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## Maritime Cooperation Between India and Pakistan: Building Confidence at Sea

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# Maritime Cooperation Between India and Pakistan: Building Confidence at Sea

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## Abstract

This paper discusses ways in which the navies of both India and Pakistan can cooperate on issues of maritime and naval significance. Although the militaries and navies of the two countries have traditionally seen each other as rivals, international economic developments make cooperation imperative.
South Asia requires an approach that can alter the existing hostile images and perceptions. This can be achieved through developing an incremental approach towards confidence building that would allow consistency and help build confidence gradually. The aim is to make confidence building a sustainable activity that would help transform hostile images and build cooperative and nonhostile relationships.
This paper proposes a five-step model to suggest what the two navies can do jointly to build confidence, with the ultimate goal of naval arms control. The steps include (1) the Signaling Stage to initiate communication between the two navies, (2) the Warming-Up Stage to build confidence through nonmilitary joint ventures, (3) the Handshake Stage to build confidence between the two navies through military joint ventures, (4) the Problem-Solving Stage to resolve outstanding disputes, and (5) the Final Nod Stage to initiate naval arms control. This model would employ communication, navigation, and remote sensing technologies to achieve success.

## Acronyms

ASEAN          Association of Southeast Asian Nations

ASW            Anti-Submarine Warfare

ATMS           Advanced Tracking and Monitoring Systems

CAM            conflict avoidance measure

CBM            confidence building measure

CBS             confidence building step

CNS             Chief of Naval Staff

CSBM           confidence and security building measures

EEZ             exclusive economic zone

GPS             Global Positioning System

IAF              Indian Air Force

IN               Indian Navy

INCSEA          Prevention of Incidents On and Over the High Seas Agreement

INDOEX         Indian Ocean Experiment

MEA             Ministry of External Affairs

MILCOMM    military communications

MoD             Ministry of Defense

MRRC           Maritime Risk Reduction Center

NGO            nongovernmental organization

PN               Pakistan Navy

VPN             virtual private network

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**Executive Summary**

The primary objective of this paper is to suggest ways to build confidence between the navies of India and Pakistan.  Building confidence is a step-by-step process that would take the navies from cooperating on less conflictual or nonconflictual issues to pure military cooperation.  The goals of this study are to outline concrete steps that could be initiated for naval and maritime cooperation between India and Pakistan and to suggest a course of action for developing sustainable communication between the two navies.

Confidence building measures (CBMs) have been criticized for a lack of applica-bility to the South Asia context.[1]  While the United States and former Soviet Union successfully used CBMs to pave the way for sustainable agreements that have deterred war, existing CBMs between Pakistan and India have not been employed to minimize the threat of war.  For example, existing CBMs (such as hot lines between the two Prime Ministers) were not successful in preventing the Kargil crisis in 1999.  South Asia requires an approach that can alter the existing hostile images and perceptions.  This aim can be achieved through adopting a sustainable approach at confidence building.

The chance of a naval encounter is increased because of political disputes and outstanding issues, both military and nonmilitary.  Presently, the sole dispute related to the naval forces pertains to the absence of a demarcated sea boundary between the two countries, which is linked to the border dispute of the 60-mile-long estuary of Sir Creek in the marshes of the Rann of Kutch.  The impact of an undemarcated sea boundary is not purely a military matter; it has a serious human dimension as well.  The respective coast guards or navies apprehend fishermen from both sides for crossing the assumed boundary in search of catch.  These people then languish in prisons for years.  Piracy, smuggling, and water pollution from untreated domestic and industrial sewage also affect the navies.

This study also highlights the tremendous efforts made by the top management of both navies from 1997 to 1999.  In the last three years of the 1990s, the Indian and Pakistan navies were at a point of negotiating cooperation that could have showed their policymakers and the other

military branches the way to forge cooperation rather than conflict. Although the Kargil operation thwarted that cooperation, those efforts leave sufficient lessons behind from which the defense establishments and governments can learn how to rebuild peace.

Existing models of maritime cooperation exist in the Middle East, Latin America, and the Asia-Pacific, and between the U.S. and China and the U.S. and Russia.

The present study evaluates steps by which confidence building can be accom-plished, especially at a time when communication has broken down completely. This study suggests a model for confidence building steps (CBSs). The assumption in this model is that there is no communication between the two navies. The steps of the model are fivefold, as follows:

1.  **The Signaling Stage:** Initiate communication between the navies. The topics could include incidents at sea or joint naval operations to control marine pollution and curb smuggling at sea.

2.  **The Warming-Up Stage:** Build confidence through undertaking nonmilitary ventures jointly. Cooperative environmental monitoring is one example of an area that could use a technical or scientific path to begin dialogue between the two navies.

3.  **The Handshake Stage:** Build confidence between the two navies through joint ventures of a military nature, such as official visits, etc. The establishment of Maritime Risk Reduction Centers (MRRCs) in both countries could provide a locus point for solving the issue of fishermen being caught when crossing into each other's territory. This stage could also engender cooperation on less sensitive issues such as search and rescue operations.

4.  **The Problem-Solving Stage:** Resolve outstanding disputes, such as delineating the Sir Creek boundary.

5.  **The Final Nod Stage:** Initiate naval arms control, such as offering the exchange of information on military exercises.

This model assumes the use of different technologies at various stages. For example, communication, navigation, and remote sensing technologies could be used to contribute to the success of the proposed CBSs. This study suggests the establishment of MRRCs in each of the countries. For communication between the MRRCs, the two navies could use encrypted telephone lines or virtual private networks for communication over the Internet. The Global Positioning System could be used for navigation technologies. Remote sensing could be implemented with sensors on aircraft or through satellite imagery.

In conclusion, peace initiatives cannot be established unless there is communi-cation between the negotiating parties. The process of gradually building confidence between the navies would allow the two navies and their governments to devise a naval arms control agenda.

Maritime Cooperation Between India and Pakistan:
Building Confidence at Sea

## 1. Introduction

Theoretical literature abounds on confidence building measures (CBMs) and their application in South Asia. Notable international and regional experts have expressed their views on how to contain tension from escalating into a self-sustained spiral of violence and conflict in the region. These studies may help Indian and Pakistani policymakers to think about options to re-emerge from the impasse caused by the recent Kargil crisis. However, this is the time when experts and policymakers have to think of ways to make peace possible. The timing is very important. The two navies stand at the verge of planning for a nuclear role. Once they start moving in that direction it would be harder to contain tension from spreading to the sea. This makes it imperative to look for ways to develop a sustainable confidence building process and methodology for coopera-tion between the two navies.

This study looks beyond isolated actions at building confidence. The study's goals are to outline concrete and incremental steps that could be initiated for naval and maritime cooperation between the two hostile neighbors of the South Asian region and to suggest a course of action for developing sustainable communication between the two navies.

What further makes this study essential is to highlight the tremendous efforts made by the top management of both navies during the last three years of the 1990s, for the fear that their achievements be lost completely in the clouds of current tension. From 1997 to 1999, the Indian and Pakistan navies were at a point of negotiating cooperation that could have showed their policymakers and the other military branches the way to forge cooperation rather than conflict. Although the Kargil operation thwarted that cooperation, those efforts leave sufficient lessons behind from which the defense establishments and governments can learn how to rebuild peace.

Thus, the primary objective of the paper is to suggest ways to build confidence between the two navies. It is a step-by-step process that would take the navies from cooperating on less conflictual or nonconflictual issues to pure military cooperation. Developing communication is, indeed, the first step towards creating such conditions. A fundamental assumption of this study is that the Indian and Pakistan navies do not carry as much psychological baggage as other branches of the services do. This is because naval confrontation between the two neighbors has never been as intense as it was between the other two services. (See Section 2.1 for details.) Hence, it would be easier to use bilateral cooperation between these institutions as a model for building confidence between the military establishments of the two neighbors.

## 2.  Building Confidence in a Hostile Environment

The existing theoretical literature broadly defines CBMs or confidence and security building measures (CSBMs) as tools for reducing tension and war avoidance.[2]  This concept developed from the East-West experience of confidence building to minimize the threat of an accidental outbreak of conflict and war.  The 1975 Helsinki Final Act and the 1990 Vienna Document are some of the agreements that formalized the means to reduce tension through the exchange of information, developing communication channels and adopting constraint measures that could then help build confidence in each other's intentions.  The primary concept was to introduce an element of predictability in the behavior of hostile states so that tension would not escalate to an uncontrollable degree.

South Asian scholars are generally skeptical of CBMs that, in their view, are used by policymakers as crisis prevention tools.  The existing theoretical literature and empirical studies on CBMs indicate the greatest shortcoming of this approach: it does not necessarily stop policymakers from taking aggressive measures against an adversary.[3]  As suggested by some analysts, CBMs are a status-quo approach aimed at stopping unnecessary escalation of tension.  Furthermore, their notion is that the history of confidence building measures between the U.S. and former Soviet Union supports such a contention.[4]  Thus far, CBMs have not minimized the threat of war, especially when seen outside the context of the East-West conflict.  In South Asia, for example, talking about CBMs did not prevent incidents like Kargil.

The development of a negative perspective of confidence building can be attributed to analysts and defense planners who tend to evaluate CBMs as a tension or crisis de-escalation strategy that essentially gives the concept a military-strategic flavor. Chellaney states that CBMs are not viewed as a valued instrument of security.[5]  What is most prominent about South Asia is that the CBM tools are the first to break down during crisis.  Despite the existence of hot lines between the Directors General Military Operations of India and Pakistan, CBMs did not work during Operation Brasstacks in 1986 and 1987, the Kargil crisis in 1999, or the shooting down of the Pakistan naval plane the same year.

South Asian policymakers have not seriously pursued CBMs because they do not see an urgent need to change their priorities.  Most of the bilateral conflicts pertain to territorial claims.  Exchanging information or formulating agreements that would compromise the ability to take any military measures is, hence, not a popular approach.  Thus, the way CBMs have been defined in the South Asian context makes them more like conflict avoidance measures (CAMs) that are adopted during a crisis.  Even while promoting the idea of confidence building, experts use a definition that is closer to CAMs.[6]  Furthermore, there is the fear that CBMs may compromise regime popularity at home.  Foreign policy issues have a direct relevance for domestic politics in all South Asian states.  Policymakers are extra careful in not supporting "measures" that would make them look weak in front of their constituents.  Opposition groups in politics have the tendency to advertise confidence building measures as acts compromising vital national security interests.

Often, the military technological imbalance is such that policymakers and military planners feel uncomfortable with the concept of transparency and exchange of informa-tion solicited under the CBM approach.  The opacity of military capabilities is considered necessary for achieving military advantage at some later date.  Transparency, it is felt, could initiate a spiral of instability and increased tension.[7]

The aforementioned arguments against CBMs do not necessarily indicate that the concept cannot be applied on South Asia. In fact, one of the reasons for a high level of tension is that governments have not invested their resources and attention on confidence building. It was not the failure of CBMs but the absence of them that resulted in incidents like Kargil. For instance, a hot line between the two Prime Ministers might have helped to avoid the incident. Currently, the Prime Ministers use the international lines to communicate. The foreign offices serve as a channel to convey the intent in advance of their respective head of government to contact his/her counterpart. It is even more important to turn confidence building into a sustained process in the region, a concept that I have tried to develop in the latter part of the paper.

Like other regions of conflict, South Asia requires an approach that can alter the existing hostile images and perceptions.  Unlike CBMs that operate within a "strategic constraint" construct, the CBMs suggested in this paper have a more positive character.  These aim at transforming hostile images and at building cooperative and nonhostile relationships.[8]  The underlying idea is to undertake gradual steps that could change nega-tive perceptions.  This is the fundamental premise of this study: to use naval and maritime cooperation as means for altering the basic strategic perceptions.  The study will, therefore, use Griffiths' typology of steps[9] that, in his view, implies forward movement towards a goal, which, in this case, is cooperation between the navies of India and Pakistan.

### 2.1  Naval and Maritime CBMs

A study on naval and maritime cooperation between India and Pakistan was a deliberate choice.  There were five reasons for this selection.  First, a navy has a farther-reaching role than other military forces.  It is not limited merely to wartime activities. Search and rescue operations, pollution control, international port calls, assistance in natural resource exploration, and fisheries patrol are some of the varied activities that navies undertake.  The diplomatic role of a naval ship, particularly bigger ships, puts the service in a different category from its sister services.[10]  This also sets a naval fleet apart from an air force squadron or a tank battalion.  Given the varied tasks of a navy, this service has a potential to cooperate with an adversary during peacetime.  This peacetime cooperation is essential to establish a sustainable cycle of cooperation that can prevail at all times.  In that respect, using naval and maritime activities for collaborative or cooperative ventures is as good as using certain nonmilitary areas such as trade.

Second, given the land orientation of the military strategy of both the South Asian neighbors, their naval forces may have a better chance to establish a sustainable dialogue and peace process.  The military establishments and governments may be less averse to establishing or encouraging contact between two services that do not have a focal role in military strategic planning.  This could prove to be a good starting point.  Once it suc-ceeds, the other services could be encouraged to replicate the model.  Third, the Indian and Pakistan navies do not share memories of war and conflict that the other services do.  Although the navies did engage against each other by virtue of being part of the armed forces, this engagement was not as intense as between the land and air forces.  Hence, there may be more of a willingness to talk.  Fourth, the navies share a common strategic objective to keep the Indian Ocean clean of foreign influence.  Peace in the Indian Ocean (obtained through cooperative measures) may help them attain this objective.  Finally, piracy and smuggling threaten national security, especially internal security, of both countries.  Cooperating to fight this threat is a common interest that can bring the navies together without challenging their respective military strategies and political goals of the governments.

## 3. India  Pakistan Confrontation

The India-Pakistan confrontation dates back to the partition of the Indian Subcontinent in 1947.  Their bilateral tensions are a result of the unfortunate situation that emerged soon after the partition and the threat perception of the policymaking elite.  The British had partitioned the Subcontinent into two independent states and left after carrying out some hurried and controversial demarcation of boundary and division of assets.  The main bone of contention between the two countries has been the former princely state of Kashmir, a territory that led to two major wars between the hostile neighbors.  A third war in 1971, which resulted in the dismemberment of Pakistan, pertained to Pakistan's eastern wing.

### 3.1  The Naval Confrontation

Since 1947, India and Pakistan have engaged in three wars and numerous border skirmishes.  These military encounters have primarily been fought between their land and air forces.  The objective in at least two wars (1947 and 1965) was Kashmir, and the conflict zone was along the land frontier.  There was no naval engagement in the first war and very limited encounters during the second.  Both navies undertook limited offensive operations around each other's coastal areas.  The third war, again, did not feature a powerful naval action from the two sides, albeit the Indian Navy (IN) did try to blockade the Pakistan Navy's (PN) main naval base and Pakistan's only seaport at Karachi.  The limited naval encounter during these wars can be attributed to three independent factors:

(1) the military strategy employed in these wars had a strong land orientation.  Navies did not figure as an important component to push the military operational and tactical goals,

(2) India's strategic calculations that focused on exerting military power in and around the region had not been put in place at the time.  During the 1980s, New Delhi started to think in terms of increased naval presence in the Indian Ocean, and

(3) the navies could not play a major role in wars that were not planned to be pro-tracted affairs (military planners on both sides plan in terms of a limited-duration war).

### 3.1.1  The Recent Naval Encounter

Having made the above argument, it would be worth mentioning that in the recent past the overall political tension did result in creating an unpleasant situation for the naval forces too.  This refers to the shooting down of the Pakistan naval plane by Indian Air Force (IAF) jets and IN's reported preparations to blockade Karachi had Islamabad not evacuated Kargil.

In the intense bilateral skirmishes that ensued after the Pakistan Army's operation in Kargil, an unarmed Pakistan naval surveillance and anti-submarine warfare (ASW) aircraft was shot down by the Indian Air Force in August 1999, killing sixteen officers on board.[11]  The Indian authorities claimed that the plane had violated their airspace and was shot down in the Indian territory while carrying out surveillance activities.  An earlier report spoke of the plane trying to attack the IAF jet fighter.  Pakistan authorities contend that the plane was on a training flight.  Surveillance activities were nothing out of the ordinary and normally are carried out by the navies.  India accused its neighbor of sending the aircraft on a spying mission.  This could have been the case since all services were on a high alert at the time and there were reports of the IN getting ready for some strategic deployments.  Contrary to the Indian claims that the plane was equipped with missiles, it was an unarmed aircraft.  The French-built Breguet Atlantic was not fitted for an attack role.  It had little maneuverability against a fighter aircraft.  Pakistani analysts claim that it was an act of revenge to avenge the shooting down earlier of two IAF jets.  Not yet a proven theory, the psychological factor did play a role in this incident.

Here, the idea is not to investigate the accident or to exonerate either of the parties but to present an example of how CBMs failed during this period of tension.  The PN could have avoided sending its plane so close to the border area at a time when tension at the Kargil front had not yet subsided.  The shooting down of the aircraft, a number of Pakistanis argue, was a violation of the 1991 India-Pakistan air agreement according to which any aircraft straying within nine miles of the boundary would be reported to the air headquarters of the country of origin.  This agreement covers air force aircraft only.  What is not popularly known is that the accident was in violation of the naval agreement officially signed between the two countries in 1994.

During the Kargil crisis, there were rumors of the IN's preparations to blockade Karachi.  This news was confirmed by an Indian source.[12]  The IN would have had to lay a long siege of the Pakistani port in order to have an effect but it would have increased the level of tension in the region.  Internationally, India may have justified such an action as a response to Islamabad's decision to cross the line of control at Batalik, Drass, and Kargil.  Given the technological advancements made on both sides, this would have been the first serious naval engagement between the two countries.  As mentioned earlier, the navies have not been as intensely a part of conflict as their respective sister services, and it is highly important to avoid a situation that may change this status.

### 3.2  The Emerging Threat

A matter of greater concern, however, relates to the aspirations of both navies to acquire a nuclear weapons capability.  India has been working more systematically than Pakistan on developing a nuclear triad to bolster its nuclear deterrence capabilities.  Developing a nuclear-powered submarine and sea-launched ballistic and cruise missile capabilities are ventures undertaken by New Delhi towards building a sea-based nuclear weapons capability.

Such technological developments by India are likely to draw a response from Pakistan, albeit at a later stage when it becomes inevitable to develop a sea-based second-strike capability.  The PN was officially given a nuclear role in May 1999 in anticipation of future technological developments.  Currently, the PN's nuclear role is limited to some participation in controlling specific onshore missile deployments stationed on naval facilities.  This role was given because of persistent pressure from the Naval Head-quarters for being assigned a role in nuclear weapons deployment.  The Navy's management, more than the Army, understands that the Navy has more potential for providing a second-strike nuclear capability to Pakistan that suffers from lack of strategic depth.  The insistence on getting a marginal role in deployment planning was to prepare

the service for a future role where the service has its own nuclear weapons. Considering Islamabad's dire financial constraints, it is not possible for the PN to procure a nuclear submarine in the future or develop sea-based ballistic missiles; however, these possibilities cannot be completely ruled out.

An analysis of the current naval technological developments indicate possible future threats. It is worth pointing out that once the IN gains a technological edge, it will be difficult for the PN to ignore the temptation of operating close to these ships and vice versa. If India does manage to develop its nuclear submarines and carry out operational deployment, it will increase the threat of the subs being attacked by conventional Pakistani subs and missiles. Accidents between the U.S. and Soviet nuclear submarines were a real threat during the Cold War.

The more they move in this direction, the greater the threat would be. This factor alone increases the significance of cooperation and communication between the two navies at this stage. The lesson of tension between the U.S. and former Soviet navies is not lost to an analyst. A review of the U.S.–Soviet naval rivalry during the Cold War era indicates the escalation of tension caused due to incidents at sea and other factors. In 1968 alone, there were 21 reported instances of incidents at sea, which led both countries to develop norms and rules to minimize such risks.[13] The negotiations between the two countries led to the signing of the prevention of incidents on and over the high seas agreement (INCSEA) in May 1972. In fact, nuclear weapons capability makes it impera-tive for two conflicting states to develop norms for dealing with each other. The lack of a demarcated sea boundary between India and Pakistan increases the likelihood of escalation of tension and conflict. It is worth noting that despite the great pressure on the top management of the PN to react to the shooting down of Pakistan's naval plane in 1999, a decision was taken otherwise. Security analysts had openly advocated an aggressive response.[14] The idea was to sink an Indian submarine operating in the area. The prudent PN management of that time decided otherwise. However, one cannot entirely depend upon human factors and arbitrary measures to contain conflict.

The better option would be to develop sustainable communication that does not break down during crisis. Talks between the traditional rivals, India and Pakistan, are susceptible to failure. In the past, both sides thwarted negotiations on maritime issues or disputes. In 1994 and 1999, for instance, talks on the resolution of the Sir Creek dispute failed because of Pakistan's resistance to solve problems independent of the Kashmir problem. Post-Kargil, all communication collapsed because of the Indian resistance to talking with a military regime in Pakistan that was also viewed as the architect of Kargil. Reportedly, the resistance from the Indian Ministry of External Affairs (MEA), Army, and Air Force is immense.[15] The Indian MEA blocked the participation of a single Pakistani ship to the International Fleet Review scheduled in Mumbai during January 2001. The bureaucratic turf war has not allowed the two navies to establish direct contact.[16] Indubitably, negotiations could be conducted more easily once the political environment is favorable for talks. Nonetheless, it is worth remembering that the Soviet Union and U.S. continued with a dialogue at the height of the Cold War. Such discussions not only reduce tension but also help in averting dangers. In South Asia, cooperation and better understanding could avert the threat of a naval nuclear weapons buildup.

## 4. The Threats

The chance of a naval encounter is increased because of the political dispute and outstanding issues. Besides the primary bone of contention between the two countries—Kashmir—there are other outstanding issues as well that relate mainly to the navies. Such issues have been categorized as military and nonmilitary. In addition to the bilateral issues, nonstate actors pose other threats, such as drug trafficking and smug-gling at sea.

### 4.1 Military Disputes

Presently, the sole dispute related to the naval forces pertains to the nondemarca-tion of the sea boundary between the two countries. The absence of a sea boundary is linked to the border dispute of the 60-mile-long estuary of Sir Creek in the marshes of the Runn of Kutch. This area lies on the border between the Indian State of Gujrat and the Pakistani province of Sindh. Islamabad contests its claim over Sir Creek based on the map drawn out in 1914. This map places the boundary on the east bank of the creek. India, on the other hand, insists on treating the line in the middle of the creek as the boundary. On several occasions, negotiations were conducted to resolve the issue, especially in the 1990s. In 1994 New Delhi offered to delineate the boundary seawards, an offer that was rejected allegedly because of other political disputes such as the Siachen glacier.[17] The actual reason for rejection, as stated by the Pakistanis, is that the plan was unacceptable to Islamabad. The acceptance of an Indian plan, it was feared, would have led inadvertently to the acceptance of a boundary without really solving the dispute.[18] One of the problems in resolving the dispute is that a baseline needs to be determined by both countries. This land terminus would help in determining the sea territory. Pakistan declared its baseline in 1996 but India did not do the same. The maritime boundary problem is considered threatening by both sides. For example, the Pakistani military authorities were of the view that India had secretly built a new naval post called "SIKKY," east of Sir Creek that was a deep-water berthing facility. The post, in Islamabad's assessment, could help the Indians gather military intelligence, be used for infiltration in Pakistan, and to harass fishermen.

The issue is critical because the final delineation would determine the sea territory of both countries. Indian Rear Admiral (Retd.) Raja Menon believes that, depending on the final decision, the gain or loss to either country could be about 250 square miles of ocean and ocean floor.[19] So, Pakistan may not have wanted to consider the Indian offer for fear of losing territory. A demarcation, however, would help in avoiding serious incidents at sea.

### 4.2 Nonmilitary Threats

The impact of an undemarcated sea boundary is not purely a military matter. It has a serious human dimension as well. The respective coast guards or navies apprehend fishermen from both sides for crossing the boundary in search of catch. These people then languish in prisons for years with no contact with their families. As part of confi-dence building, both countries exchanged about 194 imprisoned fishermen as a goodwill gesture in July 1997. This exchange of prisoners had taken place after six years. This still left 182 Pakistani and 145 Indian fishermen in custody.[20] Part of the problem is related to the absence of direct contact and communication between the naval authori-ties to solve the problem on an immediate basis. The cases of detained fishermen are referred to the respective foreign ministries that do not attach any priority to the issue.

Piracy and smuggling at sea are threats posed to both countries. The vast coastline makes it difficult to intercept and catch nonstate actors engaged in criminal activities. Narcotics, small arms, light weapons, and other contraband items are chan-neled through the sea routes. The illicit small arms and light weapons are instrumental in generating domestic turmoil in most of the countries of South Asia. Pollution in the territorial seas and the exclusive economic zone (EEZ) is another area of concern. In a recently published report from Pakistan, the fishermen's community complained about the pollution from Karachi's untreated domestic and industrial sewage. A study conducted by the Fisherfolk Forum in collaboration with a local nongovernmental organization (NGO) stated that pollution is a major and growing threat to marine resources because chemically polluted and high-salinity effluent drains into the Arabian Sea, destroying mangroves and precious species.[21] It would not be surprising to find a similar situation in India.

Delineation of a sea boundary accompanied by maritime cooperation would also result in broader economic spin-offs. The exploration of natural resources could be possible once the boundary is ascertained.

## 5. Recent History of Maritime Confidence Building

Both navies are aware of the problems and earnestly want to find a resolution. It is when the matters of maritime importance are merged with other political issues that it becomes problematic to adopt a logical approach to finding a solution. Islamabad has tended to avoid a solution for fear of compromising its position on Kashmir. The linkage was established deliberately to keep the Kashmir issue on the "front burner."

From 1997 to 1999, the top Pakistani naval officers did not share this perception. The naval chief, Admiral Fasih Bokhari, believed that there was a greater benefit in cooperating with India.[22] He was forthcoming in initiating contact with his counterpart. Messages were passed through the Indian naval attaché in Islamabad regarding the possibility of cooperation. Ideas such as holding joint naval exercises with noncombat-ant vessels and other options were conveyed. However, the messages were delayed from reaching the Indian naval headquarters because of bureaucratic red tape.[23] This did not dampen the goodwill between service headquarters of the two neighbors and the process of exchanging messages through the usual channels continued. Reportedly, the Indian Naval Chief, Admiral Sushil Kumar, expressed a desire to visit Pakistan.[24] This was soon after the signing of the Lahore declaration. Pakistan's Chief of Naval Staff (CNS) conveyed a similar wish to his Prime Minister. The Indian CNS, Admiral Vishnu Bhagwat, also conveyed to his counterpart the idea of both naval headquarters serving as a channel for their respective governments to negotiate a solution to the Sir Creek issue.[25] The politics of Kashmir and the vested interest in Pakistan, however, got in the way.

These communications were reflective of the greater possibility of the two navies developing a contact. In April 1991, the foreign secretaries of India and Pakistan had also signed an agreement on giving advance notice on exercises, maneuvers, and troop movements in order to prevent any crisis situation arising from misreading the other side's intentions. The agreement was a South Asian version of the U.S.–Soviet Union INCSEA agreement, except that this was more general in nature. The navies had agreed not to operate within three miles of each other's ships, not to fly over each other's surface ships, and other provisions.[26]

## 6. Existing Models of Maritime Cooperation

Maritime cooperation in regions of conflict or between adversarial parties is not an anomaly. This section will review some of the existing examples of cooperation to see how some of these could be applied in South Asia's case.

### 6.1 Middle East

The politico-military situation in the Middle East is closest to that of South Asia. Most of the security issues are rooted firmly onshore.[27] Despite the tension, one can observe certain developments toward maritime and naval cooperation. For instance, the Jordanian and Israeli navies conducted three exercises in 1998 to test the efficiency of the two countries' naval crews in containing pollution in the ports of Aqaba and Eilat. This was primarily to train for coping with marine pollution and protecting a fragile ecology. The peace treaty signed between the two countries in 1994 provided for such opera-tions.[28] Analysts writing on naval cooperation in the Middle East have, indeed, specified environmental protection as one of the key areas for cooperation.[29] In the Middle East's case, the governments were also willing to resolve bilateral disputes through negotiations.

The help of a third party, Canada, was sought to facilitate maritime confidence building. In fact, the process was initiated before the signing of the peace treaty. In 1993, the Arms Control and Regional Security Working Group asked Canada to help build confidence by discussing maritime search and rescue operations and the U.S.–Soviet Union INCSEA agreement.[30] The idea was to learn how naval forces cooperate. Another activity was the 1994 Senior Maritime Officers symposium held in Halifax, Canada. The principle behind this activity was to provide an informal forum where naval personnel could discuss issues, not necessarily related to their situation, and get a chance to know more about each other. Such contacts would prove extremely beneficial in understanding each other at personal and institutional levels. Also, once problems are sorted out at a political level, the governments can draw upon the experience of cooperation to further build peace and encourage the naval arms control agenda.

### 6.2 Latin America

Despite the bilateral tensions in the region, there have been instances of coopera-tion between various nations. The most recent case refers to the agreement signed between Argentina and Chile in April 1998 to hold joint naval exercises to train for naval control over maritime traffic and sea rescue operations in the Strait of Le Maire. This was despite a history of troubled relations.[31] Cooperating in nonmilitary areas of operations leads to developing understanding that could eventually pave the way for arms control and peace. It is also worth pointing out the multinational naval cooperation efforts in the region are spearheaded by the U.S. The Rio Pact of 1947 established a forum called the Commanders' Conference that provided for periodic meetings between naval officers from the U.S. and several Latin American countries. The greatest flaw of the Rio Pact was the imbalance between its members created because of Washington's political objectives in the region.[32]

## 6.3 U.S.–China

Despite the ongoing tension between Washington and Beijing, both nations have been trying to improve relations in a number of areas including maritime. From 1997 to 1998, a series of port visits was arranged bilaterally between the Chinese and U.S. navies. As part of a goodwill mission, the Chinese Defense Minister visited the U.S. in December 1996 followed by three Chinese ships visiting the historic Pearl Harbor site in March 1997. The Chief of the U.S. Pacific Command, Admiral Joseph W. Prueher, reciprocated the Chinese visit in December 1997. This was followed by a port visit of the USS Blue Ridge and USS John S. McCain in August 1998.[33] The Chinese ship visit to Pearl Harbor provided a good opportunity for naval personnel from both sides to meet each other. It would be premature to make specific conclusions about this interaction, but such an interaction does play a role in reducing negative perception of the adversary.

## 6.4 Maritime Cooperation in the Asia-Pacific

In the Asia-Pacific region, a number of forums are used for communication between the concerned states, particularly on issues of maritime significance. The Asso-ciation of Southeast Asian Nations (ASEAN) in particular realizes how critical security at sea is for the growth of trade and general economic progress. The countries of the region, especially in northeast Asia, have adopted a two-pronged approach to ensure exploitation and control of the sea resources: naval buildup and cooperation. Although the weapons buildup is not encouraging from a peace perspective, southeast Asian states have also explored ways to cooperate. They have adopted both Track I and Track II options. The Track I exercise represented by the ASEAN Regional Forum has discussed the possibility of creating a maritime information database. The Track II activities, on the other hand, are conducted through the creation of the Council for Security Cooperation in Asia-Pacific (CSCAP).[34]

China's military modernization is causing concern to other Asia-Pacific states. Nevertheless, issues of maritime importance provide the potential for cooperation between their navies. Environmental pollution and fisheries are two areas that led to bilateral and multilateral agreements. Such cooperative efforts can work because they allow both parties to safeguard personal interests.[35] From 1992 to 1994, a series of conferences was arranged with the help of some United Nations agencies to arrive upon an environ-mental agenda for the seas. Conferences were also held on oceanographic research. Allegedly, China's and North Korea's attitudes towards not revealing information on environmental practices has hampered progress.[36] Japan and South Korea, Japan and China, and North Korea and Japan have signed agreements related to fisheries. These agreements were to facilitate and regulate fishing in each other's waters. Particularly interesting was the North Korea-Japan agreement of 1987 that allowed Japanese fishermen access to North Korean waters in exchange for a fee.[37]

## 6.5 U.S.–Soviet Maritime Cooperation and Naval Arms Control

The history of U.S.–Soviet and now U.S.–Russian naval and maritime coopera-tion is very rich. It is the only case where naval confidence building expanded into the area of arms control as well. The greatest landmark was the INCSEA agreement in 1972. This was signed during the Cold War to stop or minimize the possibility of accidents between American and Soviet naval platforms. The INCSEA agreement was accom-panied by another deal signed in 1989 to prevent dangerous military activities. This agreement laid norms and procedures for the conduct of military activities in a manner deemed not threatening to each other. Analysts consider the agreement a success. Its positive results were obvious during the U.S.–Soviet naval interaction in the 1973 Arab-Israeli war. Despite the tension in the Middle East, the U.S. and Soviet navies operating in the region avoided direct confrontation.[38] Such an agreement was made possible due to consistent efforts from both sides to keep the talks going. The other element that led to signing of this agreement, as pointed out by Winkler, was the lack of publicity.[39] The Soviet authorities and U.S. did not allow the politicization of the negotiations.

In between these two agreements, they also signed another agreement on the noti-fication of the launches of intercontinental ballistic missiles and submarine-launched ballistic missiles in 1988. This was also the time when the START-I and START-II (Strategic Arms Reduction Talks) negotiations were carried out. Although naval arms control between Washington and Moscow is still an unfinished business, the talks were part of the overall confidence building framework. One problem with arms control relates to verification, an issue that has not been solved. Verification of whether nuclear weapons are on board a ship is possible but the detection does tend to cause problems.[40] This is because the action may be considered intrusive by the country whose ship is being inspected using advanced technology, and the inspection and verification technology is not readily available.

In 1994, a series of joint naval exercises was also started to train the U.S. and Russian navies to rescue civilians from earthquake disaster and to provide emergency medical care and evacuation. The series, called "Cooperation from the Sea," helped promote interoperability and fostered greater familiarization. During these exercises, U.S. Marine jeeps and trucks were loaded aboard Russian Navy landing ship tanks (LSTs) and vice versa.[41] These CBMs should not be seen in isolation but as part of naval arms control.[42]

## 7. A Model for Maritime Cooperation in the Indian Ocean

There are a number of studies on CBMs in South Asia. The contribution by Rear Admiral (Retd.) Raja Menon indicates measures that can be adopted to build confidence between Indian and Pakistan navies. These steps range from ways to solve the maritime boundary issue to cooperation in fighting marine pollution and conducting hydrographic exercises.[43]

The present study, however, goes beyond analyzing what is doable or not doable in the region. The aim is to evaluate steps by which confidence building can be accomplished, especially at a time when communication has broken down completely. Therefore, the focus in this section will be to suggest what the two navies can do jointly and how best to do it. The ultimate goal is naval arms control. In fact, initiating com-munication and introducing naval arms control in the region are two issues at the opposite end of the security and confidence-building spectrum. The real issue is how to get started and to move from one end to the other.

## 7.1  A Model for Confidence Building Steps

The assumption in this model is that there is no communication between the two navies.  The steps of the model are fivefold, as follows (see Figure 1):

1.    **The Signaling Stage:**  Initiate communication between the navies.

2.    **The Warming-Up Stage:**  Build confidence through undertaking nonmilitary ventures jointly.

3.    **The Handshake Stage:**  Build confidence between the two navies.

4.    **The Problem-Solving Stage:**  Resolve outstanding disputes.

5.    **The Final Nod Stage:**  Initiate naval arms control.

This model encapsulates the details of the confidence building concept explained in the later sections.  It also assumes the use of different technologies at various stages.
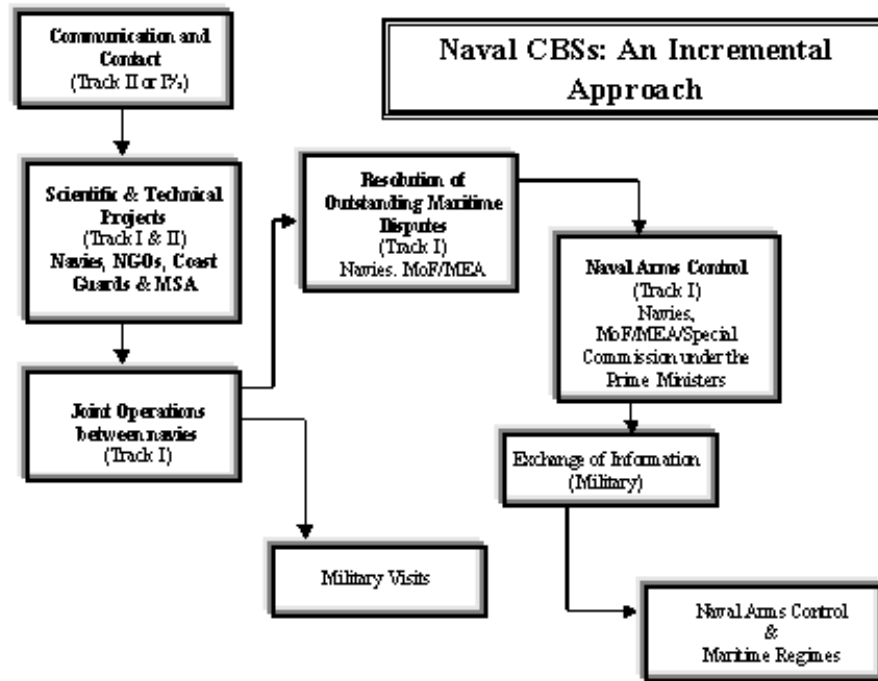


Figure 1.  Naval CBSs: An Incremental Approach

## 7.1.1  The Signaling Stage

This stage concentrates on developing communication between the navies and the governments on maritime issues.  In order to make the process sustainable, any initial contact would be low-key.  A series of multilateral workshops hosted by a third party could be held outside the region, or in the region.  These meetings could, initially, look at the cooperative models of other regions and agreements like the INCSEA or joint naval operations to control marine pollution and curb smuggling through the sea.  The aim would be to draw lessons for South Asia.  Such workshops could adopt a Track I½ approach.  All official participants (from the navies and foreign offices) could attend these events as observers.  The Track II participants could be senior retired officers.  The subjects of the workshop could gradually shift from an indirect discussion on confidence building to topics of direct relevance to South Asia.  The retired officers would have the liberty and the relevant experience of discussing matters of maritime concern to both countries.  The debates held during the workshop would have dual benefit: (1) pave the way for a direct Track I contact and (2) allow the governments of India and Pakistan to consider options that they could not with a purely Track I arrangement.  It must be noted that there has never been a naval Track II or Track I½ initiative between the two countries.  The idea is not to isolate naval issues from the others but to consider matters of a maritime nature without prejudicing the main political interests of the countries involved.  At the end of the workshops, the Track II participants could report the workshop proceedings and recommendations to their respective navies and governments.

A first workshop on "Revitalizing India-Pakistan INCSEA" could initiate the process. The workshop could allow the participants an opportunity to discuss the subject and to debate and agree on an agenda for future discussions.  It could also provide a forum for analysts to present new ideas for maritime cooperation.  The first workshop, however, does not necessarily have to be bilateral.  A multilateral effort would be more suited to revitalize communication between India and Pakistan.  This suggestion is based on political considerations.

The Canadian model for maritime cooperation in the Middle East is a viable option as well.  The Canadian Department of Foreign Affairs and International Trade, in collaboration with other Asian navies and/or the U.S. Navy, could consider holding bilateral meetings on peacekeeping missions and other subjects, bringing together middle- to junior-level naval officers for discussions.  This could be an academic exercise aimed

at facilitating familiarization among naval personnel. A multilateral meeting could also be another viable option. Retired and serving naval officers from the Arabian Sea and Persian Gulf states could be brought together to discuss maritime boundary issues, including Sir Creek. The idea is to put the issue in a far broader regional perspective. The good offices of a country like Oman could be used to help India and Pakistan solve the Sir Creek problem. For those skeptical of using a multilateral approach to the issue, it must be understood that intense and direct communication on the subject could lead to a favorable solution. Another proposed subject for discussion is marine pollution and drug trafficking.

### 7.1.2 The Warming-Up Stage

While embarking upon a chain of activities at this stage, the fundamental assump-tion is that the Indian and Pakistan navies or governments would have moved to a stage where they are comfortable with Track I contact. This level would entail Track I contacts not limited to the navies but would include other institutions that deal with maritime issues. The National Institutes of Oceanography in India and Pakistan could team up to undertake a hydrographic survey, and the institutions involved with marine pollution could pair up to carry out the studies of the ocean. Rajen presents an interesting option for cooperation.[44] In his opinion, both neighbors should cooperate in joint scientific monitoring of the Sir Creek area as a step in finding a solution to the dispute. A similar approach for scientific cooperation on Siachen has also been proposed.[45] The fundamental idea in both papers is to consider an alternative approach to problem solving, without the two countries prejudicing their political standpoints. Both authors suggest taking a technical/scientific path to cooperate in areas of conflict.

This option could be considered at a later stage. At this level, this study recom-mends undertaking scientific and technical projects to study ocean currents and flows, weather patterns, and movements of fish. A multilateral exercise like the Indian Ocean Experiment (INDOEX), conducted by the U.S., India, and a number of European states, could be expanded to include Pakistani scientists as well. The NGOs working on marine pollution or marine life could be included as well. For instance, the World Wildlife Fund in Pakistan has undertaken a blind dolphin project. The Karachi University has offered courses on marine ecosystems. The universities could offer courses in marine ecology to each other's students. These organi-zations could undertake joint projects along with official channels from their respective countries. In fact, some of the scientific projects are being carried out independently with help from foreign countries or organizations. Satellite imaging, sonar buoys, and other technologies could be used for these projects. Since the navies are the only institutions with the required infrastructure, their involvement would be necessary.

At this stage, the various maritime agencies like the Coast Guards (Pakistan and India) and the Maritime Security Agency (Pakistan) could cooperate to solve the issue of fishermen being caught crossing into each other's territory. This is a serious human problem that also requires communication and cooperation between the navies. The violation of sea frontiers takes place in part because of the absence of a boundary. A short-to-medium-term solution is to delineate the disputed area and treat it temporarily as a "no man's land" or a maritime "no-go area" at sea. The extreme outer limits of this zone would designate the last point for the fishermen (see Figure 2).
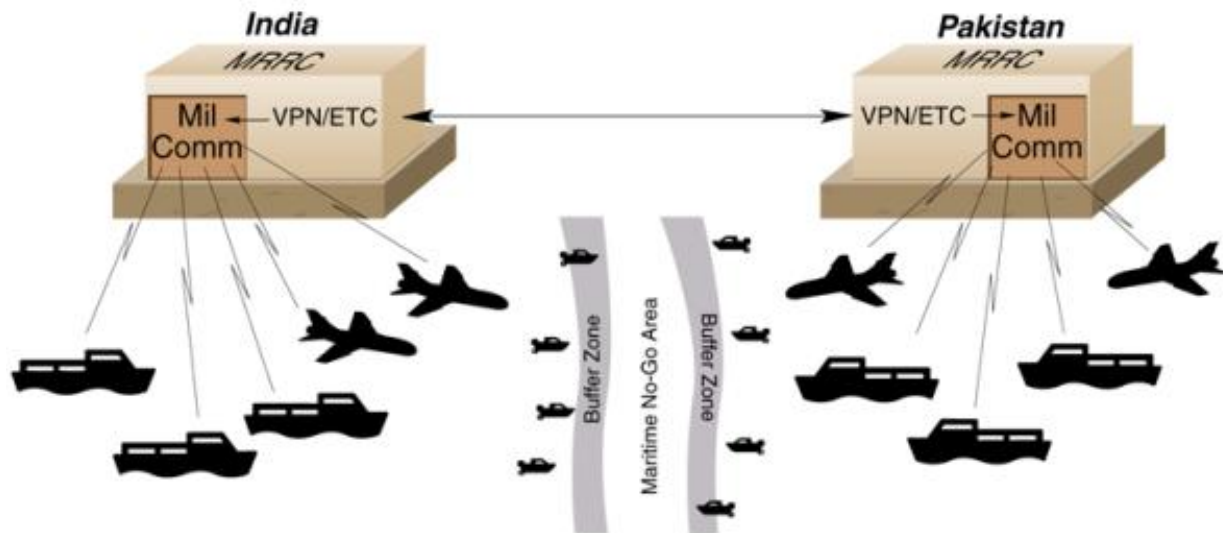


Figure .  Proposed Regime for Maintaining a Maritime Boundary

A buffer zone of 20 to 30 km between the outer and inner limits of the delineated territory could be used for the benefit of the fishermen that accidentally stray into the area. Those crossing the buffer zone could be apprehended. However, in order to avoid the existing unpleasant situation, this study recommends the creation of a Maritime Risk Reduction Center (MRRC) in coastal areas of both countries. These centers could interact with each other vis-à-vis fishermen detained by any maritime agency, with an agreed arrangement to release them after a specified period. The MRRC could use international frequencies for cross-border communication, establish a virtual private network (VPN), use specific radio frequencies, or have encrypted telephone lines for communication.

Furthermore, fishing vessels could be equipped with transponders or Global Positioning System (GPS) receivers so those fishermen do not inadvertently cross over the delineated area. This would also help the MRRCs to track the position of these vessels. To discourage people from a deliberate violation, it is suggested that the Indian and Pakistani maritime agencies jointly formulate a legal framework. An exchange of data on fishing vessels would also be carried out.

Equipping fishing vessels may initially be a financially onerous undertaking and the bureaucracies may resist the idea because of the cost. (Such reaction may not take into consideration the financial and opportunity cost of apprehending the fishermen and keeping them imprisoned for years.) In order to make the idea work, this paper proposes pilot projects for evaluating the concept. Noncombatant naval vessels of both

countries could be fitted with transponders or GPS. It could also be applied to selected private fishing vessels. A project lasting six months to one year would not only help in evaluating the cost but could also aid in determining necessary adjustments to be carried out subsequently in the system. It would also help build confidence between the navies and maritime agencies.

The MRRCs could be established in both countries. These could use two sepa-rate communication networks: one between a local MRRC and its national coast guard and naval vessels, and the other between the two MRRCs. In the case of the first communication network, each MRRC could use military communication (MILCOMM) frequencies between itself and its national naval ships, naval aircraft, and private vessels. For the second case (to communicate between the two countries), the authorities could negotiate the use of a VPN or an encrypted commercial telephone link. The MRRCs could play a vital role in joint search and rescue operations or response to emergency maritime disasters, too.

A pilot project could be divided into two parts: (1) delineation of the area and (2) establishing and implementing specific rules and norms of operations in this area in order to avoid a conflict. This breakup would be necessary to reduce the cost at the initial stage. A system of electronic or ordinary fencing at sea is a costly option. However, the countries involved may want to try it out for their benefit and that of third parties.

Such projects could have far-reaching effects. This would not only be restricted to the fishermen's problem, but could also address the greater issues such as trafficking of drugs, narcotics, and human beings. Reportedly, around 500 women from Bangladesh are smuggled to Pakistan every day. Also, the annual estimated figures of child trafficking from Bangladesh to India and Pakistan are 12,000 and 14,000 respectively.[46] This is in addition to the illegal trade of other contraband items. Through the use of technology, India and Pakistan could jointly curb this menace. In fact, smuggling is an area where other regional states could be included. These cooperative projects would be periodically reviewed through both Track I and Track II contacts, or through another mechanism as discussed in Section 7.1.4.

### 7.1.3  The Handshake Stage

The two navies could directly interact with each other on less sensitive issues like search and rescue operations. Initially, joint exercises could be conducted to train personnel for such operations. The navies could also consider exchanging port visits and visits of coast guard and naval officers. This would be done through noncombatant vessels. A permanent forum such as a "Commanders' Conference" may also be estab-lished at this stage with participation from the foreign offices. This forum could review the state of communication and discuss matters of common interest. Curbing smuggling at sea is another area where the two navies can cooperate. The Indian and Pakistan navies could agree on monitoring specified areas for anti-smuggling operations. Information could be exchanged regularly through the two MRRCs. If a suspect vessel is not appre-hended by a navy or coast guard of one country the information could be passed on to the other country's MRRC for appropriate action. This would allow the various agencies to integrate efforts to curb smuggling.

### 7.1.4  The Problem-Solving Stage

At this stage, the navies could try to resolve the outstanding dispute of Sir Creek. Before arriving at this stage, the Track I and Track II groups could carry out independent studies to evaluate options. The Indian government's proposal, rejected by Islamabad in 1994, had proposed delineating the boundary seawards. This approach has been proposed in Menon's paper.[47] However, this solution would not solve the problem permanently. There will always be the threat of conflict developing over the disputed land. It would be worthwhile to consider a temporary solution by drawing a line in the middle of the creek and agreeing upon this as a boundary for a period of five years.

This solution is supported by the PN's former CNS, Admiral Fasih Bokhari. In his view, following old maps only complicates the situation. Although both countries will still lose some area if the line is drawn in the middle of the navigable channel in the Creek as opposed to their preferred options, this presents the most logical approach to problem solving between the two countries.[48]

A viable solution after years of dispute, he added, is to draw a line in the middle and sign a temporary agreement.[49] Figures 3[50] and 4[51] provide a better understanding of the Pakistani Admiral's views.
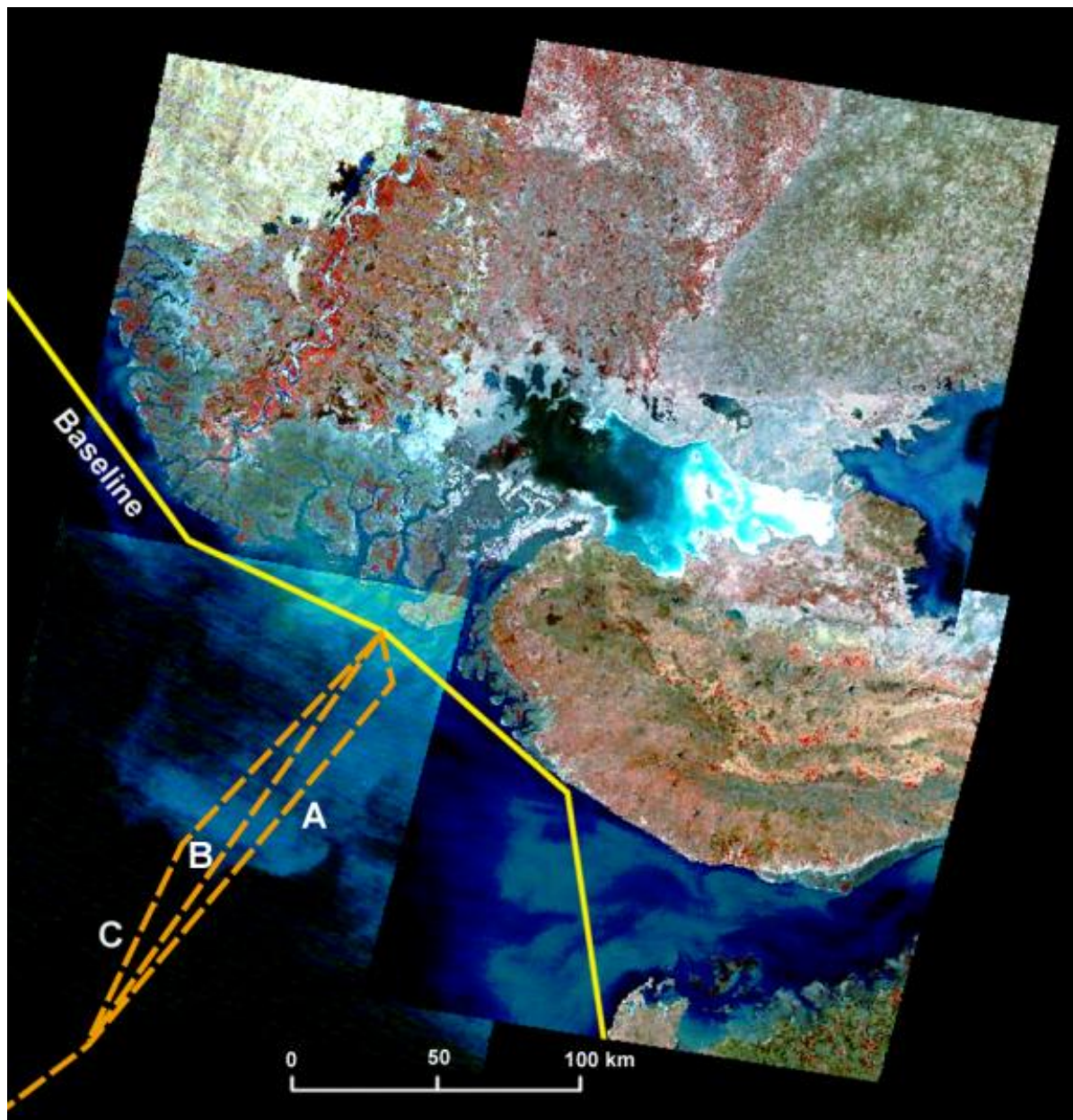
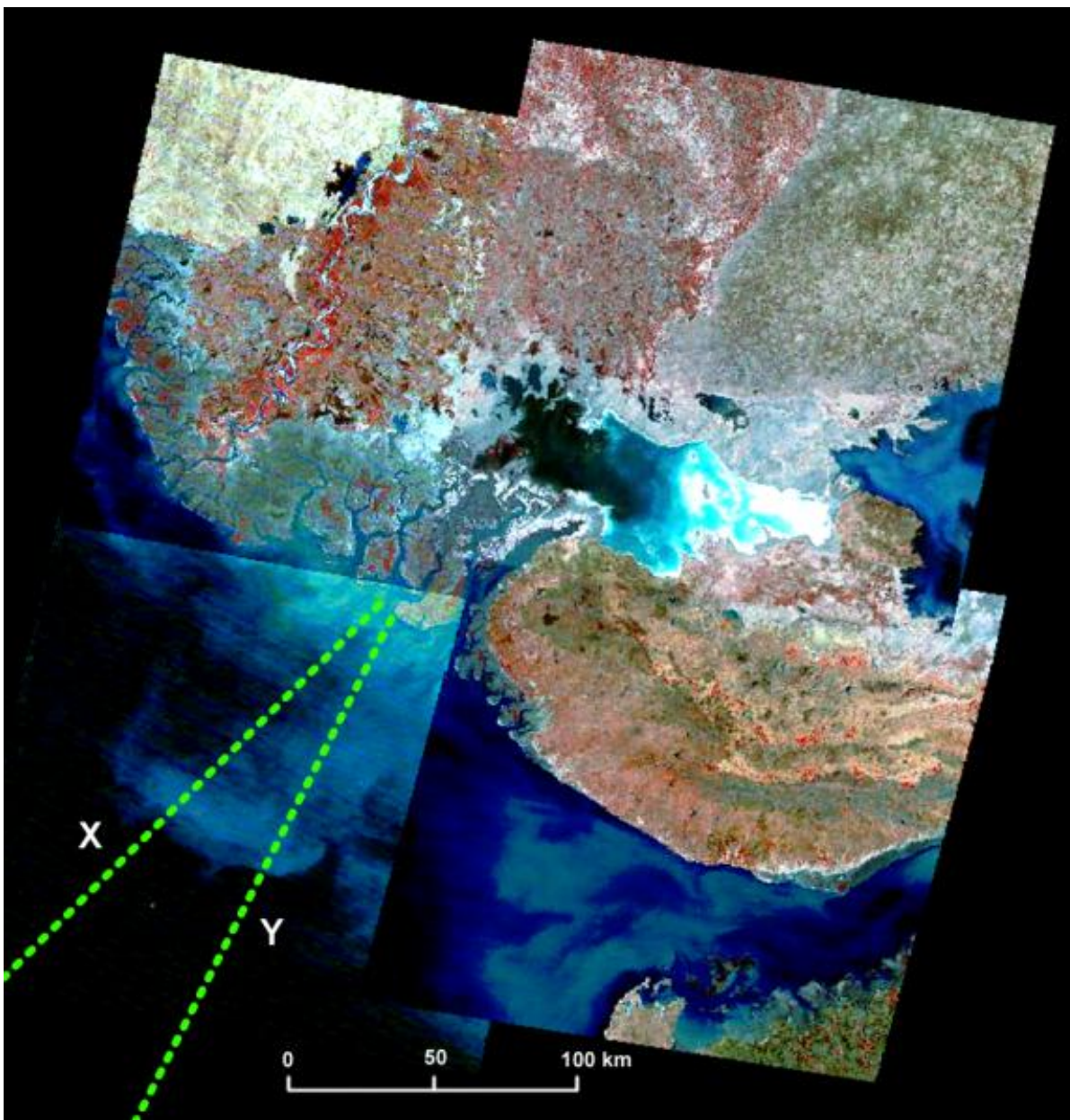Figure 3.  Pakistan's Perception of Boundary Lines at Sir Creek

Figure 4. India's Perception of Boundary Lines at Sir Creek

These figures are based on the perceptions obtained from naval sources in both countries on where their country would like the boundary to be and where, in their view, the other side wants to draw the line. This information was collected after three months of consistent communication with naval sources in both countries.

Two factors make these figures important for this paper: (1) it is the first time that this information appears in a public document and (2) the positions of both countries on their choice of boundary line as opposed to where the adversary would draw the line have been put on paper. In both cases, the countries tend to lose or gain area of the EEZ depending on where the line will eventually be drawn. It is only when the line is drawn in the middle of the navigable channel that the losses on both sides are minimized. For instance, line A in Figure 3 indicates the position of the line where Islamabad would gain approximately 1300 km$^2$ of EEZ as compared to line C in the same figure, where the loss for Pakistan would be about 1400 km$^2$. (See footnote 48.)

A Sea Boundary Delineation Data Center in both countries could be established to collect data on sea traffic, sedimentation, and natural movement of the creek and other related issues. It would help in understanding the gradual movement of the creek and in fixing a permanent boundary at a future date. This data could be reviewed periodically by a special commission comprised of naval officers, hydrographic surveyors, Foreign Office officials, and selected senior members of the government. The commissions from both sides could meet every year, with a final meeting at the end of the five years. The final meeting could be a review discussing the pros and cons of the agreed delineation. Participants could negotiate any changes in the earlier agreement, leading to a final settlement of the dispute.

### 7.1.5  The Final Nod Stage

Once sufficient confidence has been built, one could safely focus on military issues such as the exchange of information on military exercises. The discussion on naval arms control could be another option.  The governments could restrain the develop-ment and deployment of a sea-based nuclear deterrence.  For confidence building, the navies could agree not to put nuclear weapons on board the surface ships or submarines.  This would be a nonverifiable declaration.  Once strategic weapons like nuclear subma-rines are acquired, the navies could negotiate norms for deploying the subs or ASW operations.  Moreover, the navies could agree on an exchange of information.  By the time the final stage is reached, the navies would have built enough confidence to carry out joint exercises designed to avoid incidents such as the shooting down of the PN's naval plane.  The U.S. and Soviet navies have experimented with this concept as well.

It is essential to add a note on how the above-described system will work.  Although these steps have been placed in a systematic order, the placement can be changed at any time depending on the level of confidence of the negotiating parties.  Establishing communication, however, is the essential starting point.  This paper proposes that a permanent Review Council be constituted to keep track of the develop-ments.  The members of this council could comprise both Track I and Track II partici-pants.  The respective naval headquarters or the governments could select the Track II participants.  If the Review Council becomes confident to skip any particular stage and move to the next step, they could do so (see Figure 5).
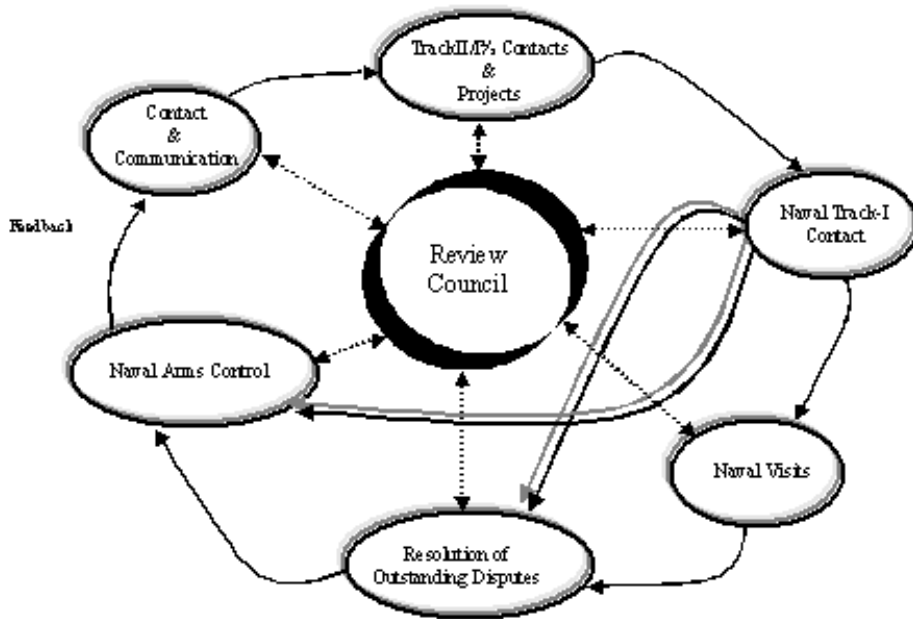


Figure 5.  Proposed Maritime Cooperation:  The Loop

### 8.  Technologies Used for Confidence Building Steps

The confidence building steps would need to use a variety of technologies.  These technologies have been divided into three categories: (1) communication, (2) navigation, and (3) remote sensing.

### 8.1  Communication

As shown in Figure 2, the MRRC could use two separate communication channels: between the aircraft and surface ships, and the MRRCs. These centers (manned by naval personnel) could use military frequencies (MILCOMM) between or with their own ships and aircraft.  These frequencies, however, would not be used for inter-MRRC communication.  The centers could opt for encrypted telephone lines or dedicated communication links.

A VPN allows secure data transmission over the Internet.  The system creates an encrypted/authenticated tunnel through the Internet between two points.  A VPN can be implemented in both software and hardware.  It is considered a cheaper option than using a leased line for Internet communication.  An estimated cost for the installation of a VPN is about $US 24,000.  An additional $US 5,000 would be required for monthly operations.[52]  This type of system has been recommended for use by the International Atomic Energy Agency.

The other option is to use encrypted telephone lines.  This system would ensure voice communication with sufficient authentication and encryption built into the system to ensure that a third party could not intercept the communication between the two MRRCs.  Setting up this system would require cooperation between the telephone companies from both sides.

One of the systems described above could be used for communication between the MRRCs during search and rescue operations or to ensure safe operations around the delineated area.  For instance, a surveillance aircraft observing any unusual activity close to the specified area would report the activity to its national MRRC, which could then notify its surface ship operating in the area.  Or, the center could inform its counterpart across the border using one of the aforementioned systems to communicate.  The MRRCs could be used for urgent problem solving.

The MRRCs could also use the concept of Authenticated Tracking and Monitoring Systems (ATMS).  The ATMS could provide global monitoring of the status and location of proliferation-sensitive items.  The concept uses sensor packs to monitor items and environmental conditions, collects a variety of event data through a sensor processing unit, and transmits the data to the INMARSAT satellite system, which sends the data to ground stations.  Authentication and encryption algorithms are incorporated to secure the data during all transmissions.  This system can be used on vehicles, railcars, or ocean ships.  A maritime version of the system would allow each MRRC to track its own set of ships and surveillance aircraft.  That information would not be exchanged by the MRRC and its counterpart.

## 8.2  Navigation

The earlier part of this paper mentioned the idea of delineation of the disputed area.  This concept could help fishing, research, or even naval vessels to avoid violation of sea territory.  This area could have electronic fencing around it.  This type of fencing is relatively expensive.  Also, there is the danger of expensive equipment being stolen by a third party.  This could be avoided with another option of using ordinary buoys fitted with lights.  A thousand buoys would cost about $US 100,000.

Two options could be considered to help vessels operate around this area without violating the limits:  (1) the GPS and (2) transponders.

The GPS is an appropriate technology for navigating on water.  A range of hand-held or mounted systems is available commercially.  The hand-held GPS could be obtained for around US $100.

Another experiment that could be conducted at the "warming-up" stage relates to fitting transponders in 25 to 30 vessels.  The transponders installed in specified vessels could allow these to be tracked by the MRRC.  When the MRRC receives any information from its counterpart or its aircraft about some peculiar vessel at sea, the concerned MRRC would know the location of its surface ships and send the relevant information to its unit for necessary action.  Alternately, an Advanced Maritime Traffic Management System could be used at the MRRCs to track the movement of its vessels.

## 8.3  Remote Sensing

Remote sensing could be carried out by the use of sensors on aircraft and satel-lites.  Remote sensing is a powerful tool for collection, extraction, and integration of data of large-scale variables not available in ground studies of the concerned area.  Satellite-borne radar sensors, in particular, are becoming increasingly important for environmental study projects.  Remote sensing data provide information from observation in a consistent and standard format.  Furthermore, such data acquired from the same or similar instruments can be used to observe ecological processes at different places or times.

One of the many existing satellites (details provided in Table 1) could be used in the recommended joint scientific experiments in the Indian Ocean.

These satellites have varied capabilities.  The ultimate objective is to base the selection for a particular system on the requirements of a study.  It is important to note that three kinds of sensor resolutions are relevant in matching a particular remote sensing technology to a particular study: spatial, spectral, and temporal.  Spatial resolution determines the size of objects detected by a remote sensing instrument.  A spectral resolution refers both to the total range of wavelengths and the number of spectral bands into which that range of wavelengths is subdivided.  Finally, the temporal resolution relates to how often the same instrument revisits a scene, or the time between successive images.  The images that are obtained thus help in observing the changes in a scene.

Remote sensing technology could be employed, for instance, in the Sir Creek region to monitor the natural changes like sedimentation, etc.  Once a temporary agree-ment is reached between the two countries on the maritime boundary issue, they will need to constantly monitor the movement of the Creek.  Hence, remote sensing is recom-mended for the purpose.  Also, any deliberate changes or developments in the area could be monitored.  Such monitoring would help build confidence in each other's actions at sea.  This technology could also be an effective tool once Indian and Pakistan navies or other agencies decide to undertake joint scientific projects.

Table 1.  Sensor Characteristics and Prices

| Satellite | Resolution (meters) | Spectral Bands | Footprint (km) | Revisit Time | Launched | Cost Per Image |
|---|---|---|---|---|---|---|
| **Landsat 4,5** | 28.5 (120 TIR) | 7 | 170 x 185 | 16 Days | 1982, 1984 | $4,400 |
| **Landsat 7** | 28.5 (TIR, 15 BW) | 8 | 170 x 185 | 16 Days | Apr. 1999 | $475–$600 |
| **SPOT 1-3** | 20 MSS, 10 BW | 3 | 60 x 60 | 26 Days * | 1986, 1990, 1993 | $1,550 MSS $1,950 BW |
| **SPOT 4** | 20 MSS, 10 BW, 1000 Mid-IR | 4 | 60 x 60 | 26 Days * | Mar. 1998 | $1,550 MSS $1,950 BW |
| **Radarsat** | 10-100 | 1(C-band) | 50 x 50, 500 x 500 | 5–10 Days | 1995 | $3,000 – $4,750 |
| **IRS** | 5.8 BW, 20 MSS | 5 | 70 x 70, 140 x 140 | 24 Days | 1995 | $2,500 |
| **KVR-1000** | | | | | | |
| · Old (<1993) | 2 | 1 | 40 x 40 | Irregular | 80s to early 90s | $30/km$^2$ |
| · New (>1993) | 2 | 1 | 40 x 40 | Irregular | Feb. 1998 | $40/km$^2$ |
| **Ikonos** | 1 BW, 4 MSS | 1,4 | 11 x 11 | 1–3 Days | Sep. 1999 | $12–$29/km$^2$ |
| **QuickBird** | 1 BW, 4 MSS | 1,4 | 22 x 22 | 1–5 Days | 2000 (planned) | TBD |
| **OrbView-3** | 1 BW, 4 MSS | 1,4 | 8 x 8 | >3 Days | 2000 (planned) | TBD |
| **OrbView-4** | 1 BW, 4 MSS, 8 Hyper | 1,4,8 | 8 x 8, 5 x 5 | >3 Days | 2001 (planned) | TBD |
| **EROS** | 0.82 | 1 to 3 | 16 | 7 Days | 2000-2001 (planned) | TBD |
| *Courtesy: University of New Mexico, Earth Data Analysis Center and Sandia National Laboratories* | | | | | | |

| Key:<br>BW - Black & White<br>MSS - Multispectral Scanner<br>Mid-IR - Middle Infrared (reflective) | Hyper – Hyperspectral<br>TIR – Thermal Infrared<br><br>*More frequent coverage available using off-vertical viewing |
|---|---|

## 9.  Conclusion

A number of ideas can be explored for maritime cooperation between India and Pakistan.  This area of cooperation has great potential for success and for building an experience that the other military branches of the two countries could draw upon later.

Developing sustainable contact is the primary focus of this study.  Peace initia-tives cannot be established unless there is communication between the negotiating parties.  This is one of the weakest areas of India-Pakistan relations.  Contact and communication tends to break down at the first sign of tension or conflict.  Although this is not an anomaly, the problem needs to be addressed.  A number of direct and indirect channels could be established.  In fact, creating indirect or Track II channels is vital.  These could be used to rebuild confidence during or after a period of tension.  In fact, the Track II participants could safely discuss ideas and new concepts from which the governments would initially shy away.  The discussions held during a maritime Track II or I½ process could lead to finding solutions to outstanding maritime disputes.  Once a solution is found, it will be easier for the two governments to endorse the same.

Besides establishing communication, this study recommends a number of other areas for possible cooperation.  Joint scientific studies of the Indian Ocean and the coast-line, search and rescue operations, and curbing smuggling at sea are some of the matters that require consideration by the policymakers.  Even if one was to leave aside the outstanding maritime boundary dispute, there are issues on which India and Pakistan can cooperate for mutual benefit.  On the Sir Creek dispute itself, Islamabad and New Delhi could consider the option of short-term and medium-to-long-term solutions.  Technolo-gies are available that can expedite the process.

The experience of confidence built gradually between the navies would be extremely worthwhile.  The process may allow the two navies and their governments to devise a naval arms control agenda.

## About the Author

Dr. Ayesha Siddiqa-Agha is a Pakistani security analyst.  She worked with the Pakistan Navy as the Director Naval Research from June 1998 to October 1999 and in various other positions with the Pakistan Government.  Her work included restructuring and reorganization of the Navy, sales and export of defense equipment, and identification of nonmilitary threats.  She has published in several international journals and written commissioned papers.  The topics of her main research interests include defense procure-ment, nuclear decision-making, defense conversion, defense production, and light weapons and narcotics proliferation.  Dr. Siddiqa-Agha is the author of a forthcoming book entitled *Pakistan's Arms Procurement and Military Buildup, 1979-99: In Search of a Policy*.  She received her doctorate from the Department of War Studies, King's College, London, in 1996 and her Master's degree in political science at the University of Punjab, Lahore, Pakistan.

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[12] Discussion with Admiral (Retd.) L. Ramdas (Ahungalla: September 1999).

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[15] Interview with the Indian former Chief of Naval Staff, Admiral (Retd.) Vishnu Bhagwat (Mumbai: July 19, 2000).

[16] The former Indian Naval Chief, Admiral Vishnu Bhagwat, was severely rebuked by the MEA for directly lodging a complaint with Pakistan's Naval Attaché in India against a Pakistani surveillance aircraft tailing an Indian naval vessel.  For reference see http://www.rediff.com/news/1999/jan/09nayar.htm.

[17] Admiral (Retd.) Vishnu Bhagwat (Mumbai: July 19, 2000).

[18] Interview with the former Pakistani Naval Chief, Admiral (Retd.) Fasih Bokhari (Islamabad: July 2000).

[19] Menon, K.R., Rear Admiral (Retd.), 1996, "Maritime Confidence Building in South Asia."  In *Maritime Confidence Building in Regions of Tension,* ed. J.R. Junnola, Report No. 21, The Henry L. Stimson Center, Washington, D.C., p. 78.

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[22] *Defence Journal* (December 1997), p. 6.

[23] Admiral (Retd.) Vishnu Bhagwat (Mumbai: July 19, 2000).

[24] Ibid.

[25] This fact was confirmed by both Admiral (Retd.) Fasih Bokhari and Admiral (Retd.) Vishnu Bhagwat.

[26] The PN wanted to use this model to negotiate an INCSEA with the U.S. Navy that was operating in the Arabian Sea from 1998 to 1999, before the U.S. attack on Afghanistan.

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[48] In the case a line is drawn in the center of Sir Creek, Pakistan would lose 2,246 km$^2$.  This is opposed to a situation where Islamabad would have to give up 2,725 km$^2$ if a line were drawn on the western side of the Creek.  Source: PN hydrographic department.  This assessment differs from the figures on page 33 (obtained from a briefing on Sir Creek prepared by the Pakistani Ministry of Defense (MoD)).  This difference indicates another shortcoming: the navy has never been allowed to spearhead discussions with its counterpart.  Also, the PN has never conducted a survey of the Sir Creek area.  The Indian Navy thwarted an effort to do so in the early 1990s.

[49] Admiral (Retd.) Fasih Bokhari (Islamabad: July 2000).

[50] Information for Figure 3 was obtained from briefing materials supplied by the MoD.

[51]  Information for Figure 4 was provided by Rear Admiral (Retd.) Raja Menon, New Delhi, India.

[52] These costs are specific to Europe.  Considering the low cost of Internet in South Asia, the estimate could be reduced further.