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THE AIRCRAFT CARRIER IN INDIAN NAVAL DOCTRINE

Assessing the Likely Usefulness of the Flattop in an Indo-Pakistani War Scenario

Ben Wan Beng Ho

In October 2015, the Indian navy released a document entitled *Ensuring Secure Seas: Indian Maritime Security Strategy (IMMS-2015).*[1] In contrast to its more conservative predecessor, *Freedom to Use the Seas: India's Maritime Military Strategy,* published in 2007, the new strategic document propounds a more assertive role for the Indian navy over the next ten years.[2] To that end, New Delhi seeks to build up a force structure centered on three aircraft carriers, each of which would form the nucleus of a carrier battle group (CBG).[3]

IMMS-2015 does not delineate what roles Indian carriers would fulfill during wartime, other than that they will be a key contributor to *sea control,* which is "a central concept around which the Indian Navy will be employed."[4] The carrier traditionally has been regarded as a useful platform for this endeavor, as it is essentially a mobile, territorially independent air base from which aircraft can be deployed to fulfill various sea control–related roles. Historically, the three main tasks for which the aircraft carrier has provided significant utility during a conventional war have been (1) attacking the enemy's maritime assets, (2) projecting power ashore, and (3) protecting one's sea lines of communication (SLOCs).

How effective would Indian aircraft carriers be in these areas during a future war with India's

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strategic rivals? This is a question worth exploring, yet no previous literature has dealt with it explicitly. Moreover, addressing this subject would contribute to the richness of the overall carrier debate that has been going on since the platform's inception in the 1920s.[5]

To contextualize the issue, an Indo-Pakistani war scenario will be discussed, given the historical enmity between the two South Asian states.[6] The level of hostility is such that Shashank Joshi believes that "India's single most probable military contingency remains a limited war with Pakistan."[7] A series of border clashes occurred in the disputed region of Kashmir between the two nations in 2014–15. More recently, in September 2016, militants ostensibly linked to Pakistan killed twenty soldiers during a raid on a military outpost in Indian-held Kashmir, which led to Indian special forces purportedly crossing the Line of Control to carry out a reprisal attack.[8] Border tensions have continued to simmer since then, so conflict between India and Pakistan cannot be ruled out. Such a confrontation, should it take place, is highly likely to be a conventional one, given that both sides have nuclear weapons and crossing the atomic Rubicon—even to use low-yield tactical devices—could escalate the conflict into an utterly ruinous war.

In a notional Indo-Pakistani war, the modest size of Indian carrier wings will give rise to what is known as the "small-deck carrier quandary." In this case, that quandary restricts an Indian carrier's utility for going on the offensive, whether focused at sea or ashore. This dilemma revolves around what proportions of such a ship's relatively small fighter complement—barely two dozen aircraft—should be allotted to defense and to attack. This will be a key consideration for a CBG commander as he faces Islamabad's burgeoning antiaccess/area-denial (A2/AD) complex.

On the other hand, the small-deck carrier conundrum would not be felt as acutely with regard to the SLOC-protection role, as Indian flattops would be able to devote their aircraft mainly to defense. Furthermore, carriers are particularly well suited for this task, as sea-based airpower has a number of operational advantages over its land-based counterpart.

To date, no academic publication has dealt specifically with the likely usefulness of Indian carriers during a possible contingency involving Pakistan. Some journal articles have covered carriers in relation to India in a general sense, but not regarding an Indo-Pakistani scenario per se.[9] While a number of works discuss the Indian navy as a whole during a notional war with Pakistan, they do not discuss the functions that carriers would perform.[10] The one academic source that does cover the subject to any significant degree is the book *Sea Power and Indian Security,* by Rahul Roy-Chaudhury. In a section entitled "An Indo-Pakistani Naval War: A Scenario in the Future," the author alludes to the likely missions of Indian carriers, but he does not assess the ships' likely effectiveness.[11]

What is more, the book was published in 1995, and naval developments in the two decades since then necessitate a fresh look at the issue. There also seems to be a misconception that the Indian aircraft carrier is a potent naval platform solely by virtue of its organic airpower. To illustrate, one commentator states rather sweepingly that INS *Vikramaditya*'s "powerful air wing is capable of executing air superiority, anti-surface, anti-ship and anti-submarine warfare" during a war with Pakistan—without explaining in detail how it would do so.[12] Thus, there exists a lacuna in the existing literature on a key aspect of the Indian navy.

This article therefore seeks to answer the following central research question: How useful would the Indian aircraft carrier be during a hypothetical conflict against Pakistan in the medium and long terms? To address the issue, this article will extrapolate from existing, open-source information to the likely dynamics of Indian carrier operations against Pakistan. The time horizon discussed will extend to 2025. (Going beyond that time frame would not be prudent, as technological developments over the longer term might render conclusions invalid, on the basis of extant dynamics.) While there has been much talk about China's fledgling naval presence in the Indian Ocean, it is unlikely to constitute a genuine strategic threat to New Delhi within the time frame discussed herein, considering Beijing's current preoccupation with its own "back yard" within the so-called first island chain.[13] Limiting the discussion to Pakistan is therefore sound, as the country always has been a clear and present threat in the eyes of India's security managers.

The next section provides current background information on India's aircraft carriers. An assessment of the platform in the offensive mode (attacking sea- and land-based targets) with reference to the small-deck carrier quandary follows, succeeded by an analysis of the use of Indian carriers for SLOC defense. The final section puts forth a number of recommendations for Indian naval planners, followed by concluding remarks.

INDIA'S AIRCRAFT CARRIERS

India has only a single carrier, INS *Vikramaditya,* in active service today, with another, INS *Vikrant,* scheduled to be commissioned in late 2018.[14] The table below captures the key features of these two vessels, both of which are classified as "small-deck" carriers by virtue of their size and aircraft complement.[15]

During operations, each carrier and its several destroyer and frigate consorts constitute a CBG, and one or two such entities make up a carrier task force (CTF). *IMMS-2015* states that each CTF is "a self-supporting force capable of undertaking the full range of operational tasks in all dimensions . . . [including] Anti-Air Warfare (AAW), Anti-Surface Warfare (ASuW), ASW [antisubmarine warfare], Maritime Strike, [and] Electronic Warfare (EW)," adding that "[d]edicated forces

TABLE 1

Name	Displacement	Length	Flight-Deck Configuration	Air Wing
Vikramaditya	44,500 tons	283 m	STOBAR	Up to twenty-four MiG-29K attack fighters and six ASW and AEW helicopters[a]
Vikrant	40,000 tons	262 m	STOBAR	Around thirty aircraft, comprising MiG-29Ks and ASW and AEW helicopters[b]

Notes:
AEW = airborne early warning; ASW = antisubmarine warfare; STOBAR = short takeoff but arrested recovery.
a. R. Sukumaran, "Operationalising the *Gorshkov:* An Appraisal," *Strategic Analysis* 28, no. 1 (2004), p. 40.
b. "*Vikrant*-Class Indigenous Aircraft Carrier (IAC)."

may be attached to the CTF as per mission requirements, such as for conduct of Expeditionary, Out-of-Area, or Amphibious Operations."[16] The key question is as follows: If India were to have a conflict with Pakistan in the 2020s, how could *Vikrant* and *Vikramaditya* contribute to the war effort?

Although the 2015 maritime strategy devotes an entire chapter to war fighting, it is not clear on the specifics of Indian carriers' role in a conflict, other than that they are to wrest sea control from the adversary.[17] The same can be said about earlier maritime strategic documents, such as the 2009 maritime doctrine and the 2007 predecessor to *IMMS-2015*.[18]

A retired Pakistani naval officer believes that implementation of the Cold Start doctrine, which was devised specifically to deal with India's western neighbor, would see the Indian navy taking a forward posture and imposing a distant blockade of Pakistani ports.[19] Similarly, Roy-Chaudhury opines that an Indo-Pakistani conflict is likely to see CBGs attacking the enemy's naval forces, striking at military-economic targets inland, interdicting the enemy's SLOCs, and defending friendly merchant shipping.[20] The first three functions involve Indian CBGs operating in an offensive mode—which brings the small-deck carrier quandary to the fore.

THE SMALL-DECK CARRIER QUANDARY AND ITS IMPACT ON OFFENSIVE MISSIONS

Studies have been conducted on the American large-deck carrier and the capabilities of its relatively large (seventy-odd) aircraft complement. Dean Mathew maintains that

> a near majority of the [American carrier] air wing gets tied down with the compulsions of self-protection. The same logic extended to the case of a medium carrier (20,000 to 40,000 tons and 20 to 35 aircraft) . . . will point towards a worse situation.

> . . . Hence, once that minimum force required for the various tasks of self-defence is subtracted, there will not be anything substantial left over in the air wing for "true carrier missions." It must also be mentioned that these predictions assume a near 100 percent availability of the air wing and optimal management of the launch/retrieve windows, which is very unlikely in a war.[21]

Therein lies the dilemma that small-deck carriers face: how to juggle their already limited complement of planes between offensive and defensive purposes. The raison d'être of the aircraft carrier is its air wing, and the latter's size dictates the operations the vessel can execute. Force projection, whether against land or maritime targets, is one of the key doctrinal roles of the carrier, and being able to carry out strike missions is thus the vessel's sine qua non. However, carriers, even small-deck flattops such as *Vikrant* and *Vikramaditya,* are large, multibillion-dollar platforms, and thus protecting them would be of utmost importance to commanders. INS *Vikrant* and *Vikramaditya* are both in the forty-thousand-ton-displacement category. Furthermore, *Vikrant* is slated to cost over U.S.$2.2 billion, while the cost of refitting *Vikramaditya,* currently the Indian navy's flagship, is about U.S.$2.9 billion.[22] In view of the carrier's capital-ship status and hefty price tag, as well as its symbolizing of national power, protecting such ships from enemy threats would be critical, and a good portion of their aircraft complements invariably would be dedicated to this.

The challenge thus is for the CBG leadership to strike a judicious balance between offense and defense—an uphill task. Bearing in mind the threats that modern A2/AD systems present, how likely would a commander be to set aside more aircraft for offensive purposes—and risk having a crown jewel of his navy attacked and hit? Nevertheless, setting aside too many aircraft for defense adds credence to the contention of various carrier critics that the ship and its escorts are a "self-licking ice cream cone"—that is, an entity that exists solely to sustain itself.[23] The CBG leadership hence would be placed in a catch-22 situation: allocate more fighters to strike missions, and the task force's susceptibility to aerial threats increases; conversely, set aside more aircraft for defense, and the carrier's ability to project power declines. Having a sizable air wing on the ship would mitigate this dilemma, but neither *Vikramaditya* nor *Vikrant* does. After all, each of them can carry only about twenty fixed-wing aircraft, and at least half of those invariably will be assigned to provide fleet air defense, leaving not even a dozen available for strike duties.

The operational history of light carriers bears this out. To illustrate, of the forty-two Harrier jets deployed on HMS *Hermes* and *Invincible* during the Falklands War, twenty-eight—a substantial two-thirds—had fleet air defense as their primary role.[24] Just as tellingly, of the 1,300-odd total sorties that Harriers flew during the Falklands conflict, about 83 percent of them were for combat air patrol.[25]

Matters are not helped by the fact that less than 100 percent of any air wing will be available for service. In fact, one informed observer of naval matters contends that around 80 percent of a carrier's air wing is mission capable at any time.[26] Assuming this to be true, twenty or fewer of the fighter jets aboard *Vikramaditya* or *Vikrant* will be flyable. It bears consideration that a recent scathing report revealed that some 21 to 47 percent of INS *Vikramaditya*'s MiG-29Ks were nonoperational.[27] Needless to say, such a low serviceability rate would have a tremendous impact on carrier operations, especially during combat, and India would do well to remedy this problem promptly and decisively. In any case, an Indian carrier's small fighter constituent means that if it were to attempt to partake in operations against an adversary with credible A2/AD capabilities, the vessel would be hard-pressed to protect itself, let alone project power.

Therefore, it is doubtful that any attack force launched from an Indian carrier would pack a significant punch. With aircraft available for strike duties barely numbering into the double digits, the Indian carrier simply cannot deliver a substantial "pulse" of combat power against its adversary. Given that the pulse an American supercarrier delivers with a full deck-load launch of over forty fighters may not constitute enough combat power, a big question mark hovers over the effects the Indian small-deck carrier could achieve with its meager strike packages.[28]

In addition, a typical strike package, besides the main attack component, usually comprises elements filling the roles of achieving air superiority and suppressing enemy air defenses. A notional strike force from *Vikramaditya* will consist solely of MiG-29Ks, and hence either it must devote its assets solely to the two aforementioned supporting roles or the attacking aircraft must give over a number of their hard points to carry air-to-air/antiradiation missiles, or electronic countermeasures pods, or both. Either choice would reduce the ordnance that could be brought to bear on the enemy. Critics may contend that mass is not needed in the current age of precision-guided munitions, but this argument ignores the fact that it may take saturation attacks to overcome modern air-defense systems.[29]

Making matters worse is the limited performance of Indian carrier planes. Both the *Vikramaditya* and *Vikrant* platforms are configured for short takeoff but arrested recovery (STOBAR), so can launch aircraft only via their ski jumps. This point is crucial, as planes taking off in this manner must carry less ordnance, fuel, or both. Notably, the mainstay MiG-29K has a relatively short combat radius of about 850 kilometers if it flies on internal fuel alone.[30] That figure could be increased to 1,300 km with external fuel tanks, but this too reduces the number of hard points available for ordnance.[31] During the Falklands War, the danger posed by Argentina's Super Étendards armed with Exocet antiship cruise

missiles (ASCMs) resulted in the two British STOBAR-configured carriers being deployed far to the east of the Falklands. This reduced Britain's Harrier jets' payloads and their loiter time in the combat zone.[32] A similar situation vis-à-vis Indian carriers is likely to ensue in an Indo-Pakistani conflict, considering Islamabad's burgeoning access-denial capabilities (which will be delineated below), that undoubtedly would dilute the effectiveness of Indian carrier airpower. In summation, a typical strike package launched from an Indian carrier not only would be small in size but would have relatively limited combat radius and pack only a modest combat punch.

Operating *Vikramaditya* and *Vikrant* together would not alleviate the abovementioned limitations to a significant degree. Walter C. Ladwig III notes that the offensive capability of such a combined entity would not match even that of the French small-deck carrier *Charles de Gaulle,* let alone that of an American supercarrier.[33] Indeed, he believes that New Delhi's decision to build *Vikrant* and *Vishal* indigenously "suggests India places a higher priority on enhancing domestic shipbuilding capacity than immediately acquiring naval airpower projection capability."[34] Moreover, having the two carriers available for service at the same time is not a given. India needs to have at least three flattops to ensure that two are operationally ready at any one time, and this would not be practicable until INS *Vishal* enters service, projected for the mid-2020s.[35] *Vishal,* with its fifty to sixty planes on board, could mitigate the small-deck carrier problem to some extent by sailing with one or more of its predecessors. Joshi compared the purported daily sortie-generation rate of a *Vikramaditya-Vikrant* task force with that accomplished during prior combat operations and hypothesized that such a force would be capable of delivering decent firepower. To illustrate, he argues that the number of sorties this task force supposedly could launch is comparable to that of the Indian air force (IAF) during the 1999 Kargil War.[36]

This argument is contentious. Land-based planes tend to accomplish higher numbers of sorties than carrier-based ones. Whether the carrier-based planes could achieve what Joshi asserts also is open to question, as Indian carriers have never partaken in operations against a near-peer opponent such as Pakistan.[37] The idea of deploying carriers together surfaces another conundrum, which naval commanders have faced since World War II: whether to disperse or concentrate these high-value units. While concentration increases combat power, it also raises the issue of whether "too many eggs are placed in one basket," thereby handing the tactical initiative to the adversary.[38]

With these considerations in mind, it arguably would be foolhardy for India to use its carriers to seek "decisive military victory," as *IMMS-2015* states, against Pakistan during the initial stages of a conflict, when Islamabad's A2/AD edifice still would be intact.[39] In any attempt to impose sea control in the northern

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Arabian Sea and to interdict Pakistani seaborne commerce by enforcing a blockade of major Pakistani maritime nodes, Indian carrier forces would have to devote a portion of their already meager airpower to attacking Pakistani vessels, thereby exacerbating the conundrum alluded to earlier. What is more, Pakistani ships are likely to operate relatively close to their nation's coast, to be protected by Islamabad's considerable access-denial barrier.

At this juncture, it is worth noting that a blockade led by the original *Vikrant* contributed to New Delhi's success in the 1971 Indo-Pakistani conflict. Carrier aircraft provided the surveillance capabilities that enabled detection of enemy ships from a distance, as well as the antisurface capabilities to interdict these vessels. In addition, naval aircraft destroyed riverine craft and bridges across strategic rivers, which prevented Pakistani troops from reaching the Bay of Bengal for an evacuation.[40] However, notwithstanding the success of the *Vikrant* task force, it must be noted that its operations took place in an area in which only insignificant Pakistani forces were available to contest Indian naval dominance. The aerial threat was limited, as the Pakistani air force had to contend with its Indian counterpart.[41] And the Pakistani submarine sent to attack *Vikrant* was sunk early in the conflict. Had this not been the case, *Vikrant* might have found its work much more difficult and its contribution to the war effort diluted. In a future conflict with Pakistan, such virtually uncontested Indian operations against Pakistan's maritime assets might not be the order of the day.

Indian carriers inevitably would invite attacks from Islamabad's A2/AD platforms during a war. Aircraft and submarines are the most likely means by which Pakistan would attack Indian forces at sea. To be sure, the Pakistani navy surface combatant force, with its various frigates and patrol craft, is not insignificant, but such units are neither as fast in response as aircraft nor as stealthy as submarines.[42]

Most experts argue that Pakistan's undersea capabilities are particularly ominous.[43] Diesel-electric submarines (SSKs), such as Pakistan's two Hashmats and the three newer Khalids, can operate virtually undetectably, thereby representing a grave threat to surface forces. However, this is provided the submarine manages to detect and track its target in the first place. Owing to their limited speed, SSKs will act essentially as mobile minefields, and in this capacity it will be a tall order for Pakistani submarines even to find the Indian CBG, unless cued exogenously. This is because the northern Arabian Sea is a vast area for a few relatively slow-moving vessels to cover. While cues provided by Islamabad's maritime patrol or airborne early warning (AEW) planes certainly might help locate the enemy carrier, communications and coordination between aircraft and a submerged platform tend to be difficult. Furthermore, while Pakistani submarines could lie in

wait along the Indian carrier's route, successful positioning is highly contingent on accurate intelligence.

On the other hand, Pakistani aerial antiship capabilities are arguably more ominous for Indian carriers. For one, it is decidedly easier to find and maintain contact with the enemy from the air than from under the waves. Pakistan's military aviation arm has a credible antisurface capability, in the form of a dedicated antiship squadron of Mirage fighters that have a combat radius of about 1,200 km and are armed with the Exocet ASCM.[44] Islamabad also plans to equip its newly acquired JF-17 attack fighters, which have a combat radius of over 1,200 km, with the Chinese CM-400 AKG ASCM, which can hit targets 180–250 km away.[45] Modern ASCMs are difficult to detect and shoot down, even for sophisticated warships such as *Kolkata*- and *Visakhapatnam*-class destroyers, which would be part of an Indian carrier force. The introduction of the supersonic and standoff CM-400 AKG into Pakistani service would complicate the protection of an Indian CBG.

While the Indian carrier would be vulnerable to the aforementioned threats while enforcing a blockade of Pakistan, at least it would be free to exploit its mobility to evade detection and attack on the high seas. In contrast, operations against land targets would render Indian carriers even more exposed to attack. First, the relatively short legs of carrier-based aircraft mean that the carrier would have to operate closer to the enemy coastline, making it more vulnerable to A2/AD threats. Pakistan also can bring more aircraft to bear on an Indian CBG when the group operates nearer the Pakistani coast. Furthermore, the Pakistani submarine threat would be accentuated, as SSKs are harder to detect in waters nearer land. While the carrier could operate farther from land, this would be at the expense of its strike-aircraft payloads.

Hence, the Indian carrier force commander would have to weigh the greater likelihood of taking hits against the utility, if any, of attacking Pakistani targets ashore. As discussed earlier, any such carrier-borne strike package would be relatively limited in size and combat power. Indeed, John Mearsheimer has derided naval bombardment of enemy assets ashore as "pinprick warfare," and this description applies well to any Indian carrier-launched attack on Pakistani land targets.[46] Given that one of the traditional rules governing the employment of a fleet is that it should not become "decisively engaged with land forces unless decisively superior," the Indian CBG would be exposing itself to hits, especially should it carry out "first day(s) of war" operations against land targets, when Islamabad's A2/AD complex presumably still would be intact.[47]

Matters are not helped by the ongoing nuclearization of the Pakistani navy—in particular, the challenge this may pose regarding Indian naval concentration in

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the event of war. Islamabad has refused to adopt a no-first-use policy on nuclear weapons, and its navy sees nuclear arms as a means to negate Indian superiority at sea.[48] Pakistan's naval nuclearization and its lowering of the threshold for use of nuclear weapons could face Indian naval planners with another conundrum. Should they concentrate their ships, as conventional naval doctrine dictates? Or should they disperse them, so a Pakistani tactical nuclear weapon would not wipe out, or at least incapacitate, an entire Indian naval task force in a single swoop?[49] Choosing the first option would protect the Indian CBG better against Pakistan's A2/AD threats; choosing the second option would protect better against the nuclear threat.

With that said, various observers have maintained that long-range missile strikes might be one way to kick down the proverbial access-denial door before forces less able to tolerate A2/AD threats, such as carriers, are deployed to the area of operations.[50] This argument is applicable to the American carrier strike group (CSG), given that its *Ticonderoga*- and *Arleigh Burke*–class surface warships can fire Tomahawk cruise missiles at targets nine hundred nautical miles away.[51] In stark contrast, U.S. carrier strike fighters, such as the F/A-18E/F Super Hornet currently in service and the upcoming F-35C Lightning, have a combat radius of five to six hundred nautical miles.[52] With regard to the kicking-down-of-the-A2/AD-door argument, the American CSG can use its Tomahawks to breach enemy defenses during the opening stages of a conflict. The American carrier therefore can maintain a greater distance between itself and the enemy, then move closer in to deploy its aircraft only when it is safer to do so. The Indian CBG, however, cannot hew to this concept of operations in the near future, as its escort ships are armed with the relatively short-range BrahMos cruise missile. Indian carrier aircraft far outrange this weapon's 290 km striking reach.[53] The mainstay of the Indian submarine force is its Kilo-class platforms, and they too lack a long-range missile capability equivalent to that of their Russian counterparts.[54] Even if they were to have such a capability, their lack of a vertical launch system (VLS) precludes the launching of the mass missile attacks needed to overwhelm enemy air defenses.[55]

WHITHER THE OFFENSIVE UTILITY OF THE INDIAN CARRIER FORCE?

Going forward, with Indian CBGs hamstrung by various operational limitations, is there an offensive role for them to play during a high-intensity conflict?[56] Perhaps not as "first day(s) of war" platforms, when the adversary's access-denial capabilities still would be strong. However, the CBG may have a part—albeit a supporting one, at best—once the A2/AD barrier has been breached. As Vice

Admiral Pradeep Chauhan (Ret.), a former commanding officer of the decommissioned carrier *Viraat,* once said: "[In the event of a war,] Indian sea control would complicate Pakistan's defence dilemma. In addition to defending 2,900-odd kilometers of land border, Pakistan would then have to defend an additional 1,046 kilometers of coastal boundary."[57]

Nonetheless, Indian sea control (or at least a working level of it) in the northern Arabian Sea remains contingent on weakening the enemy's A2/AD edifice; only after this was attained could Indian carrier forces play a more prominent role in the war. They then could exploit their mobility to carry out the hit-and-run attacks that would complicate Pakistani defense plans ashore. Indeed, mobility is one of the key advantages of carrier aviation over its land-based counterpart. As Andrew T. Ross and James M. Sandison put it, in history "[t]he mobility of aircraft carriers could frequently place them in positions to menace many different targets at once, whereas there was little of this ambiguity surrounding the use of land-based aircraft, as they flew from known fixed bases. So, provided the enemy knew what types of aircraft were stationed there, he would know what range of targets could be menaced and attempt to take adequate precautions."[58] While Indian carrier-borne raids against shore targets would have limited utility (as discussed earlier), such operations could exert a strategic effect, as Islamabad might have to divert forces from other fronts to defend against seaborne threats. It is worth noting that, deployed in this "cavalry" role, the Indian carrier would play a merely supporting role in the overall scheme of things.[59]

Hence, it may be time for New Delhi to rethink the centrality of the "queen of the waves" in its naval planning. It bears consideration that before World War II, U.S. naval planners deployed carriers merely to support the battle fleet: naval aircraft were to search for enemy battleships, attacking them only if a good opportunity arose, so as to weaken them for one's own battle fleet to deliver the coup de grâce. However, over the course of World War II, the flattop came to upstage the dreadnought, and the former has been the primus inter pares of warships ever since, with surface combatants largely acting as its consorts. However, some commentators have argued that the advent of the long-range Tomahawk cruise missile and its deployment on the American cruiser/destroyer force could upset the current carrier–surface ship nexus in the U.S. Navy. If cruise missile shooters were to overshadow carriers during an actual conflict, the relationship will have come full circle since World War II.[60] If this dynamic materializes, during the initial stages of a high-intensity conflict the carrier will act only as an enabler—in the surveillance, the air-superiority, and other supporting roles—to enable the missile shooters to breach the A2/AD door.

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Missile-armed platforms seem to be the way ahead in maritime warfare, as they are highly suited for the access-generating role. As Andrew F. Krepinevich puts it, aircraft carriers will "run a high risk of detection and damage or destruction in a mature maritime precision-strike regime" characterized by robust A2/AD edifices, adding that "[u]nder these conditions, smaller surface platforms with longer-range, survivable strike elements may be attractive for a fleet in a mature maritime precision-strike regime."[61] Indian naval strategists would do well to bear that in mind and make such platforms more central. While one scholar makes the case for unmanned systems to alleviate India's A2/AD problem, just as important is the need for more, and deadlier, missile shooters.[62]

However, the Indian navy currently does not possess a long-range cruise missile like the Tomahawk. (See table 2.) As discussed earlier, the much-vaunted BrahMos missile can hit targets at most 290 km away—well within the Pakistani access-denial bubble. (India's counter-A2/AD dilemma would be mitigated should the six-hundred-kilometer-range BrahMos be introduced.)[63] To compound matters, currently only surface combatants in the Indian navy are armed with cruise missiles, and these are the BrahMos. New Delhi would do well to incorporate existing missiles with a greater striking reach, such as the Dhanush (range: 750 km) or equip its existing cruise missile–capable assets with new ones, such as the Nirbhay (range: one thousand kilometers), currently under development.[64] It also would be an astute move for India to introduce cruise missiles onto

TABLE 2

Name	Range	Speed	Warhead	Launch Platform(s) in the Indian Navy	Status
BrahMos ASCM/LACM[a]	290 km >400 km (extended-range variant)	Mach 3	Conventional, 200–300 kg	Surface ships	In service (submarine-launched version successfully test-fired, air-launched version being tested)
3M-54 Club ASCM[b]	220 km	Mach 2.9	Conventional, 500 kg	Submarines, surface ships	In service
KH-35 ASCM[c]	130 km	Mach 0.8	Conventional, 145 kg	Surface ships, aircraft	In service
Nirbhay ASCM/LACM[d]	1,000 km	Mach 0.6–0.7	Conventional, 450 kg (nuclear capable)	Possibly surface ships	Under development

Notes:
ASCM = antiship cruise missile; LACM = land-attack cruise missile.
a. "BrahMos Supersonic Cruise Missile."
b. "3M-54 Klub/SS-N-27," GlobalSecurity.org.
c. "Uran-E," *Rosoboronexport,* roe.ru/.
d. "Nirbhay."

its submarines, which arguably are the ideal counter-A2/AD platforms, owing to their stealth characteristics.

INDIAN CARRIERS FOR SLOC DEFENSE

While Indian carriers may not be suitable for taking the fight to Pakistan, the fit is better in the trade-defense role. This mission would not require their meager aircraft complements to be split between attack and force protection.[65]

New Delhi depends heavily on seaborne trade for its economic well-being, and Islamabad therefore would do well to target Indian SLOCs during a conflict.[66] Over 90 percent of India's global trade by volume and more than 70 percent by value is seaborne.[67] Most notably, some 75 percent of New Delhi's crude oil needs are imported, of which 58 percent are obtained from Middle Eastern, particularly Gulf, sources, according to the U.S. Energy Information Administration.[68]

The SLOCs linking these sources to India sit astride key Pakistani naval nodes in the northern Arabian Sea, which is the maritime domain where combat most likely would take place in another major Indo-Pakistani war. There are three such nodes: the Pakistani navy's headquarters in Karachi; the Jinnah submarine base in Ormara, 240 km west of Karachi; and Gwadar, another 215 km farther west.[69] In fact, Gwadar is practically coterminous with the entrance to the Gulf of Oman, through which much of India's oil imports pass.[70] While there has been much talk about India imposing a maritime blockade on Pakistan, the aforementioned geostrategic realities mean that Islamabad actually would be in a better position to do the same to its adversary. Therefore, the Indian military will find it operationally challenging to safeguard its critical Arabian Sea SLOCs in the event of another Indo-Pakistani conflict.

However, a CBG can mitigate this problem, and arguably is the best hedge against the multidimensional threats that Pakistan poses to India-bound commercial shipping. To ameliorate the threat of Pakistani interdiction of Indian SLOCs in the Arabian Sea, a CBG could be deployed to cover the safe passage of the convoys most crucial to the Indian war effort. The carrier's AEW helicopters effectively extend the "eyes" of the convoy much farther out, providing advance warning of the presence of adversarial elements. How far a naval force is able to "see" in the battle space is highly dependent on two key attributes of its AEW assets: combat radius and service ceiling. The Ka-31 AEW helicopter deployed on Indian carriers is decent in the aforementioned areas, with a range of six hundred kilometers and a service ceiling of 3,500 m.[71] Furthermore, the Ka-31's radar has 360-degree azimuthal coverage and can detect aircraft and ships up to 150 km and 200 km away, respectively.[72] Taking their cues from the AEW assets, the carrier's fighters can counter enemy air attacks better.[73] Similarly, carrier-borne Ka-28 ASW helicopters, with an operational reach of up to two hundred kilometers,

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would enhance significantly the convoy's defense against hostile submarines by detecting them much farther out.[74] Indeed, an enemy helicopter deploying its dipping sonar is said to be one of the submariner's worst nightmares.[75] All in all, modern submarines and their standoff weaponry necessitate the detection of undersea threats at a considerable distance from friendly forces. As Ross and Sandison put it, "[b]ecause of the huge detection zones involved, it is not a practical solution to rely exclusively on surface escorts for detection, as an enormous number would be required. Fixed-wing and rotary-wing aircraft are the cost-effective means of performing this function, supported by surface escorts where necessary."[76]

Although it can be argued that land-based fighter aircraft also can provide air cover for convoys in the Arabian Sea, this is valid only to a certain extent, as their coverage is limited by their combat radius from their base locations. A CBG would be a superior candidate over land-based planes for providing air cover for, say, a convoy of tankers carrying much-needed oil for India's war machine that was transiting through the Gulf of Oman and the northwestern part of the Arabian Sea. This is because the convoy would be too far away to come under the effective aegis of most India-based aircraft. Indeed, a notional India-bound convoy at the fringes of the Gulf of Oman is some eight to nine hundred kilometers away from the nearest IAF base, at Naliya in western Gujarat State.[77] Only the IAF platform with the longest legs—the Su-30MKI multipurpose fighter, with a useful combat radius of up to a thousand kilometers—can cover that distance comfortably, and even this assumes that the Su-30MKIs are operating from Naliya and are flying unopposed in a straight line.[78] Moreover, while the Su-30MKI is the most numerous tactical aircraft in the IAF inventory, there still are only about 230 of them, and a significant portion of them would be deployed in other roles against Pakistan.[79] Although the range of land-based planes can be extended via midair refueling, tanker aircraft are essentially defenseless, so would need escorts —which would divert yet more assets from other missions. Any Indian navy P-8I Poseidon maritime patrol aircraft deployed for submarine-hunting duties in defense of a convoy are similarly vulnerable to Pakistani fighters—and that is where Indian carrier airpower would come in very handy.

In addition, even if long-range, shore-based airpower is available for SLOC defense, its effectiveness could be stymied by a lack of the coordination between the air force and navy. As Arun Prakash puts it, "Any navy which has operated with or tried to orchestrate shore-based tactical air support for naval units will know that the command, control, and communication problems at even slightly extended ranges can be mind-boggling. The consequences of tying down a fleet to operate within shore-based air support range cannot be anything but disastrous."[80] Granted, Prakash was an admiral in the Indian navy, and a carrier aviator at that.

However, his words do have merit, considering that the Indian armed forces still struggle to achieve jointness, despite having taken steps to do so. As Bernard Cole puts it, jointness is "much more a goal than a reality."[81] In the same vein, Joshi observes that "Indian institutions remain very far from the inter-service integration seen in other power-projecting states."[82]

Sea-based aviation is more suitable for SLOC defense than its land-based counterpart for two additional reasons. First, the loiter time of carrier planes in the area of operations (AO) would be significantly longer, as they need not transit from land bases.[83] Indeed, having a flattop in the AO enables sustained coverage of friendly forces at sea. To illustrate, during World War II carrier aircraft could be back in action within a short period after combat, as the process of refueling, rearming, and aircrew debriefing could take as little as seven minutes.[84] In contrast, land-based aircraft would have to make a longer journey back to base after depleting their ordnance and fuel in combat. As a corollary, owing to the longer transit time involved in flying from airfields ashore to the AO, crew fatigue could reduce the combat effectiveness of land-based airpower.[85] To be sure, convoys would be just as vulnerable to the threats delineated earlier; however, the aircraft on board whichever carrier was assigned to convoy protection would be devoted mainly to defense—hence the offense-versus-defense dilemma presented earlier would be less acute. This would increase the survivability of the convoy.

All in all, the defense of Indian convoys in the Arabian Sea—the maritime domain in which combat almost certainly would take place in a conflict with Pakistan—is undertaken best by a CBG with its organic airpower, as the critical western and northern portions of the body of water are, for the most part, better covered by naval than by land-based aircraft. It is noteworthy that this role is akin to that routinely performed by the unglamorous and often overshadowed escort carriers of World War II. During the Battle of the Atlantic, such vessels often were deployed with Allied convoys to fend off attacks from German U-boats and bombers.[86] This conclusion is rather paradoxical, in that it leaves the largest and most expensive platforms in the Indian military arsenal performing less-prestigious defensive duties during a major war. Tellingly, the same could be said about China's carriers. *Liaoning* and the slightly more capable Type 001A that currently is undergoing sea trials are STOBAR configured, and thus would suffer from the small-deck carrier affliction during a high-intensity fight against a foe of considerable A2/AD capability.[87] Much like Indian carriers, the two Chinese flattops simply do not have a large and capable enough aircraft complement to project force like American supercarriers.[88]

If a fifth Indo-Pakistani war breaks out within the next several years, the Indian aircraft carrier is likely to be of limited usefulness in offensive roles. This is

because the small aircraft complement of either *Vikramaditya* or the upcoming *Vikrant* brings to the fore the light-carrier quandary that afflicts Indian carrier forces. If Indian flattops were to be deployed in traditional offensive roles—striking at the enemy's maritime and land targets—they also would be rendered more vulnerable to Pakistan's increasingly potent A2/AD complex. With this complex looming large, would the Indians be even more cautious in their deployment of carriers? Indeed, would the Indians put their carriers totally out of harm's way, like when they deployed *Vikrant* to the Bay of Bengal during the 1971 conflict because of the threat that Pakistani submarines posed in the Arabian Sea?[89] The answer remains to be seen, but—bearing in mind the points raised in this article—it probably is yes.

This article has put forth a number of recommendations that could alleviate the Indian navy's A2/AD problem, such as focusing more on missile-armed platforms. To be sure, moving away from a carrier-centric force would not gain traction with many Indian defense planners, but the alternative—Indian CBGs being rendered less survivable and less combat effective during wartime—is much worse. Militaries are often hidebound entities that resist far-reaching change, and the Indian navy is likely to be no exception. In the light of the challenges that not only could limit severely the utility of India's much-vaunted carrier force but could endanger it as well during a war with a near-peer adversary such as Pakistan, India should do some serious evaluation and consider measures to address the issue.

An observer once described U.S. carriers as "little more than political instruments, not real war fighters."[90] This statement has an element of truth, to the extent that carriers of any nation have not been tested in the crucible of high-end combat since 1945. After all, during the postwar period even the mighty U.S. supercarrier has been deployed only in highly permissive operational milieus against third-rate adversaries that could not contest control of the sea.[91] One also must bear in mind that the aforementioned observer was referring to a platform that is decidedly superior, in terms of capabilities, to its Indian counterpart. Would a similar, or even more hard-hitting, statement be heard in the future in the context of an Indo-Pakistani (or, in the more distant future, a Sino-Indian) naval confrontation? One hopes we will never find out.

NOTES

1. Ministry of Defence (Navy) [India], *Ensuring Secure Seas: Indian Maritime Security Strategy,* Naval Strategic Publication 1.2 (New Delhi: Indian Navy, 2015), available at indiannavy.nic.in/.
2. Rahul Roy-Chaudhury, "Five Reasons the World Needs to Pay Heed to India's New Maritime Security Strategy," *The Wire,* December 22, 2015, thewire.in/. For a succinct and cogent assessment of *IMMS-2015,* see Greg

Kennedy and Harsh V. Pant, "Indian Navy's Maritime Security Strategy: An Assessment," *National Maritime Foundation,* August 8, 2016, www.maritimeindia.org/.

3. Ministry of Defence (Navy) [India], *Ensuring Secure Seas,* p. 138. While the idea of having a three-carrier fleet is not new, *IMMS-2015* is the first official document to delineate such a force.

4. One authoritative source defines *sea control* as "one's ability to use a given part of the ocean/sea and associated air(space) for military and nonmilitary purposes and to deny the same to the enemy in a time of open hostilities." Milan Vego, *Maritime Strategy and Sea Control* (Abingdon, U.K.: Routledge, 2016), p. 24; Ministry of Defence (Navy) [India], *Ensuring Secure Seas,* p. 71.

5. The crux of this debate revolves around whether the carrier would be useful, vulnerable, or both in the face of threats such as aircraft and submarines. For a recent academic contribution to the debate, see Ben Wan Beng Ho, "The Combat Utility of the U.S. Fleet Aircraft Carrier in the Post-war Period," *Journal of Military and Strategic Studies* 16, no. 4 (2016), pp. 67–105.

6. It is worth noting that the utility of the CBG extends to scenarios other than that of an Indo-Pakistani war, but such cases lie outside the scope of this article.

7. Shashank Joshi, *Indian Power Projection: Ambition, Arms and Influence* (London: Routledge, 2016), p. 29. For the possible pathways to war, see Christopher Clary, "Deterrence Stability and the Conventional Balance of Forces in South Asia," in *Deterrence Stability and Escalation Control in South Asia,* ed. Michael Krepon and Julia Thompson (Washington, DC: Stimson, 2013), pp. 138–41.

8. Shawn Show, "17 Indian Soldiers Killed in Kashmir: India-Pakistan Tensions Heating Up," *The Diplomat,* September 19, 2016, available at thediplomat.com/; Shawn Show, "Is India Capable of a Surgical Strike in Pakistan Controlled Kashmir?," *The Diplomat,* September 30, 2016, available at thediplomat.com/.

9. See, for instance, Dean Mathew, "Aircraft Carriers: An Indian Introspection," *Strategic Analysis* 23, no. 12 (2000), pp. 2135–58, and Gurpreet S. Khurana, "Aircraft Carriers and India's Naval Doctrine," *Journal of Defence Studies* 2, no. 1 (Summer 2008), pp. 98–108.

10. See, for example, Iskander L. Rehman, "Tomorrow or Yesterday's Fleet? The Indian Navy's Operational Challenges," in *India's Naval Strategy and Asian Security,* ed. Anit Mukherjee and C. Raja Mohan (New York: Routledge, 2015), pp. 37–64; Walter C. Ladwig III, "Indian Military Modernization and Conventional Deterrence in South Asia," *Journal of Strategic Studies* 38, no. 5 (2015), pp. 729–72; and Clary, "Deterrence Stability and the Conventional Balance of Forces in South Asia," pp. 141–45.

11. Rahul Roy-Chaudhury, *Sea Power and Indian Security* (London: Brassey's, 1995), pp. 125–28.

12. Kyle Mizokami, "If India and Pakistan Went to War: 5 Weapons Pakistan Should Fear," *National Interest,* August 16, 2014, available at nationalinterest.org/.

13. See, for instance, Abhijit Singh, "Decoding China's Military Strategy White Paper: Assessing the Maritime Implications," IDSA Strategic Comments, *Institute for Defence Studies and Analyses,* June 2, 2015, www.idsa.in/. China, however, has been building up its expeditionary forces and could possess a competent expeditionary posture after 2025. See Oriana Skylar Mastro, "A Global Expeditionary People's Liberation Army: 2025–2030," in *The Chinese People's Liberation Army in 2025,* ed. Roy Kamphausen and David Lai (Carlisle, PA: U.S. Army War College, 2015), pp. 207–34.

14. While *Vikrant* should be commissioned by then, it reportedly will not be combat ready until 2023, when its surface-to-air missile system and Russian aviation complex will be operational. See Rajat Pandit, "India without Aircraft Carrier for 8 Months," *Times of India,* July 27, 2016, available at timesofindia.indiatimes.com/. India also intends to build a third and much larger carrier, provisionally named *Vishal*. The 65,000-ton platform with an aircraft complement of fifty to sixty is slated to be delivered in the mid-2020s, but it is anybody's guess when specifically this will be, given that the *Vishal* program is still in the conceptual stage, and also given India's checkered history of naval shipbuilding.

15. In stark contrast, American large-deck carriers of the *Nimitz* and *Ford* classes have displacements of about one hundred thousand tons and air wings of over seventy aircraft apiece.
16. Ministry of Defence (Navy) [India], *Ensuring Secure Seas,* p. 162.
17. Ibid., pp. 60–75. According to *IMMS-2015,* "[a]ircraft carriers are central to fleet operations and the concept of sea control, as they offer flexibility and versatility of a very high order." Ibid., p. 162.
18. Ministry of Defence (Navy) [India], *Indian Maritime Doctrine,* Naval Strategic Publication 1.1 (New Delhi: Indian Navy, 2009), p. 125.
19. Muhammad Azam Khan [Cdr., PN (Ret.)], "India's Cold Start Is Too Hot," U.S. Naval Institute *Proceedings* 137/3/1,297 (March 2011), p. 45. For a good overview of the Cold Start doctrine, see Walter C. Ladwig III, "A Cold Start for Hot Wars? The Indian Army's New Limited War Doctrine," *International Security* 32, no. 3 (Winter 2007/2008), pp. 158–90.
20. Roy-Chaudhury, *Sea Power and Indian Security,* p. 128. James R. Holmes and his coauthors also believe that in a future showdown with Pakistan the Indian navy will carry out land-attack and maritime-strike missions. James R. Holmes, Andrew C. Winner, and Toshi Yoshihara, *Indian Naval Strategy in the Twenty-First Century* (New York: Routledge, 2009), p. 151. Similarly, a retired Pakistani naval officer has opined that the Indian navy will provide aerial support for the Indian army's integrated battle groups and blockade Pakistani ports during any cold-start operation; see Khan, "India's Cold Start Is Too Hot," p. 45.
21. Mathew, "Aircraft Carriers," p. 2156.
22. This figure is exclusive of the cost of the air wing and weapon systems, as laid out in "*Vikrant*-Class Indigenous Aircraft Carrier (IAC)," GlobalSecurity.org, and "INS Vikrant: India's New Carrier," *Defense Industry Daily,* December 10, 2015, available at www.defenseindustrydaily.com/.
23. Benjamin S. Lambeth, *American Carrier Air Power at the Dawn of a New Century* (Santa Monica, CA: RAND, 2005), p. 102.
24. "AV-8B Harrier Operations," GlobalSecurity .org.
25. Ibid.
26. Galrahn, "The Monster Myths of the CVL Concept," *U.S. Naval Institute* [blog], August 27, 2009, blog.usni.org/.
27. Vivek Raghuvanshi, "Report: India's Russian-Made MiG-29K Fighters Face Problems," *Defense News,* August 10, 2016, available at www.defensenews.com/.
28. Robert C. Rubel [Capt., USN (Ret.)], "Show of Force—or Just for Show?," U.S. Naval Institute *Proceedings* 139/4/1,322 (April 2013), p. 17.
29. To illustrate, given that the SPADA 2000 surface-to-air missile launcher currently in Pakistani service can track one hundred and engage four targets at any one time, a saturation attack stands a higher chance of overwhelming the defense put up by an entire SPADA 2000 battery. "Spada 2000 Air Defence Missile System, Italy," army-technology .com.
30. Joshi, *Indian Power Projection,* p. 63.
31. Ibid. Carrier aircraft generally have shorter "legs" than their land-based counterparts. There is serious concern within the U.S. defense community that the increasing reach of land-based A2/AD capabilities, coupled with the decreasing range of American naval aircraft, threatens the U.S. supercarrier's viability in its force-projection role against near-peer competitors. For a comprehensive discussion of this issue, see Jerry Hendrix, *Retreat from Range: The Rise and Fall of Carrier Aviation* (Washington, DC: Center for a New American Security, 2015).
32. For a definitive account of the aerial and naval campaigns of the Falklands War, see Sandy Woodward [Adm., RN], *One Hundred Days: The Memoirs of the Falklands Battle Group Commander* (Annapolis, MD: U.S. Naval Institute Press, 1992).
33. Walter C. Ladwig III, "Drivers of Indian Naval Expansion," in *The Rise of the Indian Navy: Internal Vulnerabilities, External Challenges,* ed. Harsh V. Pant (London: Routledge, 2016), pp. 33–34.
34. Ibid., p. 33.

35. Rehman notes that India's navy would be hard put to maintain a carrier-centric force while pursuing nuclearization. Iskander Rehman, "Drowning Stability: The Perils of Naval Nuclearization and Brinkmanship in the Indian Ocean," *Naval War College Review* 65, no. 4 (Autumn 2012), p. 68.
36. Joshi, *Indian Power Projection,* pp. 62–63.
37. Geoffrey Till, *Seapower: A Guide for the Twenty-First Century* (London: Frank Cass, 2004), p. 235.
38. Rehman, "Tomorrow or Yesterday's Fleet?," p. 51.
39. Ministry of Defence (Navy) [India], *Ensuring Secure Seas,* p. 61.
40. Roy-Chaudhury, *Sea Power and Indian Security,* p. 74.
41. Ibid., p. 72.
42. The Pakistani navy has a total of six frigates and eight patrol craft armed with ASCMs. International Institute of Strategic Studies [hereafter IISS], *The Military Balance 2017* (London: Routledge, 2017), p. 321.
43. The Pakistani submarine threat will loom even larger when Islamabad receives eight Chinese export-version Yuan-class SSKs over the next decade. See Franz-Stefan Gady, "China to Supply Pakistan with 8 New Stealth Attack Submarines by 2028," *The Diplomat,* August 30, 2016, available at thediplomat.com/.
44. Admittedly, Pakistan also has seven P-3 Orion maritime patrol aircraft (MPAs) that can tote Harpoon ASCMs, as well as three Atlantic MPAs that can be armed with Exocets. However, being turboprop aircraft, they are slow moving and would be highly exposed in a nonpermissive operating environment.
45. Jeffrey Lin and P. W. Singer, "China's Military Reboots 'Fierce Dragon' Jet Fighter with Homebuilt Model," *Popular Science,* January 22, 2015, available at www.popsci.com/; Rehman, "Tomorrow or Yesterday's Fleet?," p. 43.
46. John J. Mearsheimer, *The Tragedy of Great Power Politics,* updated ed. (New York: W. W. Norton, 2014), p. 89.
47. Robert C. Rubel, "The Future of Aircraft Carriers," *Naval War College Review* 64, no. 4 (Autumn 2011), p. 17.
48. Iskander Rehman, *Murky Waters: Naval Nuclear Dynamics in the Indian Ocean* (Washington, DC: Carnegie Endowment for International Peace, 2015), p. 20.
49. Ibid., p. 39.
50. See, for instance, Ben Wan Beng Ho, "Opinion: It's Time to Rethink U.S. Carrier CONOPS," *USNI News,* May 24, 2016, news.usni.org/.
51. Ibid.
52. Ibid.
53. "BrahMos Supersonic Cruise Missile," *BrahMos Aerospace,* www.brahmos.com/.
54. India's Kilo-class SSKs are armed with the Club cruise missile that can hit targets up to 220 km away. In contrast, Russian Kilos are armed with the Club variant that has a range of over two thousand kilometers.
55. Without a VLS, Indian submarines would have to fire missiles from their torpedo tubes. The Kilo, for instance, has six torpedo tubes, which means that the most missiles it can launch at any one time is five, as it is prudent to have at least one torpedo ready for firing should an enemy submarine appear.
56. For a discussion of the utility of carriers in the "soft power"–projection mode, see Abhijit Singh, "INS Vikramaditya—Deployment Options for India," IDSA Issue Briefs, *Institute for Defence Studies and Analyses,* January 21, 2014, www.idsa.in/.
57. Quoted in Ajai Shukla, "India's Navy: Strong on Aircraft Carriers, Short of Submarines," *Business Standard,* September 30, 2014, www.business-standard.com/.
58. Andrew T. Ross and James M. Sandison, *A Historical Appreciation of the Contribution of Naval Airpower* (Canberra: Sea Power Centre, 2008), p. 73.
59. During the first few months of 1942, American carrier task forces executed hit-and-run raids on Japanese-held islands in the central Pacific, such as Wake and the Marshalls. While the material damage they inflicted was limited, these raids were a significant morale booster in the dark days after Pearl Harbor. For a good account of the exploits of U.S. carrier forces during the early months of the Pacific War, see Samuel Eliot Morison, *History of United States Naval Operations in*

World War II, vol. 3, *The Rising Sun in the Pacific, 1931–April 1942* (Boston: Little, Brown, 1948).

60. Philip E. Pournelle [Cdr., USN], "The Rise of the Missile Carriers," U.S. Naval Institute *Proceedings* 139/5/1,323 (May 2013), p. 34.
61. Andrew F. Krepinevich, *Maritime Competition in a Mature Precision-Strike Regime* (Washington, DC: Center for Strategic and Budgetary Assessments, 2015), pp. 4–5.
62. Rehman, "Tomorrow or Yesterday's Fleet?," pp. 53–54.
63. Dipanjan Roy Chaudhury and Manu Pubby, "MTCR Benefit: India, Russia to Develop 600-km Range Cruise Missiles That Can Cover Entire Pakistan," *Economic Times,* October 19, 2016, economictimes.indiatimes.com/.
64. "Nirbhay," *Missile Threat,* missilethreat.csis.org/. The Indian navy also possesses the Dhanush short-range ballistic missile that has an antiship capability, but this weapon currently is not deployed on India's major surface combatants. With a 350 kg warhead, the Dhanush can hit targets a thousand kilometers away. See "Indian Navy Successfully Test Fires Dhanush Missile: All You Need to Know," *India Today,* November 26, 2015, available at indiatoday.intoday.in/.
65. Ladwig makes this argument as well, writing that India's decision to acquire medium-sized, rather than large, carriers is suggestive of New Delhi's view that these platforms should make SLOC protection their priority. Ladwig, "Drivers of Indian Naval Expansion," p. 37.
66. *IMMS-2015* states unequivocally that it places a greater emphasis on "[t]he safety and security of seaborne trade and energy routes, especially in the IOR [Indian Ocean region], considering their effect on global economies and India's national interests." Ministry of Defence (Navy) [India], *Ensuring Secure Seas,* p. 6.
67. Ibid., p. 25.
68. "India Continues Developing Its Strategic Petroleum Reserve as Its Oil Imports Grow," *U.S. Energy Information Administration,* July 19, 2016, www.eia.gov/.
69. Rehman, "Tomorrow or Yesterday's Fleet?," p. 41.
70. Ibid.
71. "Ka-31 Radar Picket Airborne Early Warning (AEW) Helicopter, Russia," airforce-technology.com.
72. Ibid.
73. To be sure, rotary-wing AEW assets are simply not as capable as their fixed-wing counterparts, but what the Ka-31 offers in terms of sensory coverage is still a profound improvement over shipborne radars, which typically can detect targets only a few dozen kilometers away, owing to Earth's curvature.
74. "Ka-27/28 and Ka-29 Helix, Russia," naval-technology.com.
75. Arun Prakash [Capt., IN], "A Carrier Force for the Indian Navy," *Naval War College Review* 43, no. 4 (Autumn 1990), p. 63.
76. Ross and Sandison, *A Historical Appreciation of the Contribution of Naval Airpower,* p. 63.
77. This is the area where Pakistan would be nearest to the convoy. The author derived this figure using Google Maps.
78. Ashley J. Tellis, *Making Waves: Aiding India's Next-Generation Aircraft Carrier* (Washington, DC: Carnegie Endowment for International Peace, 2015), p. 6.
79. IISS, *The Military Balance 2017,* p. 293.
80. Prakash, "A Carrier Force for the Indian Navy," p. 63.
81. Bernard D. Cole [Capt., USN (Ret.)], *Asian Maritime Strategies: Navigating Troubled Waters* (Annapolis, MD: Naval Institute Press, 2013), p. 147.
82. Joshi, *Indian Power Projection,* pp. 99–100. See also Vinod Anand, "Evolution of Jointness in Indian Defence Forces: Stuck between the Services," in *Handbook of Indian Defence Policy: Themes, Structures and Doctrines,* ed. Harsh V. Pant (New York: Routledge, 2015), pp. 173–86, and Anit Mukherjee, "Fighting Separately: Jointness and Civil-Military Relations in India," *Journal of Strategic Studies* 40, nos. 1–2 (2017), pp. 1–29.
83. Khurana, "Aircraft Carriers and India's Naval Doctrine," p. 102.
84. Ross and Sandison, *A Historical Appreciation of the Contribution of Naval Airpower,* p. 65.
85. Ibid.
86. For a definitive account of this subject, see William T. Y'Blood, *Hunter-Killer: U.S. Escort*

Carriers in the Battle of the Atlantic (Annapolis, MD: Naval Institute Press, 2012).

87. Indian carriers are, however, more vulnerable to A2/AD threats during a high-intensity confrontation compared with their Chinese counterparts owing to geography. Any such conflict involving China most likely will break out over Taiwan, with Chinese carriers operating well within the defensive umbrella provided by land-based airpower from the mainland—the Taiwan Strait separating the two sides spans only 180 km. On the other hand, the entirety of southern Pakistan sits astride the Arabian Sea AO, and any Indian air force assets providing air cover for their brethren at sea would have to grapple with the full gamut of Pakistani resistance along the coast as well as the "tyranny of distance."

88. It is believed that the Type 001A carrier can deploy perhaps a handful more aircraft compared with *Liaoning*'s thirty-odd-strong air wing. "What Do We Know (So Far) about China's Second Aircraft Carrier?," *China-Power,* chinapower.csis.org/. Commenting on *Liaoning,* a number of defense experts contend that it will "confer prestige on a rising great power, help the Chinese military master basic procedures, and project *a bit of power* [emphasis added]—perhaps especially against the smaller neighbors on the periphery of the South China Sea." Andrew S. Erickson, Abraham M. Denmark, and Gabriel Collins, "Beijing's 'Starter Carrier' and Future Steps: Alternatives and Implications," *Naval War College Review* 65, no. 1 (Winter 2012), p. 28.

89. Mathew, "Aircraft Carriers," p. 2149.

90. Quoted in Martin van Creveld, *The Age of Airpower* (New York: PublicAffairs, 2011), p. 167.

91. One commentator even describes the U.S. supercarrier as a "flat-track bully that dominates an inferior adversary who cannot really fight back." Ho, "The Combat Utility of the U.S. Fleet Aircraft Carrier," p. 82.