AIR DOMINANCE OVER THE OCEANS

JASJIT SINGH

Air power has acquired a significantly increased salience over the past century. However, its impact against surface targets, both on land and at sea, had been far less than in air-to-air warfare because of the inaccuracies involved, requiring area attacks even when the sighting systems had improved. This was one reason why strategic bombing had become necessary with the "thousand bomber" raids and area targeting during World War II. Notwithstanding this limitation, naval air power played a critical role in shaping the outcome towards victory during crucial battles like at Pearl Harbour, Battle of the Midway, etc. Looking at the macro-trends, especially in future weapons and sensor technologies, it is obvious that air dominance – in both air-to-air as well as air-to-surface warfare – would play a strategically dominant role, making the difference between victory and defeat on land and the oceans.

It is not surprising, therefore, that China has launched the first of its many planned aircraft carriers and specifies its strategy for winning future local border wars through (i) command of the sea; (ii) command of the air; and (iii) strategic counter-strike—the three interlinked capabilities of future wars. It is interesting that the term "command of the air" has been used by China in the official declaration of its doctrine, while the term was last used by Douhet in 1923 and even the US Air Force (USAF) does not lay claim to such capability. On the other hand, we need to note that all

Air Commodore **Jasjit Singh** is the Director, Centre for Air Power Studies, New Delhi.

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three components form a composite approach to war-fighting which would have a unique impact on air and (conventionally armed) missile power in the coming years, especially in terms of the effect of these capabilities in future wars in the maritime environment. But more of it later.

LOOKING BACK TO SEE THE FUTURE

Air power, by its very nature, is capable of exercising strategic effect. Since it operates in the medium of air and space, it has an intrinsic capability to influence, and even control, the movement and capabilities of surface forces, whether on land or at sea, while they, in turn, have only a limited capability to influence, leave alone control, air operations except in a narrow area of terminal point defences limited in height. Inevitably, aerospace power is highly technology intensive. Hence, with the exponential advances in aviation and space technology in recent years, it was inevitable that the capacity and capabilities of air power to achieve strategic effect on surface forces would also correspondingly increase. This places it in a crucial niche among the armed forces of every country that can afford modern air power.

But before looking at some of the essential issues of air power in the maritime milieu, it would be useful to briefly look at the role and effect of naval aviation in operations in the past, which, I am sure, naval aviators are fully aware of. The war in the Pacific started with the Japanese surprise air strike on Pearl Harbour that sank most of the US' capital ships, except for the aircraft carriers which were away on an exercise and, hence, survived to fight back later. The Japanese possessed a much stronger naval force than the Allied combined strength in the Pacific and Indian Oceans. But they realised that US industrial strength would tilt the balance against them. Their 3-phase plan was to (i) neutralise the US Pacific Fleet through a surprise attack; (ii) simultaneously seize the strategic areas with resources in Southeast Asia

and establish a defensive parameter around it; and (iii), defeat and destroy any Allied efforts to penetrate the perimeter.

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The Japanese fleet that targeted Pearl Harbour in the first phase was composed of six aircraft carriers with 408 aircraft. After an advance aerial reconnaissance confirmed the location of the US naval fleet, Adm Chuichi Nagumo launched almost all his aircraft, holding back only 48 on the carriers for possible defence. The first wave was composed of 180 torpedo carrying bombers that targeted US warships in the harbour; and the second wave of 180 light bombers, fighters and dive bombers targeted the harbour installations, fuel depots, airfields, and so on. In spite of sufficient information at the Pentagon's highest levels of the likelihood of Japan launching a war, the US leaders failed to alert their subordinates. The strategic surprise was complete although at least one US radar operator had picked up signals of the incoming attack. The US Navy suffered a crippling loss: of the 8 battleships present, 3 were sunk, another capsized and the remainder were seriously damaged. On land, only 166 USAF aircraft (out of the total 231 deployed) remained intact or reparable; of the navy and marine corps, only 54 out of 250 aircraft remained. But all three aircraft carriers, the total deployed by the US Navy in the Pacific, survived since they were out on an exercise and the Japanese were ignorant of this fact.

Within three days of the Pearl Harbour disaster, the Allies suffered another major strategic setback, with Japanese aircraft sinking capital ships without a naval engagement. This was done by Japanese naval aircraft sinking the two capital ships – HMS *Repulse* and HMS *Prince of Wales* of the Royal Navy on December 10, 1941, in the South China Sea. The *Prince of Wales* was among the most powerful gun-carrying naval platforms in the world at that time, and incorporated the latest in anti-aircraft and anti-torpedo defences, including both guns and specially designed underwater armour against torpedoes. Prime Minister Winston Churchill believed that the two heavily armed warships to the east of Singapore would deter the

Japanese from attempting any movement toward the British colonies in the region. The battleships were to be accompanied by one aircraft carrier, the HMS *Indomitable,* but it was under repairs and, hence, could not accompany the capital ships, and no land-based British air power was in range. No naval engagement took place, but a total of 86 Japanese aircraft operating from airfields around Saigon carried out persistent air strikes with torpedoes and bombs against the two capital ships and their escorting destroyers. The Royal Navy suffered heavy loss of life and except for three US aircraft carriers, the Allies were left with no serviceable capital ship in the Pacific and Indian Oceans. Both Pearl Harbour and the sinking of the Royal Navy capital ships witnessed no naval engagement or for that matter air-to-air engagement; the war was between aircraft in the air and capital warships on the surface of the ocean where the latter lost grievously. The air-to-surface dominance was well demonstrated.

After these dramatic air strikes which left the Indian Ocean undefended, the Japanese exercised control over both the Pacific and Indian Oceans, all made possible and achieved by the employment of air power in the maritime environment. For some time at least, control over both oceans passed into Japanese hands. The Japanese fleet sailed through to the Indian Ocean, bombed Madras (where the British Governor ordered total evacuation), Vishakhapatnam, Kakinada, Calcutta and other ports before — curiously — turning back to the Pacific. Japan lost the opportunity to control the Pacific Ocean after the Battle of the Coral Sea in May 1942, and even more important, the Battle of Midway, a month later, to the US Navy and its carrier naval aviation force.

The Battle of the Coral Sea (May 7-8, 1942) was the first naval battle as such, but the naval forces never even sighted each other. The US Navy had two aircraft carriers against three Japanese carriers. The Americans meticulously planned the air strikes on the Japanese carriers to catch them when they would be refuelling and being turned around (a strategy Israel was to follow with dramatic success a quarter century later against the Arab Air Forces). The Americans lost more ships, but the Japanese lost more aeroplanes and this battle halted the Japanese advance southward.

During the Battle of Midway, once again, the Japanese had four aircraft carriers (with 254 aircraft embarked) against three with the US Navy with a total of 362 aircraft (including nearly 100 based on land). By the time the Battle of Midway ended, all four Japanese carriers were sunk, compared to one of the American carriers, all without a direct naval engagement; and the US regained complete control of the Pacific Ocean while the backbone of the Japanese Navy was broken. The US Navy lost 132 aircraft against 275 by the Japanese. One direct effect was that Washington immediately cancelled the construction programme for 5 large battleships (of nearly 58,000 tons displacement between them), and the aircraft carrier became the capital ship of the navy, replacing the battleships!

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On the other side of the globe, the experience in the Atlantic Ocean was no different and naval aviation (along with submarines) played a major role in ensuring that the Allied life-line in the war was kept open in spite of German submarines making many heroic attempts to interdict the merchant convoys.

After World War II, the most significant role played by naval aviation was during the 1982 Falklands War. Argentina possessed an old 20,000-ton aircraft carrier, the *Veinticinco de Maya,* which could embark Super Etendard and/or Skyhawks. On May 1, 1982, it was about to launch five Skyhawks against the British task force about to invest the Falklands, but heavy seas (or lack of sufficient head winds) prevented the aircraft being launched. The next day, the British nuclear-powered submarine sank the Argentine cruiser *General Belgrano* and the aircraft carrier was not put out to sea.

During the short war, at least five British warships were sunk or seriously damaged by Argentine Skyhawks employing the Exocet anti-ship missiles and a few more with iron bombs delivered at low altitude. The number might have been larger if Argentina had more than the stock of six Exocets! The

British carriers HMS *Hermes* and HMS *Invincible* had to be withdrawn east of the Falklands well outside the range of the land-based Skyhawks during daytime. In more recent times, the US aircraft carriers and naval aviation played a significant role in the 1991 Gulf War, the 2001 Afghanistan War and the 2003 Iraq War by using the aircraft for strikes against land targets.

The foregoing would no doubt give some idea of the role and effectiveness of naval aviation, especially embarked on aircraft carriers (which were generally 20,000 to less than 40,000 tons displacement during World War II). With larger and faster jet aircraft, the aircraft carriers also increased in size and capabilities. A counter-view of the foregoing brief summary comes surprisingly from the internationally recognised authority on military history and strategy, Martin Van Creveld, in his 500-page obituary of air power in his recently published book, *The Age of Air Power*. He concludes, "The record of the use of naval aviation at sea, in anti-submarine warfare, or against an opponent of its own kind is equally unimpressive. In fact, though there were some incidents and an occasional shot may have been exchanged, during the entire period since 1945, only rarely was naval air power, whether land- or sea-based, employed in a real war against a real enemy able and willing to respond."[1] He may be only partially right because there was no hostile air power to challenge the carrier aviation and, consequently, there was no real major war in the classical sense after World War II which was fought between colonial powers with their empires, and others aspiring to the same status and capacity. This is unlikely to be replicated if for no reason other than the demise of imperial colonies across the world. But what is certainly possible is a more limited military-to-military war (and the ever present risk of nuclear weapons exchange) which could alter the regional and future balance of power. We, in India, cannot plan our future naval capabilities on the assumption that since the Western powers would be engaged only in constabulary wars, this is the global trend. Hence, even if anti-piracy may persuade some of this being the primary role of our Navy and Air Force, we need to reflect, expect, and rely seriously on, regular warfare under the nuclear overhang.

1. Martin Van Creveld, *The Age of Air Power* (New York: Public Affairs, 2011), pp. 267-268.

It is not surprising that in recognition of the role of air power over the oceans, President George H. W. Bush has written, "One of the first questions I always asked as Commander-in-Chief when American interests were threatened around the globe was '*Where are our aircraft carriers?*' (emphasis in original) The ability to project power from the sea — free from the restrictions of international political manoeuvring — has repeatedly played a key part in crisis management and in securing vital US interests."[2] This cannot be carried out without air dominance of the oceans. Martin Van Creveld has almost completely ignored in his expansive study the role of military power for coercive diplomacy and/or "operations other than war" and the contingencies and vital interests that the former President of the United States has highlighted. Two important studies[3] on US coercive diplomacy during 1947-82 indicate that the US employed its military forces for coercion without war to achieve political objectives at an average of 7-8 incidents per year; and the frequency has, if anything, increased since then. In nearly 75 percent of the cases, the aircraft carrier and the embarked air power was the primary instrument of choice, with air and naval forces individually accounting for another 15 percent of the cases.

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In the world of tomorrow, with the political landscape changing with the shift of power from the West to the East primarily due to the rise of China and India, there will be additional demands on the Indian armed forces to apply force for protecting and promoting our national interests without necessarily having to enter into a war. If the past is any indicator, air power, whether land- or sea-based, would have to be employed in an overwhelming proportion of the instances as compared to the land forces.

2. Douglas V. Smith, ed., *One Hundred Years of U.S. Navy Air Power* (Annapolis: Naval Institute Press, 2010), p. xi.
3. Barry Blechman, Stephen Kaplan, et al, *Force Without War: US Armed Forces as a Political Instrument* (Washington DC: Brookings Institution, 1978) and Philip Zelikow, "Force Without War, 1975-82," *The Journal of Strategic Studies* (London), Vol. 7, No. 1, March 1984, pp. 29-54, which updates the earlier study.

We can already see the extensive role for the Indian Navy in tracking piracy and making the Indian Ocean safe for commercial uses. This obviously requires extensive employment of available air power like the helicopters embarked on most of our warships.

FUTURE OF AEROSPACE POWER

Aerospace power has acquired a significantly increased salience, especially in the maritime environment during the past three decades. As noted above, even during crucial battles earlier, naval air power had played a critical role in shaping the outcome towards victory. Looking at the macro-trends into the future, it is obvious that air dominance would be the crucial capability required for effective outcomes of our land, sea and air operations. The earlier concept followed in our armed forces of "favourable air situation" was conceptually flawed. This is not the place to go into the whys and wherefores of how that came about. Air superiority was the essence of warfare in the past ever since heavier than air flight came into being; and it will continue to be so in the future.[4] But air superiority has its limitations and so has air supremacy, a notch above air superiority. Both were perceived in terms of air-to-air superiority and differed from each other only in detail. Beyond Visual Range (BVR) combat and struggle for dominance had led to all weather day and night capabilities, far beyond the line of sight air warfare soon after World War II. Hence, air dominance in the air-to-air role is certainly available to most modern air forces and is a capability that is not restricted to the developed countries only.

However, one of the greatest limitations of air power in the past was that the air-to-surface air warfare had remained limited to "line of sight" air warfare. A partial exception was the use of air power in the maritime environment with somewhat longer range weapons, essentially because a naval target could be sighted quite some distance away and, hence, the torpedo was the weapon of choice in World War II which had given way to anti-ship sea-skimming missiles by the time the Falklands War was

4. See Jasjit Singh, *Air Power in Modern Warfare* (New Delhi: Lancer International, 1985), chapter titled "Air Superiority: The Struggle for Dominance", pp. 1-34.

fought in 1982. The target on land, however, had to be visually sighted before a weapon could be fired. This, in turn, also meant the attacking aircraft having to practically fly over the target area by the time it expended its weapons. In turn, this provided a tremendous incentive for strengthening air defence of the battlefield area, in turn, raising the cost of air-to-surface warfare. All this is changing, particularly for countries that are willing to invest in the available/emerging technologies, especially those for beyond visual range Reconnaissance Surveillance and Target Acquisition (RSTA) and precision guided weapons for long-range strike. This alters the long prevailing limitations on air-to-surface warfare and provides the means for air dominance in this domain also. The new technological capabilities, like the fourth/fifth generation combat aircraft, Unmanned Aerial Vehicles (UAVs) especially for surveillance and reconnaissance, and in particular induction of supersonic cruise missiles and anti-ship ballistic missiles (including those with manoeuvrable reentry warheads, etc.) would define the contours of air warfare in the maritime domain in the future.

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It is in this context that we need to reflect on some of the technological and doctrinal changes that are taking place. It needs to be recalled that ballistic missiles were not very accurate and the inaccuracies increased with range. Hence, they were useful only against area targets and, consequently, nuclear weapons became the inevitable choice as the missile warheads. In turn, the ballistic missiles came to be associated with nuclear weapons and the search started for defence against ballistic missiles leading to the 1972 Anti-Ballistic Missile (ABM) Treaty [later scrubbed when Ballistic Missile Defence (BMD) technically appeared more feasible]. But by the mid-1980s, the US Global Positioning System (GPS) was getting installed. A major study by Albert Wholstetter and nine other leading strategists of the United States had come to the conclusion that even Intercontinental Ballistic

Missiles (ICBMs) would be capable of accuracies of less than 10 metres by the turn of the century.[5] This assessment has come true and ballistic missiles of lesser range like the Intermediate Range Ballistic Missiles (IRBMs), in fact, are highly accurate at ranges of 1,600 km or more. At the same time, advances in technology have made it possible to exploit the so far unusable band of altitude of around 25-125 km and, hence, these are becoming usable even with conventional warheads. In addition, technological advances have now made it possible to exploit the reentry vehicles for manoeuvres before impacting on the targets. This appears to make the BMD already redundant, and offence may again be dominant over defence in the missile domain in the coming decades, especially at the strategic level.

To the changing ballistic missile capabilities, we also must add the changes taking place in cruise missiles. The current trends have already enhanced the cruise missiles to supersonic speeds though the range of most new ones is limited to around 300-km in order to remain within the limitations imposed by the Missile Technology Control Regime (MTCR).[6] Such missiles are capable of being launched from the ground, sea and air against surface targets. Defence against even the 300-km range cruise missiles would pose serious challenges, especially when they are launched from an aircraft, particularly a fourth-generation supersonic aircraft.

It is these three specific capabilities that form the backbone of China's so-called "Anti-Access Strategy" against the US Navy to try and extend the proverbial sea denial capability far beyond that of the earlier days, and amounts to extended sea denial-cum-control capabilities. All this is sought to be achieved by exploitation of aerospace characteristics, technology and capabilities. The implication of the changes can be gauged from the fact that even in defending against a 60-70 km anti-ship sea-skipping missile like the Exocet or the Harpoon, the optimum defence against such "mini-cruise" missiles was to intercept the launch platform before weapon release. With a 300-plus km supersonic cruise missile, the distance from the defending fleet would be enormously expansive. This is in keeping with the general

5 Albert Wholstetter, et. al., *Discriminate Deterrence* (Washington DC).
6. For a detailed study, see Sitakanta Mishra, *Cruise Missiles* (New Delhi: KW Publishers).

trend in warfare where we are experiencing the expansion of space and contraction of time, thus, fundamentally altering the nature of warfare. Nowhere is this problem more acute than in China's war-fighting aims, objectives and capabilities.

POWER PROJECTION WITH AIR POWER

The foregoing clearly indicates the increasing vector of air dominance over the oceans. Global trends since World War II indicate that wars between military forces, where they have taken place, have generally been limited in aim, scope and conduct. The Korean War is now accepted as a "limited war." By 1985-87, China had defined its military strategy in terms of future wars to be "local border wars." All the wars that the People's Republic of China (PRC) had fought after the civil war had indeed been limited and no doubt had played a major role in the formulation of the local border war doctrine and strategy. But we also must recognise that military logic makes it clear that in a limited and/or local border war, the land forces would normally be restricted to areas close to the border and not attempt a deep strike and penetration, especially if the other country possesses nuclear weapons since escalation to nuclear levels would then be almost inevitable.

China has been placing great emphasis on the role of air power in such wars based on the experiences of wars since the end of the Cold War. As it is, the history of wars leads to unambiguous conclusions that air power played the dominant role in achieving victory.[7] Once China adopted the doctrine of local border war, its dependence on air power naturally increased. However, it still did not possess the technology for modern air power systems. But the collapse of the Soviet Union opened up new unprecedented opportunities for acquisition of selected high-technology weapon systems for China's military modernisation. As a consequence of new capabilities coming in, the air force leadership sought higher budgets (which were provided by slashing the strength of the land forces) and clearly started to expound their plans in public.[8]

7. John Andreas Olson, ed.. *A History of Air Warfare* (Washington DC: Potomac Books Inc., 2010), besides many others.
8. "PLA Officer Complains About Budget," *FBIS-CHI*-1999-0309, March 9, 1999.

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By the end of the 1990s, the Chinese Air Force Commander was publicly expounding the new strategy for the air force. He publicly sought a greater role for the People's Liberation Army (PLA) Air Force declaring that the Chinese Air Force will strive for a transformation from the air defence type to an offensive and defensive type as soon as possible. He announced, "At the turn of the century and in the early part of the new century, the Air Force will have a batch of new-types of early warning aircraft, electronic-equipped fighter planes, and ground-to-air missiles" and that the "*Air Force must give more prominence to air offensive, gradually integrate offensive and defensive, and build up a crack, first-rate air strike force*[9] (emphasis added). His forecast goal can be seen to have generally materialised by now. It is not surprising, therefore, that a study by Germany's leading think-tank, SWP, has concluded that the "Chinese Air Force is the only branch for which the 2008 Defence White Paper identifies offensive capability."[10] However, the centre of gravity of the Chinese military will remain the army because of its predominant role of underpinning the supremacy of the Chinese Communist Party, thus, making it primarily domestically oriented. Projection of military power outside the state, however, would rest with the air force, navy and strategic forces.

This aspect could be clearly seen a decade later in China's bold and unambiguous announcement of its military strategy in its 2004 White Paper on National Defence. The crucial section candidly stated is reproduced below:[11]

9. "Air Force Commander Liu Shunyao on Air Force Transformation" *FBIS-CHI*-1999-1107, dated November 7, 1999.
10. Sophie-Charlotte Brune, Sascha Lange and Janka Oertel, *Military Trends in China: Modernising and Internationalising the People's Army* (Berlin: Stiftung Wissenschaft und Politics, February 2010), translated by Meredith Dale, pp. 13-14.
11. "Revolution in Military Affairs with Chinese Characteristics" in *White Paper on China's National Defence in 2004*, Chapter III, p.1, published to illustrate China's national defence policies and the progress made in the previous two years, *China Daily*, December 28, 2004, at http://www.chinadaily.com.cn/english/doc/2004-12/28/content_403913.htm.

> While continuing to attach importance to the building of the Army, the PLA gives priority to the building of the Navy, Air Force and Second Artillery Force to seek balanced development of the combat structure, in order to *strengthen the capabilities for winning both command of the sea and command of the air, and conducting strategic counter-strike*" (emphasis added).

At the same time, China has focussed heavily on (ballistic and cruise) missiles and modernised them. It has developed the Manoeuvring Reentry Vehicle (MaRV) in addition to the earlier Multiple Independently Reentry Vehicle (MIRV) capabilities for the reentry vehicle warheads for its ballistic missiles. It has also been developing and testing its own BMD system based on the Russian supplied S-300 and S-400 air defence and anti-missile systems. In January 2007, China destroyed its own obsolete satellite at around 700-km altitude by a ground-based missile mainly to showcase its Anti-Satellite (ASAT) capabilities.

For at least more than a decade, the Chinese Navy would be able to play only a limited role in the Indian Ocean (except with submarines and possibly by long range highly accurate and/or with manoeuvrable reentry capability) primarily due to the limitations of naval assets to operate so far away, even though ports like Gwadar, etc. may be available. Little politico-military advantage is likely to accrue to China by attempting naval warfare in India's backyard. Similarly, a major contradiction of the local border war doctrine is the shape and mission of the Chinese Air Force, naval aviation and strategic missile capabilities in the future, since they all represent targeting hundreds of kilometres beyond the border region, thus, negating the concept of local border war. Incidentally, this suits the Chinese fairly well since they keep claiming a doctrine of local border war (which represents strategic restraint) and, hence, supportive of its posture that it seeks to focus on peace and development in the future.

The second contradiction of the local border war doctrine is the long-range strikes by the strategic forces with IRBMs armed with conventional warheads and MaRV (which would pose serious challenge to BMD when it becomes operational) which is the upcoming deep strike instrument with

or without nuclear weapons, with range of around 1,500-km against fixed targets (especially air bases) essentially for interdiction of road/railway lines and junctions to restrict the movement of logistics and reinforcements. China is already reported to have deployed over 1,000 such missiles on the east coast against Taiwan/USA to deny access to a US naval armada.[12] These are mobile missiles and there is no reason to believe that a large number cannot be deployed on the Indian frontier. This emerging threat with conventionally armed MaRV missiles requires that the Indian Air Force (IAF) moves its key assets for offensive action into the great strategic depth that is available.

It is not surprising, therefore, that the United States, which had planned to drastically cut back its naval power after the Cold War, now maintains 11 aircraft carrier-based task forces, roughly equal to the Cold War period; and China has launched the first of its many planned aircraft carriers, and specifies its strategy for winning future local-border wars through "*command of the sea and command of the air*," the two interlinked capabilities in the maritime environment *supported by strategic counter-strikes,* as noted earlier. This combined arms capability is believed to be central to the anti-access strategy against US naval power in the Pacific Ocean. The US, in turn, is formulating its new "Air-Sea Battle" strategy which demonstrates that air power would play a major role in the maritime environment in its response to China's anti-access strategy. It is worth recalling that the Chinese Central Military Commission (CMC), the ultimate authority for employment of military power, by 1985, when it took the decision to cut back the ground forces by one million people, had concluded: "Air power and precision strike are now the primary means of conducting warfare, with ground operations remaining secondary."

The foregoing also must be viewed in the context of the strategic nexus between China and Pakistan under which China has been supplying not only the bulk of conventional weapons in Pakistan's military inventory, but also in terms of nuclear and missile capabilities. China has also constructed and launched satellites for Pakistan. Most of the ballistic and cruise missiles

12. *Pentagon Annual Report to the Congress 2011,* issued in March 2011 at Washington DC.

in Pakistan have their origin in China. It is, therefore, reasonable to assume that China may also supply the more accurate ballistic missiles besides those fitted with manoeuvrable reentry warheads to enable Pakistan to put in place its own "anti-access strategy" in the Indian Ocean.

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This leads us back to the question of aircraft carriers. Their vital necessity arises from the basic factor of the criticality of air power in the maritime environment. India's national interests are expanding faster than its economic growth and consequent trade and the efforts to acquire energy and other resources. We have a large expatriate population abroad, most of them in politically volatile regions of the world (there are 4.8 million Indians in the Arab states of the Gulf region alone) who may have to be provided support in times of danger. Land-based aircraft without air bases will be of little utility beyond their operational combat ranges.

Looking closer home, we need to carefully monitor the potentially hostile capabilities being created in naval air power, ballistic missiles, and space that can be brought to bear on us. The Indian peninsula has historically not been an area of great air defence concern; but with hostile aerial refuelled long-range strike aircraft (even if land-based) and/or ballistic missiles, it could now become India's Achilles' heel. Cruise and anti-ship ballistic missiles are likely to dominate the vastly expanded maritime battlefield; and future aircraft armed with supersonic anti-ship/cruise missiles would have to be neutralised before weapon launch. In short, the scope, extent and quality of air dominance in the maritime environment would also require much closer coordination between the Indian Navy and Air Force, not to talk of adequate numbers of fourth/fifth generation combat aircraft embarked on larger aircraft carriers for autonomous operations further away. In turn, this would require aircraft carriers of around 60,000-ton class to embark adequate resources to function effectively across the Indian Ocean. At another level, BMD capabilities on warships would need to be seriously considered; and,

at the same time, ballistic missiles usable with conventional warheads and manoeuvrable reentry warhead equipped missiles (even with conventional warheads) would be necessary for deterrence through offence.