the crossing of environmental boundaries. Maritime forces are joint by definition, typified by balanced naval forces, comprising air, land (in the form of amphibious

elements) and integrated naval power under a composite command structure. Joint Sea Basing can provide afloat headquarters, logistics, area surveillance and denial platforms and facilities for joint forces, offering advantages in flexibility, sustainability and access. Indeed, forces delivered into theatre by sea as part of an amphibious task force are configured tactically and deployed ready for use; they are not merely transported. They are available for a joint task force commander to be afloat or ashore, depending on the nature of an operation. Their integral combat power can be decisive in the shaping and sustaining of most modern operations.

- d. **Sustained Reach.** Maritime forces have integral logistic support, including repair and medical facilities. The range and endurance that these provide, give individual maritime units and task forces autonomy and sustained reach, which is the ability to operate for extended periods at considerable distance from shore support. Reach is enhanced by the provision of organic and consolidation tankers, supply and repair vessels. Only a maritime force so equipped can exploit the full potential of maritime power. If reach is to be sustained for an extended period, a roulement of replacement forces may be required. Seaborne logistic support provided by sea basing is an important element in sustaining forces employed in joint operations, particularly those engaged in manoeuvre warfare.

- e. **Resilience.** Warships are designed to absorb substantial damage, before they become non-operational. While a loss of capability through damage will degrade operational performance, a ship's company is trained to restore systems to use as quickly as possible. Warships are also designed to operate within areas contaminated through the use of Weapons of Mass Destruction (WMD), with minimum degradation to their operational capability.
- f. **Lift Capacity.** An important duty for maritime forces is protecting the unhindered passage of sealift. Sealift permits land and amphibious forces to transit and poise in theatre and, then, enables joint power to be brought to bear ashore. Furthermore, it may often be the only practicable means of deploying mass (significant land and air forces, their battle winning equipment and logistic support) into a theatre of operations quickly and cheaply.
- g. **Poise.** Once in theatre, maritime forces can remain on station for prolonged periods, either covertly or overtly. They can retain or seize the initiative or signal political resolve and act as a force for deterrence or active coercion. The ability of maritime forces to poise in international waters allows the 'footprint' ashore to be optimised; that is to say the political complications and military risks of deploying forces and their logistic support for extended periods on land can be reduced. This unique capability to match the pace and reflect the tone of diplomatic activity is particularly useful in the dynamic and uncertain situations of the modern world. Poise exploits mobility, versatility, sustained reach and lift capacity.

- h. **Leverage.** Through suitable positioning and force packaging, maritime forces can provide leverage to exploit access and to influence events ashore disproportionately greater than the scale of force applied. Leverage is both a strategic and an operational concept, whose effects can be directly political or primarily military. Political leverage involves the coercion of governments which, prior to hostilities, is an aspect of naval diplomacy. At the strategic level, a maritime nation or coalition can use maritime and other expeditionary forces to shape and exploit the battle space and expose an enemy's flank and rear. At the operational level, joint forces on a seaward front or flank can provide manoeuvre from the sea to attack, distract and fix much larger forces ashore, envelop or otherwise achieve the disruption of an enemy.

75. **Maritime Contribution to Contingent Overseas Operations.** These may include:

- a. **Peace Support Operations.** Although not new, it is since the end of the Cold War that Peace Support Operations (PSO) have become ever more prevalent, with a consequent increase in the involvement of maritime forces. PSOs are multi-functional operations, involving military forces and diplomatic and humanitarian agencies. They are designed to achieve humanitarian goals or a long-term political settlement, usually in support of an appropriate mandate. Applying the attributes of Access, Mobility and Versatility, UK's maritime forces may make a major contribution to these operations. PSO covers a wide range of operations that are linked by the key characteristic of impartiality.

- b. **Conflict Prevention.** Conflict prevention activities are normally conducted under Chapter VI of the UN Charter. They range from diplomatic initiatives to preventative deployments of forces intended to prevent disputes from escalating into armed conflicts or from spreading. Conflict prevention can also include fact-finding missions, consultations, warnings, inspections and monitoring. Preventative deployments will normally need to possess sufficient deterrent capability to avoid a conflict and will, therefore, seek to overmatch the protagonists.
- c. **Peace-making.** Peacemaking covers the diplomatic activities conducted after the commencement of a conflict, aimed at establishing a ceasefire or a rapid peaceful settlement. They can include the provision of good offices, mediation, conciliation, diplomatic pressure, isolation and sanctions. Military support to add weight to the diplomatic process may well be required.
- d. **Peace Enforcement.** Peace Enforcement operations are coercive in nature and are preferably undertaken under Chapter-VII of the UN Charter, when the consent of any of the major parties to a conflict is uncertain. They are designed to maintain and re-establish peace or enforce the terms specified in the mandate.
- e. **Peace-keeping.** Operations undertaken under Chapter-VI of the UN Charter, with the consent of all the major parties to a conflict, to monitor and facilitate the implementation of a peace agreement. Such operations are principally engaged ashore, although there may be maritime aspects at the

margins or involving the patrolling of rivers and other internal waterways.

- f. **Peace-building.** Peace building covers actions that support political, economic, social and military measures and structures, aiming to strengthen and solidify political settlements, in order to address the causes of conflict. This includes mechanisms to identify and support structures that tend to consolidate peace, advance a sense of confidence and well being, and support economic reconstruction.
76. **Humanitarian Assistance and Disaster Relief**
- a. Humanitarian operations are conducted to relieve human sufferings. Military activities may accompany, or be in support of humanitarian operations conducted by specialised civilian organizations. Maritime forces can provide a comprehensive logistics base and refuge offshore for humanitarian operations, with ship-borne helicopters providing a versatile means of transport.
 - b. The flexibility of maritime forces and their independent logistic support makes them particularly effective in disaster relief operations, following hurricanes and tropical cyclones, local unrest or infrastructure collapse. Maritime forces are especially important in the very early stages of disaster relief, when they may well be the only assistance available to provide 'first-aid', such as fresh water, food, temporary shelter, fuel and electric power, while other agencies, including NGOs mobilize longer term assistance.
 - c. All vessels on the high seas are required under international law to assist in search and rescue and salvage operations may also be appropriate in some

circumstances. In some cases, it may be necessary to carry out a degree of marine pollution control. This is also a particularly specialist task that military forces cannot cope with over extended periods, if the level of pollution is high, as it often is, if it emanates from a stricken oil tanker. Again, maritime forces may be extremely useful in the early stages of a crisis, for carrying out initial surveillance or providing early assistance.

- d. Many of these operations are both manpower and specialised equipment intensive. Disaster relief and salvage operations in particular may involve the entire ship's company of a frigate or destroyer and require a good deal of specialist equipment. Ships deploying to the West Indies, where such operations occur frequently, receive additional training and equipment prior to their deployment.

Future Trends

77. **Influence of Technology on Maritime Warfare.** The development and progress of technology has had a profound impact on the conduct of war at sea. Navy, being a technological intensive force, is directly affected by the development and progress of technology. Today in the modern era, due to technological impact the old prime concept of 'Fleet against Fleet' has become subordinate to 'Fleet against Shore'. Set fleet actions have been replaced by long range strikes. Technology has also made it possible for many countries to have a respectable sea denial capability at an affordable cost to threaten a superior navy. The technology required for sea control is not only becoming cost prohibitive to the new aspirants but also in some cases, where countries have the wherewithal but are denied access to it through effective barriers, difficult to access. Another aspect of technology has been that naval

vessels can influence events ashore, while staying at a safe distance from the threat.

78. Rapid development in the information warfare in particular has revolutionary effects on maritime operations. The information warfare presents new opportunities and challenges for naval forces. The overall impact of these changes has caused a significant shift in the ways of exercising effective command and control. Information technology coupled with network centric capability have provided naval forces with the means of achieving better situational awareness. The evolution of network technology has resulted in aircraft and submarines into a coherent fighting machine. Thus, enabling the Commodore to achieve synergy in efforts, resulting in maximum effects against minimum application of force.

79. **Effects Based Operations (EBO) and Network Enabled Capability (NEC).** Future military operations may place increased emphasis on influencing the mind of an adversary, and EBO approaches this goal by seeking to coordinate the activities of all national players. The two main concepts in this regard are Network Centric Warfare (NCW) and Network Enabled Capability (NEC). The US has the means and the capability to employ NCW in naval warfare, whereas, countries like UK are using NEC. Successful EBO rely on identifying the effects that will lead to campaign success and on deploying the optimum mix of capabilities with which to achieve them. However, EBO will not reach its full potential without NCW/NEC. These envisage the provision of single, robust national communications architecture and comprehensive joint information management procedures that are compatible with close allies; it is seen as key to any nation's expeditionary capability. At the operational level NCW/NEC will allow powerful new combinations of combat power, principally through shared situational awareness. Further to this, NCW/NEC will enable enhanced joint and integrated planning and should aid

agility by avoiding unnecessarily early commitment to a particular course of action.

80. Naval Command, Control, Communications, Computers and Intelligence (C4I) Systems. Naval C4I systems are the information systems, equipment, software, and infrastructure that enable the commander to exercise authority and direction over assigned forces. C4I systems also help the commander to monitor and influence the actions of the maritime force through the chain of command. These systems support the following five basic functions:

- a. Collecting, gathering and formatting data for processing.
- b. Processing filtering, correlating, fusing and evaluating data to produce a picture required for the commander to take appropriate action.
- c. Disseminating and distributing information for use or further processing and distributing orders and instructions.
- d. Displaying and presenting information to the user in the most effective and efficient manner.
- e. Protecting and guarding information from an adversary's attempts to exploit, corrupt, or destroy it.

81. Security. Security, commensurate with the operator's requirements and the perceived threat from interception and exploitation, is essential. This may be achieved by employing appropriate security protection.

82. Timelines. Information must be processed and disseminated between and within commands rapidly enough to maintain a high tempo of operations and ensure that the decision-making process remains faster than that of any opponent.

83. Flexibility. Systems must be capable of being re-configured quickly so that they can respond to any rapidly changing environment (Flexibility).

84. **Interoperability.** In order to ensure that information can be exchanged amongst all commanders and forces involved in an operation, maritime C4I systems should be able to operate in joint and multi-national environments, integrating with other government departments and civilian organizations in theatre. Increasingly, the development of a network-enabled capability will be key in ensuring this.

85. **Survivability.** Survivability can be attained by dispersal and protection of key nodes, physical and electro-magnetic hardening, and redundancy of communications paths and information processing nodes.

86. **Information Operations.** Effective command and control are essential to success in modern operations. Information systems, command and control facilities must, therefore, be protected and maintained, since the whole system can be degraded through the loss or malfunctioning of one or a small number of components. Consequently, operations conducted against an opponent's command and control infrastructure and decision-making process play a key part in modern conflict. Information Operations embrace the components of the former Command and Control Warfare (C2W) (i.e. electronic warfare, physical destruction, operational deception, psychological operations and operational security) and Computer Network Operations, co-ordinated with Media Operations. Amongst its objectives is the gaining of information superiority by exploiting, influencing, degrading, confusing or destroying the enemy's command and control capabilities, while protecting friendly systems against such actions. Good intelligence and co-ordination between various elements in joint and combined forces are essential to its success.

87. **Space.** Modern command and control concept makes extensive use of space systems for communications and navigational accuracy; they are also a medium for critical, strategic and operational surveillance assets. Space is one of the warfare

environments, along with the sea, the air, the land, the information environment and the electro-magnetic spectrum. It can be an important enabler, which may not only be exploited by a sophisticated opponent but also by an increasing number of nations and interests serving, in part, proxy and commercial sources.

88. **Multi-national and Coalition Maritime Operation.** In multi-national operations there will be an additional dimension to the command and control organization. Multi-national operations are conducted by *integrated multi-national forces* and, by their nature, are complex. They involve forces with different national equipment and *doctrine*, often with specific political constraints on their employment. Close liaison between various governments and their own individual services is required to ensure the achievement of common objectives.

Low Intensity Conflicts at Sea

89. Most common form of warfare today and in the foreseeable future will be low intensity in nature, which can be defined as:

"A political-military confrontation between contending states or groups below conventional war and above the routine, peaceful competition among states. It frequently involves protracted struggles of competing principles and ideologies. Low-intensity conflict ranges from subversion to the use of the armed forces. It is waged by a combination of means, employing political, economic, informational, and military instruments. Low-intensity conflicts are often localized, but contain regional and global security implications".

90. LIC at sea may take place in a variety of forms, some of which are: quarantine, coercion, harassment to shipping, enforcement of territorial disputes, anti piracy, counter-terrorism, counter-insurgency and peace keeping operations.

91. In the wake of the 9/11, the activities of Extra Regional Naval Forces in our region have increased manifold. Role specific

platforms are being deployed and personnel are being trained and equipped to undertake the variety of tasks concerning LIC. Anti-terrorism, anti-drug trafficking operations are but a few examples of the tasks being performed by these ERF forces. In the context of India-Pakistan scenario, the nuclear deterrence has increased the chances of LIC in this region and the sea is no exception.

Regional Maritime Strategies

92. In the global maritime context, there is a visible shift from Blue water to littoral and expeditionary operations. The political, economic and military significance of littorals has been steadily increasing since the end of Cold War. This transformation has brought fundamental changes in the employment and development strategies of regional navies. In addition, piracy incidents and drug trafficking through Indian Ocean region is highest in the world. With countries of the littorals being nuclear and also having the largest standing armies, the IOR has a high degree of turbulence built into it. Therefore, the security environment of IOR is becoming more and more challenging with time.

93. **Indian Navy.** Although India has a coastline of 7516 km, however, there was less focus on the exploration of maritime sector potential. After the transformation from an agriculture based economy to a resource-intensive industrial economy, it has shifted its strategic focus to protecting its maritime trade in recent years. The salients of Indian maritime strategy include:

- a. Due to unprecedented economic growth being witnessed, India heavily relies on foreign energy resources. India imports 67% of oil from Gulf Region. India also has a contract for import of LNG with Qatar for 25 years.
- b. 95% of Indian trade is through sea.
- c. Indian mercantile marine has developed tremendously in last decade and comprise approximately 500 vessels including oilers, CNG carriers, bulk cargo ships,

containers etc. Security of these platforms is important for Indian booming economy.

- d. India has also laid a lot of emphasis on the capacity building of her ports. Indian ports' infrastructure is expanding at a rate of 8% per year to meet the growing requirement of trade and oil handling.

94. For protecting the maritime interests in Indian Ocean region, India is spending about US \$ 30 billion for its Navy in various projects by 2022. This heavy expenditure on building navy is testimony of fact that India is very serious in having 100-ship navy built around three carrier battle groups and nuclear power submarines fleet for extending its sphere of influence in IOR and to achieve a Blue water navy status. Indian naval achievements continue to move it towards exclusive club of great naval powers. Indian Navy (IN) continues to hold perceptions that it can reconcile peaceful Indian intentions with growing Indian prowess at sea. The revised IMD⁴⁰ summarises four roles or core capabilities for IN as:

- a. Strategic deterrence based on nuclear submarine.
- b. Littoral warfare through strike capability.
- c. Controlling the sea from Malacca Strait to Persian Gulf.
- d. Land attack capability from the sea to influence events on land.

95. Indian Navy has been steadily enhancing its influence and reach in the Indian Ocean Region. It has concluded security pacts with Mauritius, Maldives and Seychelles, and established its communication and electronic intelligence outposts in Madagascar. Indian Navy's joint patrols with South Eastern navies in Northern approaches to Malacca Straits, anti-piracy operations in HOA and conduct of Indian Ocean Naval Symposium portray its intention to project IN as a regional power. The cardinals of Indian maritime strategy can be summarized as:-

⁴⁰ Indian Maritime Doctrine

- a. Shaping for the maritime battlefield in peacetime.
 - b. Maintaining hegemonic designs through robust presence in the region.
 - c. Maintaining strong deterrent posture with the strategic ability to respond.
96. **Pakistan Navy**
- a. **Peacetime (Enhance Regional Maritime Security).** Pakistan Navy supports the traditional freedom of navigation on high seas and does not undermine international law. Prevention of terrorism at sea and curbing its linkages with trans-national crimes are high on its agenda. The emerging maritime scenario in Indian Ocean has, thus, necessitated a more dynamic role for Pakistan Navy, so as to safeguard own maritime interests, which are key to economic well being, sustenance of daily life and influence in the region. The need for a proactive role for Pakistan Navy becomes even more pronounced due to Extra Regional Forces' activities in our areas of maritime interest. The most significant maritime challenge of Pakistan Navy is to ensure maritime security in the region. Thus, maintaining well structured naval forces, it participates in following regional maritime campaigns:
 - (1) CTF-150, Coalition Maritime Campaign Plan (CMCP) since April 2004.
 - (2) CTF-151, Anti Piracy task force since January 2009.
 - b. Secondly, the maritime potential of Pakistan has largely been neglected since independence for its contribution towards economic activities. Though Pakistan maritime strategy has been formulated but

it needs to be realized on ground, through a comprehensive implementation plan, against a well defined timeline. Following facts with respect to maritime sector are relevant in this regard:-

- (1) Presently, Pakistan flag vessels carry 5% of dry cargo and 40% of liquid cargo. Non-existence of national shipping capacity puts a burden of US \$ 4 billion per year.
- (2) Sea-catch/fisheries contribute US \$ 130 million per year against a potential of US \$ 2 billion per year.
- (3) Pakistan has an EEZ of 200 NM which is rich of mineral and energy resources, has largely not been exploited and explored. The total area of EEZ is 240,000 sq km, which is larger than the combined land area of Sind and Khyber Pukhtunkhwa provinces of Pakistan. With the extension of continent shelf an additional 55,000 sq km of sea area will be added to our EEZ.
- (4) Operationalisation of Gwadar port needs to be undertaken on priority basis. The port provides leverage to have an additional commercial port other than Karachi, cost effective energy outlet for Central Asian States and trans-shipment facility similar to Dubai port.
- (5) Though the ship-building/repair facilities at KS&EW have shown some signs of recovery in last couple of years, but there is still a long way to convert it into a self sustainable and profitable industry.

- c. **Tension Period/War (Fleet in Being – Defensive Offensive Strategy).** The military threat to PN emanates from Indian Navy. Notwithstanding the fact that Indian Navy's quantitative and qualitative superiority is continuously shifting the military balance in the favour of Indian Navy, Pakistan Navy through a 'Fleet in Being' strategy, holds the wherewithal to generate sufficient combat potential and achieve its military objectives, particularly:
- (1) Protection of SLOCs.
 - (2) Seaward defence.
 - (3) Limited offensives on the enemy.
- d. As regards to the response for IN PAO's, PN has prepared a Strategy to negotiate with such a situation through revision in SOPs, formulation of comprehensive war plans, including general level state of preparedness i.e IRF (Immediate Response Force) and FoF (Follow on Forces), dispersal and peace time and war deployment etc. The material shortcomings in surveillance and air defence plans are also being worked out for plausible solutions, as applicable.

Pakistan Naval Destroyer – PNS Shahjahan (DDG-186)



97. **China**

- a. There is a general world perception about China that she is following 'String of Pearls' theory. It is further being brought out by US and India that China is carving into the Indian Ocean security architecture by regular incursions into the region and anti-piracy operations in Gulf of Aden. On the contrary, the realities are that after having achieved an economic boom, China has initiated various initiatives in the region to safeguard its maritime and energy security interests. Chinese cooperation with regional countries include sale of military hardware to Indian Ocean littorals, assistance in maritime infrastructure developments in Pakistan (Gwadar), Srilanka (Hambantota Port) , Bangladesh (Chittagong) road and energy pipeline networks and electronic surveillance installation in Myanmar (Burma).
- b. From Chinese point of view, PLA Navy follows '**Active defense**' strategy which is based on:
 - (1) Maintain national security and unification, and secure national interest of development.
 - (2) Guard against and resist foreign aggression.
 - (3) Free, the sea lanes of communication from threat.
 - (4) Oppose and contain the extremist forces.
 - (5) Enhance capabilities to undertake integrated maritime operations and nuclear counterstrikes.
 - (6) Secure the capabilities for all kinds of complicated situations, effectively responding to different crises, maintaining peace, deterring wars and winning a war in case it breaks out.

98. Since 2009, a new phenomenon has been observed, where PLA Navy gradually extended its strategic depth of offshore defense

and enhanced its capabilities to undertake sustained operations in IOR. This trend is due to China's increasingly active role in security of trade and its heavy reliance on external energy resources from Arabian Gulf region and Africa.

99. **Iran**

a. The maritime strategy of Iran is influenced by the geographical location of Persian Gulf and Strait of Hormuz, in close proximity to Iran. The vital water – ways of the region can be the most vulnerable, in case Iran's national interests are threatened either by:

(1) Iran's attempt to disrupt the Persian Gulf SLOCs or

(2) Blockade of the Strait of Hormuz.

b. The disruption of SLOCs is achievable through combination of conventional and asymmetric means available to Iran. Iranian Navy has the capability to hit the targets in Persian Gulf, with shore based missiles, JAMARAN destroyer, Fast Attack Craft (10 Hudong Missile Patrol Boats) armed with SSMs (C-801K, Range -75 kilometers and C-802, Range - 120 kilometers) sea-skimming anti-ship missiles and shoulder launched missiles, 11 C-14 high-speed catamarans, which are equipped with FL-10 anti-ship missiles and additional North Korean missile boats, submarines (3 Kilos), sea mines and fighter aircraft and helicopters.

100. **Extra Regional Forces (ERF)**

a. **Peace time.** Around, 85-95 ERF ships operate at any given time in the North Arabian Sea. In view of the strategic importance of Arabian Gulf region for international community, ERF presence in the region

is likely to continue for foreseeable future for following main reasons:

- (1) No regional Navy or collaborative security arrangement of regional navies possess the capabilities matching to ERF, so as to take over maritime security responsibilities in the region.
- (2) US and Allies prowess displayed during Iraq war-2003.
- (3) Iran factor.
- (4) Growing Chinese influence in the region.

b. **Indo-Pak Standoff/Conflict.** In case of an Indo-Pak conflict scenario, the role of ERF can be crucial and, therefore, had to be critically analysed from following aspects:-

- (1) ERF may provide some indications about initiation of hostilities by Indian Navy.
- (2) ERF may enhance PN liberty of action in North Arabian Sea or curtail liberty of action by imposing exclusion zones in area west of Gwadar port or GoA.
- (3) ERF may indirectly support Indian Navy by providing intelligence and electronic jamming etc.

Analysis

101. After having studied the historical perspective and evaluated the contemporary maritime thoughts, following points have emerged:-

a. **General**

- (1) Sea has been and would remain the source of resource exploration, medium of communication, scientific knowledge and power projection in the contemporary world.

- (2) Though generally wars at sea have been the extensions of battles ashore, however, viewing the future reliance on maritime resources, Navy's role would be further enhanced.
- (3) Maritime strategies have been evolving throughout the known history and those who have kept in pace with the emerging trends have benefitted maximum and are controlling the ocean highways and its riches.
- (4) Maritime powers desire to exercise command and control over sea for own advantage and deny the same to adversary. It led to the concepts of Fleet in Being and decisive battles. Both these concepts have proven their usefulness.
- (5) Those nations which could not keep the pace with the maritime technological developments eventually lost their place in the comity of maritime nations.
- (6) Europeans exploited the sea power to keep their influence and dominance world-wide.
- (7) Except for Command of the Sea concept, all other thoughts of Mahan and Corbett are still applicable in the maritime domain.
- (8) World War-I witnessed the true manifestation of Blockade and 'Guerre de Course'. 'Fleet in Being' concept proved its worth.
- (9) Submarine emerged as a new potent platform for attrition warfare and commerce raiding.

Evolution of Maritime Strategy and Employment of Naval Power

- (10) In World War-II amphibious landing emerged as a superior manoeuvre in maritime power potential.
- (11) Sea air power established itself as a decisive factor in the outcome of naval campaigns in Pacific theatre during World War-II.
- (12) Cold War maritime strategies were primarily centered onto the concept of contest for power projection and containment between two super powers i.e Soviet Union and USA.
- (13) To match with the maritime technological developments during Cold War era, both super powers undertook intensive R&D for taking lead in conventional and nuclear realms.
- (14) After Cold War, a major shift in maritime strategy of sole super power witnessed shift in its roles from Blue water to economic vibrant rim-lands.
- (15) Lessons learnt from Gulf war 1991, necessitated for improvements in joint warfare.
- (16) After new world order, the maritime strategy emphasized on deterrence, forward presence, crisis response and power projection.
- (17) 9/11 incident brought a paradigm shift in the international security order, whereby, concept of collaborative security has been introduced.
- (18) With the emphasis on constabulary and benign roles, involvement of Navies in maritime affairs would be further pronounced.

- (19) Technological developments have re-shaped the total power projection paradigm of the naval forces and maritime wherewithal. Navies now have capability to 'launch sea-based air and ground attacks against enemy targets ashore'.
- (20) Submarines are best suited platforms for strategic deterrence and 2nd Strike capability,.
- (21) With the advent of network centric capability naval warfare has also witnessed a major shift in its employment. Future wars are likely to be based on cyber warfare concept.
- (22) To achieve concealment and surprise, use of stealth technology on naval platform is likely to further increase in future.

b. **Contemporary Era**

- (1) Maritime power projection has become a major tool for leading maritime nations of the world for furthering their interests.
- (2) Application of blockade and containment is still valid in the present times.
- (3) Maritime interest and world economies are greatly dependent on good order at sea. Hence, role of navies to combat transnational crimes like drugs and human trafficking, piracy, smuggling and protection of EEZ is likely to be further augmented.
- (4) Navies, due to their reach, poise and power projection ability, are excellent tool of gunboat diplomacy.
- (5) Expeditionary operations have regained significance in the current environment.
- (6) Low intensity maritime operations have

transcended the focus towards littorals.

- (7) Importance of Navy for protection of SLOCs is likely to gain more prominence, as sea trade is increasing day by day.
- (8) Formulation of maritime strategy and development of naval power is essential for sea faring states.

c. **Regional Context**

- (1) In the regional context, Indian navy's hegemonic designs are manifested in their developmental strategy. This expansion is likely to establish its stature as a major maritime player in near future.
- (2) Presence of PLA (Navy) in Gulf of Aden for anti-piracy operations is a manifestation of China's new maritime strategy to enhance its forward presence in the areas of interest.
- (3) Pakistan's maritime potential could not be exploited/explored due to lack of focus at the national policy level.
- (4) The decline in shipping sector of Pakistan has led to heavy dependence on foreign flag carriers. A policy shift for creating enabling environment in this sector is considered most essential.
- (5) To become competitive in fishing sector in the region, there is a requirement to remain abreast with the latest technology in fish catch and preservation.
- (6) Impact of severe pollution in Karachi harbor on sea life and mercantile marine is a point of serious concern that warrants immediate attention.

- (7) Pakistan's inland waterways have remained unexploited for transportation and goods transfer.
- (8) Shipping industry in Pakistan has remained underdeveloped due to lack of consistency in govt policies.
- (9) For economic viability of Balochistan province, operationalisation and exploitation of the true potential of Gwadar port is considered of utmost importance.
- (10) Maritime security in North Arabian Sea has gained more significance in the post 9/11 period. For the same, availability of matching resources is considered essential.

Part-V**LESSONS LEARNT FOR PAKISTAN'S MARITIME/NAVAL STRATEGY**

102. Based on the above study some of the important lessons are:-
- a. Sea has immense economic benefits and military significance for a littoral state. Awareness about maritime potential and its contribution towards economic growth needs to be realized to benefit from this sector.
 - b. Shipping sector of Pakistan needs to be expanded to meet national requirements.
 - c. Pollution of Karachi harbor needs to be tackled on immediate priority.
 - d. Exploitation of EEZ for natural and energy resource requires focused attention.
 - e. Sea catch/fishing industry needs to be developed on modern lines for achieving its true potential and enhancing its contribution in national economy.
 - f. Port developmental programmes need to be made part of economic development plans. Moreover, operationalisation of Gwadar port needs to be realized on immediate basis.
 - g. Against growing Indian influence in the region, it is considered imperative that as a balancing act, Pakistan should initiate measures and policies through regional cooperation.
 - h. As China has now opened doors for maritime cooperation and extending its reach in the IOR, Pakistan should utilize the opportunity by enhancing cooperation between the two navies.
 - i. As Pakistan's trade is extensively dependent on sea, therefore, protection and maintenance of SLOCs is

imperative at all times. To meet this requirement, a strong and potent navy is mandatory.

- j. In the Global maritime environment, functioning of states in isolation is becoming impracticable. Therefore, presence of ERF in the region should be taken as an advantage and capitalised upon through regular engagement.
- k. Govt policy on development of inland waterways needs to be issued on priority.
- l. Shipping industry in Pakistan needs to be expanded to attract domestic and regional customers. For the same, phased project plan for next 10 years should be made part of national maritime strategy.

Conclusion

103. Throughout history, the sea has been playing an important role for the prosperity and well being of the mankind. The Sea power and Maritime Strategy has been instrumental in transforming the world order to its present shape. Maritime forces have remained abreast with the challenges of technological advances and geo-politics and have retained their significance till date. With the advent of nuclear weapons at sea, the maritime philosophy has also experienced a prominent change. The events of 9/11 have brought in an unparalleled transformation in the use of sea power and the concept of maritime warfare. The vulnerabilities of maritime highways particularly strategic choke points to the threats of maritime terrorism and their wide implications are neither ordinary threats nor these can be dealt by individual nation's navy. The concept of 'collaborative' or 'cooperative' maritime security is, therefore, being emphasised.

104. The methodology provided by Alfred Thayer Mahan over 100 years ago remains an effective way to develop an effective maritime strategy. The best maritime strategy will be the one that

fully caters for the ends, ways, means and risks for undertaking peacetime operations as well as for winning the wars.

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