

NETWORKED TRANSPARENCY

Constructing a Common Operational Picture of the South China Sea

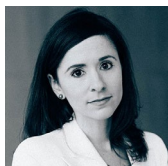
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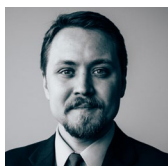
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About the Asia-Pacific Security Program

The Asia-Pacific Security program seeks to inform the exercise of U.S. leadership in Asia by analyzing how the United States can rebalance its priorities; shape a rules-based regional order; modernize traditional alliances; build the capacity of new partners; and strengthen multilateral institutions. From exploring rising maritime tensions in the region to crafting ways to renew key alliances and partnerships to articulating strategies to extend and enhance America’s influence, the program leverages the diverse experience and background of its team, deep relationships in the region and in Washington, and CNAS’ convening power to shape and elevate the conversation on U.S. policy across a changing Asia.

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01 CHAPTER

Introduction

I. Introduction

The South China Sea is strategically important and resource-rich, crucial to the lifeblood of U.S. and Indo-Pacific economies. Roughly one-third, or \$5 trillion, of the world's commercial shipping passes through its waterways annually. The South China Sea is home to proven reserves of at least 7 billion barrels of oil, as well as what is estimated to be 900 trillion cubic feet of natural gas.¹ Fifty percent of all global oil tanker shipments pass through the region.² And these shipments are vital to meeting the energy needs of most Asian countries, providing 60 percent of Japan's and Taiwan's energy, two-thirds of South Korean imports, and 80 percent of China's crude oil imports.³

It is also a highly contested space, and the proximate sources of tensions are well-known. Ongoing sovereignty disputes among China, the Philippines, Vietnam, Taiwan, Malaysia, and Brunei lead to competition over hundreds of islands, reefs, and reclaimed land. The strategic implications for growing tensions among these claimants are profound. Together these nations produce \$11.7 trillion of global gross domestic product (GDP) and are home to a third of the world's population, including half a billion who live within 100 miles of the South China Sea coastline alone.⁴

Yet underlying these resource and sovereignty tensions is something even more pernicious: The South China Sea is an opaque, low-information environment. Most South China Sea islets are hundreds of miles from shore, making it especially difficult for governments and commercial entities to monitor events at sea when they occur. This dearth of situational awareness worsens regional competition in the South China Sea. The region is already rife with rapid military modernization, resurgent nationalism, the blurring of economic and security interests, and heightened geopolitical wrangling with China (by great and small powers alike). Left unchecked, these pressures make conflict more likely by tempting major military accidents and crises that could drag down the economic and political future of the region.

These negative trends converging in the South China Sea also create missed opportunities among regional stakeholders for positive gains. South China

Sea stakeholders have many transnational and economic interests of growing importance in common – from counterpiracy to maritime commerce and disaster response – but the competitive nature of the South China Sea today impedes collective action to solve shared problems. States have trouble engaging in cooperation, even when it would advance shared interests. This challenges the foundations of a stable regional order. The more states believe they live in an anarchical neighborhood, the more likely the region sees the worst of geopolitics: security dilemmas, arms races, and policies motivated by fear and greed rather than reason and restraint.

There is no silver bullet to entirely resolve the historical, strategic, and technological factors that are contributing to a more contentious security environment in Asia. Nevertheless, there remain practical and politically viable initiatives that could have a substantial effect in mitigating insecurities while fostering cooperation on issues of common interest.

The South China Sea is an opaque, low-information environment.

This report proposes that enhanced, shared maritime domain awareness (MDA) – that is, a near-real-time understanding of air and sea activities – in the South China Sea is a realistic means of addressing some of the underlying and proximate problems facing this strategic waterway. A maritime domain awareness architecture may engender cooperation in a region devoid of trust, prevent misunderstandings, encourage operational transparency, and lead to capacity-building efforts that contribute to the regional public good. This study explores how advances in commercial technology services, regional information-sharing, and security cooperation can contribute to enhanced regional security. We believe these advances can do so by moving the region closer to establishing a common, layered, and regularly updated picture of air and maritime activity in the South China Sea – a common operational picture (COP) for a tempestuous domain.

A maritime domain awareness architecture may engender cooperation in a region devoid of trust, prevent misunderstandings, [and] encourage operational transparency.

The U.S. military has long relied on a common operational picture to enable command and control linking strategic decisionmakers located at headquarters elements and operational units located in the field. A COP amounts to a visualization tool for situational awareness, described more narrowly by the military as “a single identical display of relevant information shared by more than one command that facilitates collaborative planning and assists all echelons to achieve situational awareness.”⁵ This domain-agnostic military definition conveys that a COP is a tool for maintaining situational awareness, but not how situational awareness occurs. That requires the confidence-building, technical capacity, and commitment to stability-promoting transparency that this report explores.

Transparency: The Next Phase of the Rebalance

While this report was being written, U.S. policymakers made two major public commitments linking South China Sea transparency to larger goals of stability and assured access. The first, the Asia-Pacific Maritime Security Strategy, lays out what the Department of Defense (DoD) sees as the most pressing challenges facing the region, as well as the most promising openings for future collaboration and improvement. The second, the Maritime Security Initiative, seeks to make these opportunities reality, funding regional capacity-building efforts to the tune of \$425 million. Both initiatives rightly prioritize enhancing local partner military abilities, regional cooperation, and maritime domain awareness in the South China Sea, but they focus much more on framing past actions and justifying present initiatives than on laying out a road map for the future.

Such an effort could be an important part of the broader U.S. strategy for the region. To that end, this report prescribes for the United States a maritime domain awareness road map comprising four lines of effort. We envision coordinated capacity-building for select Southeast Asian militaries through:

- A concert of outside stakeholder powers;
- A U.S.-centric effort relying heavily on U.S.-controlled information collection and distribution;
- Expansion of the capacity and reach of extant institutions that perform maritime awareness and information-sharing functions; and
- An inclusive approach that empowers regional institutions and relies on private-sector partnerships.

Each of these strategies prioritizes different ways of enhancing maritime domain awareness, and each has distinct benefits and drawbacks. In aggregate, the types of activities constituting these strategies offer policymakers menus from which they can pick and choose to build better maritime domain awareness given political realities, cost constraints, trust, and other salient conditions that may shift over time. Advancing shared situational awareness in practice will likely require drawing on all four strategic approaches, and this report identifies several key near-term tasks for policymakers and operators to render the region’s most volatile waterway into an open, transparent, and stable one.

02 CHAPTER

Taking Action Against Troubling Regional Trends

II. Taking Action Against Troubling Regional Trends

The evolving Asian security environment – increasingly influenced by the aforementioned resource and sovereignty competition – is on a trajectory that promises to become less stable absent intervention. Territorial disputes in the South China Sea have long been a source of friction, but the strategic landscape is shifting in new directions. The lack of maritime domain awareness in the South China Sea is encouraging military competition and increasing the risk of miscalculation. Three interlocking trends are feeding this trajectory: widespread military buildups in high technology; a distinct type of coercion that blurs the line between aggressor and defender; and a growing “securitization” of maritime economic issues.

The Spread of Advanced Military Technologies

In this environment of increasing uncertainty, militaries across the Asia-Pacific region are engaged in arms buildups and force modernization initiatives. These efforts are both fueled by and simultaneously reinforce mistrust about the intentions and capabilities of neighbors.⁶ China’s growth in military spending and capability development is well-known, and a source of concern for many, but China is not alone.⁷ Japan’s shift in both its acquisition and development of advanced capabilities has gained notice, but of even more interest to its neighbors are the (U.S.-backed) changes to the historically restrained role of the Japanese Self-Defense Forces. North and South Korea, the Philippines, India, Indonesia, Singapore, Malaysia, Australia, Vietnam, and Myanmar are all undertaking major modernization programs as well, ranging from improved coastal defenses and surveillance to investments in modern fighter aircraft, unmanned aerial vehicles, cruise missiles, and ballistic missile defense.⁸ There are even creeping indications of an arms race in aircraft carriers among China, India, Japan, and South Korea just over the horizon.⁹ The danger, of course, is that all of these growing military capabilities are increasing the latent capacity for violence should conflict occur, which enhances mistrust among neighbors.

The Emergence of “Gray-Zone” Challenges and Land Reclamation

Asia’s territorial disputes have also seen a new pattern of “gray-zone” conflicts, defined broadly as a distinct form of coercion that falls somewhere between peace and war. In contrast to the blatant use of force for political ends, gray-zone strategies exploit operational ambiguities and informational asymmetries, often through the use of intermediaries rather than rank-and-file military forces. They employ militaristic aggression behind a thin veil of deniability.¹⁰ Although this phenomenon is not unique to Asia, China’s pattern of assertiveness in the South China Sea provides an apt illustration of what gray-zone conflicts are and why they threaten regional stability. While other countries have also engaged in provocative behavior to advance their claims in the South China Sea, China’s behavior has become increasingly coercive in recent years and may have outsized strategic effect.

The evolving Asian security environment is on a trajectory that promises to become less stable absent intervention.

As a means of asserting and defending its territorial claims in the region, China has often eschewed direct use of the People’s Liberation Army (PLA) in favor of its increasingly muscular coast guard, fishing vessels, and construction crews building artificial islands. China has used its coast guard, for example, to contest Japan’s administration of the Senkaku Islands and to force the Philippines off Scarborough Shoal. China’s artificial island-building in the South China Sea is likely military in its intended purposes but was executed primarily by private companies. In addition to nontraditional coercive actors, China has also employed nontraditional coercive means, including high-powered water cannons, unarmed intrusions using surveillance drones, and sound-wave equipment that induces nausea in its target.¹¹ Because gray-zone coercion falls short of traditional militarized violence, it aims to avoid provoking a major military response from other major powers, such as the United States, and to avoid sparking regional conflict.

Its effect is to shift the burden of retaliation decisions to defenders, and in the process it blurs the lines of legitimacy and culpability.¹² China's seizure of Scarborough Reef in 2012 was emblematic of the coercion that can occur in this environment of low information. When the Filipino coast guard stopped private Chinese vessels suspected of illegal fishing, China responded by unexpectedly and rapidly escalating the standoff with its own vessels – blurring the roles of coast guard and naval ships in the process – and ordering the Filipinos to withdraw.¹³ Despite objections from the United States and others in the region, Chinese behavior has continued apace, particularly in areas such as maritime patrols, energy exploration, and land reclamation, where there is great opacity about Chinese intentions.

Many of the negative regional security trends that led to these types of events, including military modernization and the securitization of economic interests, have been unfolding and accelerating over many years. One punctuated development, however, took place over the course of just 18 months. More brazen than even the seizure of Scarborough Reef are China's Spratly Islands land reclamation efforts. This building of new, artificial islands, more than any other trend, highlights the need for improved and cooperative maritime domain awareness in the South China Sea.

Between early 2014 and mid-2015, Beijing converted seven formerly submerged reefs and rocks into artificial islands using commercial dredging techniques. China has since begun installing military facilities and equipment on these islands. This includes sophisticated radar and communications equipment, high-capacity port facilities, and as many as three 3,000-meter airstrips, all of which are capable of landing any military aircraft that China possesses. Admittedly, China is not the only South China Sea claim-



Surveillance video from a U.S. Navy P-8A Poseidon as it flies over Chinese island building efforts in the South China Sea in May 2015. (U.S. Navy)

ant to have used land reclamation in the Spratlys: Taiwan reclaimed 5 acres over two years; Malaysia, approximately 60 acres over 30 years; and Vietnam, 50 to 60 acres over five years. China, however, has done so at an unprecedented rate, reclaiming over 3,000 acres in just one year.¹⁴ And while Taiwan, Malaysia, Vietnam, and the Philippines all have airstrips in the Spratlys, these pale in comparison to China's in size and capacity.¹⁵ With its new island bases, China will significantly improve its ability to monitor the Spratly Islands area. With the ability to install radar and communications equipment and conduct reconnaissance flights 1,000 miles farther from its shores than it could previously, this may also allow Beijing to put pressure on other claimants. Experts have speculated that in relatively short order, China may use its new monitoring capabilities to declare a South China Sea air defense identification zone (ADIZ), as it did in the East China Sea in 2013.

More troubling than any one of Beijing's new island capabilities, however, is the deep uncertainty about China's long-term intentions that this building has raised. By using a construction technique that is not illegal and that other claimants have employed, and by unfurling its island bases at lightning pace, Beijing made it difficult for regional states to mount a coordinated response to its efforts. But it also made minimal effort to assure its neighbors that it was not seeking to upend the political or territorial status quo in the South China Sea. With a limited ability to monitor Beijing's Spratly Islands construction as it unfolded, and few avenues through which to share information or coordinate responses, other claimants were forced to accept a Chinese *fait accompli*. This, in turn, has likely changed forever geography and security in the South China Sea.

Economic-Security Nexus

Economic issues in the South China Sea can actually feed – rather than ameliorate – risks of political and military confrontation, which constitutes a third worrisome trend. Asian policymakers increasingly face an environment that blurs the lines between distinctly economic and security-related activities.¹⁶ Many of the interactions that occur routinely in the South China Sea involve nongovernmental commercial entities fishing and hauling cargo, both of which are crucial to the economies of the surrounding areas. Some of these activities may

involve contested geographic boundaries but are fundamentally legal, as with Malaysian or Filipino fishing vessels or Chinese oil exploration. Yet this type of overt and nominally legal activity regularly leads to gray-zone confrontations with government entities operating in the South China Sea. China's coast guard, for example, routinely intercepts and blocks Filipino ships in contested areas from conducting otherwise innocuous resupply activity, and the two-month China-Philippines standoff over Scarborough Reef started with a Filipino law enforcement action against Chinese fishing vessels.

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Other commercial activity is unambiguously illegal, such as with Chinese oil rigs operating inside other countries' territory or narcotics and human trafficking embedded inside the Thai fishing industry. These types of illicit commercial activity can also produce confrontations between governments. In May 2015, Indonesia destroyed 41 foreign ships, including a Chinese-flagged ship, after they were caught illegally fishing in its waters, which caused China to issue a statement of "serious concern." Conflict was unlikely, but the incident ratcheted up political tensions and the Chinese reaction was much stronger than many expected. And in the largely ungoverned "tri-border" maritime area shared among the Philippines, Malaysia, and Indonesia, pirates and insurgents conducting raids or attacks in the Philippines have been known to exploit the opacity of the area to seek shelter in or launch attacks against a neighboring country.

In the South China Sea, then, it is not only increasingly difficult to separate economic issues from national security issues, but civilian actors pursuing their economic interests – whether legally or illicitly – risk forcing governments to clash.

To What End, Maritime Domain Awareness?

As these miscalculations, crises, and examples of coercion caused by regional military modernization and gray-zone ambiguity have grown, regional states have voiced a concomitant interest in maritime domain awareness capabilities. Malaysia exercises leadership in convening Southeast Asian states to discuss MDA in the South China Sea.¹⁷ Indonesia has pursued closer MDA ties with Australia.¹⁸ Vietnam has made public its interest in closer MDA cooperation with the United States.¹⁹ Washington and Manila already collaborate closely on the Philippines' Coast Watch System (CWS).²⁰ State-level demand for maritime domain awareness does not necessarily translate into regional collaboration toward that end, however.

Southeast Asian countries are eager to acquire MDA capabilities for their own security needs close to their shores but are not necessarily convinced of the utility of sharing this information with their neighbors to create a common picture of the South China Sea. This hesitation, which risks MDA efforts being seen as yet another destabilizing example of military modernization, has at least two sources. First, regional states have deep concerns about sharing information with their neighbors, including those with whom they have positive relations. Second, Southeast Asian countries have hesitations about the political ends toward which a common operating picture may be directed. If policymakers are to implement a truly collaborative MDA system in the region, they must understand and surmount both obstacles.

The first of these political hurdles is not unique to Southeast Asia. Sensitive intelligence- and information-sharing can be a challenge even among long-standing allies – after 60 years of close ties, the United States and Japan are still working to improve their intelligence-sharing. In Southeast Asia, the Philippines and Thailand have formal treaties with the United States, but these states do not have close defense ties to each other. Regional trends have encouraged new alignments, including a new partnership between the Philippines and Vietnam, but this is only a first step toward deeper defense cooperation. Even as regional states increase the frequency and nature of their military interactions, they may hesitate to share sensitive maritime information. Intelligence-sharing has a unique ability to reveal state weaknesses as well as strengths.

A second, less common political hurdle also presents itself in Southeast Asia. Regional states have complex security and economic relationships with China, and therefore to the political goals that a South China Sea common operating picture would serve. As negative trends in the South China Sea have accelerated, U.S. policymakers have searched for ways to support regional partners and are themselves increasingly interested in providing countries with MDA capabilities. Improved maritime domain awareness can give partners the ability to monitor events at sea, deter and dissuade gray-zone coercion, and may even engender deeper regional understandings if maritime information-sharing begets broader patterns of cooperation. These capabilities are appropriate for engaging all manner of regional threats and challenges. The United States' interest in supporting them, however, has an added, if unspoken, motivation: MDA can help partners deter and defend their own interests against a rising China.

U.S. policymakers do not generally articulate a China-focused aim of their MDA efforts, and this reticence is sensible for several reasons. First, publicly identifying China or its behaviors as the object of a U.S.-led regional maritime domain awareness network would contribute to a containment narrative. Second, it would obscure the fact that regional partners who seek MDA capabilities may desire maritime aware-

Improved maritime domain awareness can give partners the ability to monitor events at sea, deter and dissuade gray-zone coercion, and may even engender deeper regional understandings if maritime information-sharing begets broader patterns of cooperation.

ness for narrower and more parochial purposes, discussed below; in many instances, these purposes too align with U.S. interests. Third, while most Southeast Asian states are deeply troubled by Beijing's assertiveness in the South China Sea, they have complex relationships to China that include deep ties in other domains. It would be inimical to Malaysian or Indonesian interests to sign onto an MDA project that explicitly targeted China.

The lack of a clearly articulated, unifying political purpose for a regional maritime domain awareness network, however, means that regional states are somewhat skeptical of its merits. Beyond China's assertiveness, each state can point to other national MDA missions and would prefer to do so if asked to opine in public. States can also point to existing national or international information networks that may at least partially help to fill these needs. The political obstacles to a common and transparent picture of the South China Sea therefore require that the United States not only exercise leadership in making MDA technology available. It must also work to craft a nuanced, persuasive narrative about the political ends that the technology will serve and convince Southeast Asian states that their need for this capability outweighs their reservations about information-sharing. This, in turn, requires that the United States identify the common mission threads among claimant states and analyze the degree to which existing regional networks fill national MDA needs.

Opportunities for Collective Action: Common Mission Threads

In the absence of shared maritime domain awareness, Asia's negative security trends will continue to enhance the opacity of an already dimly lit domain and increase risks of accidents and conflict as a result. Strengthening information-sharing mechanisms in the South China Sea can ameliorate the downside risks of these trends and in some cases harness them to promote stability.

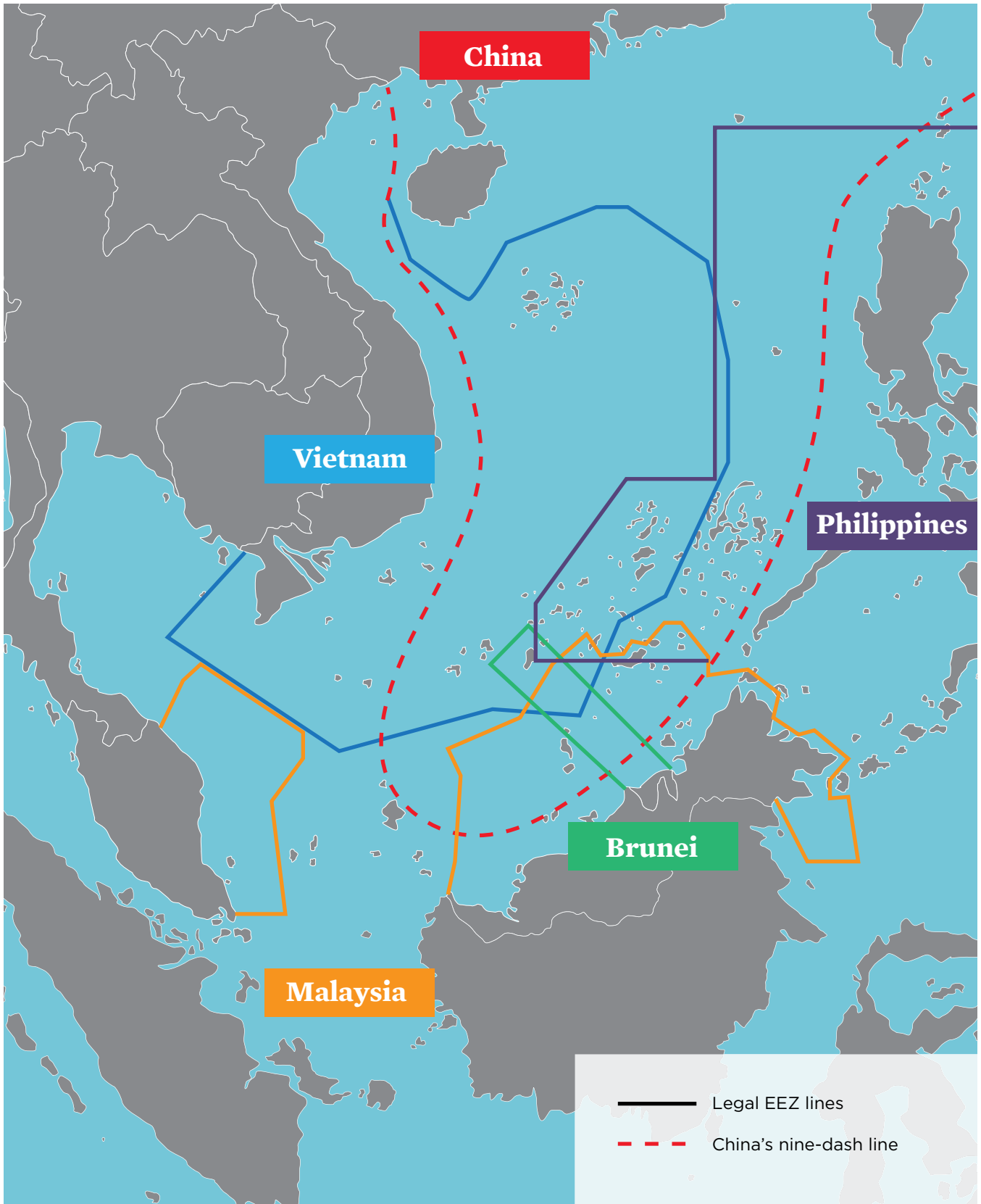
Since at least 2013, improved situational awareness in the South China Sea has been a Secretary of Defense-level priority and is central to the Department of Defense's 2015 Asia maritime security strategy. DoD's emphasis on operational transparency through surveillance and information-sharing responds to the South China Sea's emerging

strategic dilemmas in several ways. First, moving the region closer to a common operational picture of this contested space would enhance regional stability by increasing transparency, information, and communication. Second, it would help deter adventurous behavior by raising the likelihood that provocations at sea are met with appropriate responses, and it would help countries to better calibrate and coordinate their maritime and air activities. And most importantly, it would provide an impetus for more coherent and effective regional cooperation that would ultimately result in the kinds of interoperability and closer political and military ties that serve U.S. and regional interests.

In the absence of shared maritime domain awareness, Asia's negative security trends will continue to enhance the opacity of an already dimly lit domain and increase risks of accidents and conflict as a result.

At the same time, we recognize that macro-level regional trends – however problematic – are likely insufficient to catalyze collective action among maritime Southeast Asian countries. Low trust and limited maritime surveillance capacity continue to hamper information-sharing and situational awareness. Yet there are numerous collective problems beyond traditional security concerns facing maritime Southeast Asia that are exacerbated by the region's larger negative trends and that can be a basis for cooperation without needing a great deal of trust. Greater shared awareness of who is doing what and where in the South China Sea is a cross-cutting way to address multiple “mission threads” – shared motivations for operational-level cooperation. Through background research, workshops, and interviews, the Center for a New American Security (CNAS) has identified several common, potential mission threads that may form the basis for regional information-sharing in the South China Sea.

COMPETING SOUTH CHINA SEA CLAIMS



Illegal, unreported, and unregulated fishing activities are worth more than \$23 billion annually.

Illegal Fishing

The fishing industry is central to Southeast Asian economic development. The export industry for global marine products exceeds \$129 billion annually,²¹ and Southeast Asia remains the second-highest-producing fisheries subregion in the world.²² Illegal, unreported, and unregulated (IUU) fishing activities – that is, fishing without proper licensing, pursuing catches of endangered marine life, or fishing in protected areas or other states’ exclusive economic zones (EEZs) – are worth more than \$23 billion annually.²³ Although the figures vary, Indonesia alone claims annual revenue losses from illegal activities are worth \$20 billion.²⁴ For Southeast Asian governments, the billions of dollars in illegal fishing is more than lost income for registered, law-abiding fishermen; it represents uncollected tax revenue that could be used for development.

Governments across Southeast Asia have signaled an appetite to combat the epidemic of illegal fishing. In 2007, 11 Southeast Asian and Pacific Island nations – Australia, Brunei Darussalam, Cambodia, Indonesia, Malaysia, Papua New Guinea, the Philippines, Singapore, Thailand, Timor-Leste, and Vietnam – signed the Regional Plan of Action to Promote Responsible Fishing Practices (RPOA). This agreement commits governments to jointly ending IUU fishing and coordinating best practices of fisheries conservation, though most signatories face challenges with governmental capacity to monitor and enforce it.²⁵ And although it can raise the ire of neighbors, Asian states have adopted certain deterrent practices. Not only have Southeast Asian governments begun prosecuting illegal fishing crews even when hailing from other countries, but they have also started a practice of burning or blowing up the captured ships.²⁶ Thailand, Vietnam, Malaysia, Indonesia, China, and the Philippines have all either conducted these prosecutorial practices or had ships and citizens subjected to them.



The Taiwanese-flagged fishing vessel *Yu Feng* shortly before being boarded by law enforcement on suspicion of illegal fishing in 2009. (Wiki Commons)

Despite a demonstrable and collective will to curb illegal fishing, the practice remains widespread. Informational opacity in the South China Sea is part of the problem, constituting a wide area of coverage where sovereign claims to EEZs are contested and therefore difficult to monitor persistently. But maritime capacity is an issue as well. Southeast Asian states operate small navies and coast guards, yet face the challenge of tracking down the 5,000 vessels that illegally harvest fish within their EEZs each day.²⁷ With greater surveillance and interdiction capacity, Southeast Asian states may be able to drastically reduce illegal fishing, as well as the opportunities for geopolitical friction that result from it.

The Transnational Crime Complex

Beyond illegal fishing, parts of maritime Southeast Asia have shown interest in cooperation on a complex of other challenges, including nuclear nonproliferation, piracy, the narcotics trade, and human trafficking.

Working with international partners to curb and interdict illicit trafficking in nuclear materials is a shared interest of many states in Southeast Asia that rely on maritime commerce and need to maintain a reputation for competent and transparent management of territorial waters and port facilities. This rationale is part of a likely complex set of motivations for Southeast Asian states joining the Proliferation Security Initiative (PSI), which is designed to foster international cooperation to counter nuclear proliferation.²⁸

Piracy, human trafficking, and the narcotics trade are all festering problems confronting Southeast Asia.

Other nontraditional security challenges are also becoming increasingly important to the area. Piracy, human trafficking, and the narcotics trade are all festering problems confronting Southeast Asia. While substantial challenges on their own, they are made even more so because they present themselves as an interwoven set of issues that overlap with one another – and with illegal fisheries – in ways that make combating one challenge difficult to distinguish from combating them all.

The South China Sea's regional geography makes piracy an ongoing and difficult challenge. To tackle this challenge, most member states in the Association of Southeast Asian Nations (ASEAN) have joined with other interested stakeholders to form the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP), which is responsible for most of the data that the International Maritime Bureau uses to account for piracy attacks. These attacks on maritime commerce run the gamut from kidnappings to petty theft of textiles and ship parts, but the primary target in 2014 was the hijacking of tankers; the gas-oil cargo onboard can be easily siphoned and sold on the black market.²⁹

Combating the narcotics trade in Southeast Asia is a related and pre-existing common mission thread. As early as the 1976 ASEAN Declaration of Principles to Combat the Abuse of Narcotics Drugs, ASEAN governments have shared a consensus to cooperate against the drug trafficking that flourishes in the porous maritime borders in and around the South China Sea, particularly in Myanmar and Laos inside the “Golden Triangle.”³⁰ In subsequent decades, ASEAN has convened regular meetings to address narcotics coordination among ministers and chiefs of police, which demonstrates a political will to at least address the issue. Regional coordination of national policing and enforcement efforts has resulted in an average of 50,000 arrests per year in the region. Nevertheless, the value of illegal drugs consumed in East and Southeast Asia in 2011 still reached \$31.3 billion, implying the problem is far from resolved.³¹

Human trafficking in Southeast Asia, which overlaps to a great degree with the fisheries problem, is emblematic of the difficulty in separating combating one nontraditional security challenge from another. International human rights nongovernmental organizations (NGOs) and the U.S. State Department have identified Southeast Asian countries such as Thailand as hotbeds for trafficking activity that presses individuals into sexual slavery, but less well-known is the prevalence of “sea slaves” in Southeast Asia: the practice of forced labor at sea to support IUU fishing and other illicit activities that require maritime transit. On some occasions, low-income laborers are tricked into joining a maritime crew when they are in fact being sold into slavery. In other instances, entire communities of desperate, displaced

migrants are offered passage out of oppression only to be stripped of any legal identity and pressed into unpaid labor at sea. The Rohingya, a community long displaced by an ethnic war with the military junta in Myanmar, have faced this problem en masse.

Fortunately, human trafficking too is a problem Southeast Asian governments are at least rhetorically committed to correcting. For example, Thailand – one of the region’s worst human rights violators – has acknowledged its marred international standing and has pledged to work with others to end the “sea slave” trade.

These nontraditional security challenges all share several features: They affect multiple Southeast Asian nations; they are facilitated by the opacity of the South China Sea and the porousness of overlapping borders in maritime Southeast Asia; and they are issues for which political-level recognition and commitments to address the problems have already been publicly declared.

Human trafficking in Southeast Asia is emblematic of the difficulty in separating one nontraditional security challenge from another.

Humanitarian Assistance and Disaster Relief (HA/DR)

Mitigating threats and combating transnational crime are not the only bases for multilateral cooperation in Southeast Asia. Governments have also demonstrated the strongest cooperation consensus on an area of common interest that is not cast in threatening security terms: alleviating human suffering and the destruction of government capacity by natural disasters. HA/DR is a cooperative mission thread on which all Southeast Asian governments agree. Natural disasters, which disrupt social and economic life, afflict every ASEAN government. When national governments are not able to respond quickly enough to relieve post-disaster suffering, the legitimacy of political elites is challenged, making HA/DR that rare issue that is at once a national public good, an international public good, and a domestic political expedient. It is, perhaps, the safest of issues on which to cooperate regionally. This may explain the commitment that ASEAN has made to the issue, standing up the ASEAN Coordinating Centre for Humanitarian Assistance (AHA Centre), which trades in HA/DR best practices and supports capacity-building efforts for Southeast Asian governments to become more resilient to natural calamities.

03 CHAPTER

Information-Sharing Capacity for the South China Sea

III. Information-Sharing Capacity for the South China Sea

Any project to enhance South China Sea maritime domain awareness starts from a solid baseline; Southeast Asian governments own some capabilities and participate in local information-sharing networks that may lend themselves to a more integrated picture of South China Sea activity. Regional states vary substantially in the intelligence, surveillance, and reconnaissance (ISR) assets they possess, as well as those they desire, and this may inform the degree to which they are able to contribute to and draw from collaborative MDA efforts. There are also several functional but incomplete multinational platforms in the region, some of which may have a role to play in an integrated MDA picture, but all of which are decidedly limited in their scope at present.

Asia's ISR Gap

Many countries in the region face an ISR “gap” – a shortfall between their actual and desired capability for maritime domain awareness. Perhaps counterintuitively, this gap is in large part a product of the new surveillance opportunities enabled by information technology. Seafaring nations have always had limited awareness of what was over the horizon, but modern technology now holds the potential for greater awareness than ever before. To achieve this, however, nations must invest in various surveillance assets – drones, satellites, radars, or other collection tools – along with the analytic backbone to process and make sense of this information. Drones in particular have dramatically lowered the cost of persistent surveillance, making previously unimaginable levels of continuous situational awareness now reasonably affordable for many nations. Space-based surveillance is similarly poised on the brink of a new revolution in low-cost satellites capable of delivering imagery and resilient communications. Regional countries are pursuing a number of investments to increase their ISR capacity, building off of a baseline foundation of open-source tracking systems. Even as nations, including the United States, continue to invest in additional surveillance capacity, the gap between their actual and desired capability is likely to persist. It may even grow as the appetite for awareness and the opportunities enabled by technology increase.

Open-Source Tracking Systems

All countries worldwide have access to two open-source public tracking systems, one specific to ships and one to aircraft. The automatic identification system (AIS) is a ship-based transponder that broadcasts a ship's name, position, heading, and speed. AIS data is accessible directly via VHF radio to an AIS receiver or can be accessed on the Internet.³² When ships are outside of radio range, AIS signals can be picked up via satellite. Aircraft are transitioning to an analogous transponder-based system, the automatic dependent surveillance–broadcast (ADS-B) system, which transmits an aircraft's location, altitude, heading, and speed via satellite. ADS-B will be mandatory for most aircraft by 2020.³³

Many countries in the region face an ISR “gap” – a shortfall between their actual and desired capability for maritime domain awareness.

While AIS and ADS-B are valuable publicly available tools, they establish only an initial baseline for situational awareness. They



AIS transponder data, especially when combined with other sensor platforms like radar systems, provide crucial information for maritime domain awareness. Here, the New York Harbor's Vessel Traffic Center monitors port traffic. (Wikipedia)

do not in and of themselves achieve sufficient domain awareness. Since both AIS and ADS-B require ships and aircraft to activate transponders to opt into the network, actors wishing to avoid detection can choose not to use these systems to broadcast their position. In order to detect actors not using AIS or ADS-B, other methods such as radars, ships, surveillance aircraft, or satellites are required.

Existing ISR Capabilities

All nations in the region have some capacity for maritime surveillance, although every country desires more. The below table, adapted from IHS Jane’s, shows the current and desired ISR capabilities for a number of countries in the region.³⁴

	Maritime Patrol and Reconnaissance		Airborne Early Warning		Electronic Warfare and Signals Intelligence		Reconnaissance	
	EXISTING	GREATER DESIRED	EXISTING	GREATER DESIRED	EXISTING	GREATER DESIRED	EXISTING	GREATER DESIRED
Australia	■	■	■				■	■
India	■	■	■	■	■	■	■	■
Indonesia	■	■		■	■			■
Japan	■		■		■		■	■
Malaysia	■	■		■			■	■
Philippines	■							■
Singapore	■		■		■		■	■
South Korea	■	■	■	■	■		■	■
Vietnam	■	■						■

Planned Investments

Countries in the region are pursuing a number of investments in order to expand their ISR capabilities. Several nations are investing in maritime patrol and reconnaissance aircraft, such as the P-3 Orion, P-8 Poseidon, or the unmanned MQ-4 Triton. Australia and India each plan to purchase eight P-8s, with the option to buy four additional aircraft.³⁵ Australia also has indicated it will purchase MQ-4s, although the total number is not yet finalized.³⁶ India has expressed interest in either the MQ-4 or the related RQ-4 Global Hawk.³⁷

Several additional countries are also investing in high-end reconnaissance drones, capitalizing on the revolution in uninhabited aircraft. South Korea is buying four RQ-4 Global Hawks and Japan plans on buying three.³⁸ Both the RQ-4 and MQ-4 are notable for their extreme endurance, on the order of 24 to 30 hours; large payload capacity; high altitude (allowing coverage over a wide area); and range. The RQ-4 and MQ-4 can carry a range of sensors, including electro-optical, infrared, radar, and signals intelligence.³⁹ They can also be equipped with communications relay payloads, allowing them to relay data among aircraft, ships, and ground stations. The

Countries in the region are pursuing a number of investments in order to expand their ISR capabilities.

aircraft are costly, however, at well over \$100 million apiece. In addition, because of their payload and range, they qualify as Category I systems under the Missile Technology Control Regime (MTCR), which limits their export.⁴⁰ With the goal of limiting missile proliferation, MTCR members, which include most advanced militaries, agree to a “strong presumption of denial” when faced with export requests for any missiles, UAVs, or space-launch vehicles that qualify as Category I systems.⁴¹

The uninhabited-aircraft ecosystem, however, is diverse and includes a range of smaller, shorter-range, and more affordable systems, both on the global market and indigenous to various countries. Israel continues to dominate the global drone market and has sold to a number of countries in the region, including Indonesia, Singapore, and Vietnam. Nearly every country is also developing some indigenous drone capacity, although indigenous drones are usually smaller and less capable, at least initially.⁴² These drones will range from larger, medium-altitude land-based systems similar to the U.S. MQ-9 Reaper drone to smaller, ship-based systems like the U.S. ScanEagle.

Medium-altitude land-based drones can serve a wide variety of functions for countries beyond simply maritime domain awareness, including border surveillance, search and rescue, humanitarian and disaster relief, and national security, making them an attractive investment. Ship-based drones, which are generally smaller and cost less, can also provide a valuable way for vessels to put “eyes on” a situation remotely at lower cost and lower risk than a manned helicopter, all while maintaining persistent surveillance for longer durations. For these reasons, small and mid-sized drones are likely to contribute most to the expansion of ISR capacity in the coming decade.

Space-Based Surveillance

Just as investments in uninhabited aircraft have been enabled by lower costs and improved technology, the satellite industry may be poised for a revolution in lower-cost access to space. Companies such as Skybox Imaging and Planet Labs are capitalizing on the democratization of geospatial information due to less expensive, small satellites and offering high-quality commercial satellite imaging.⁴³ In addition, the invention of reusable rockets has the potential to dramatically lower the cost per pound of putting satellites into orbit, ushering in a new revolution in satellite use.⁴⁴ Many countries in the region, including India, Indonesia, Japan, Malaysia, Singapore, South Korea, and Vietnam, already have government/military surveillance satellites, but lower-cost space access could expand their capabilities and the number of space-faring countries.⁴⁵

Insatiable Demand for Information

Over the past 15 years, the U.S. military has dramatically expanded its ISR capability and capacity, driven in large part by the urgent needs of the wars in Iraq and Afghanistan. U.S. defense planners have grappled with a seemingly insatiable demand, however, for more information. Even as ISR capacity has increased, most notably with the addition of thousands of drones, military commanders’ interest in and demand for ISR have increased even further.

Today, despite massive investments, ISR remains a critical capability gap for U.S. military commanders. In their 2015 posture statements to Congress, both the U.S. Central Command (CENTCOM) and U.S. Pacific Command (PACOM) commanders noted



Inexpensive, small satellites (or “cube sats”) are lowering the cost of geospatial information by offering high-quality commercial imaging. Here, Planet Labs cube sats are launched from the International Space Station. (Wiki Commons)

shortfalls in ISR capacity.⁴⁶ Their statements are particularly notable because CENTCOM and PACOM generally are the highest-priority commands for resourcing. Between the two of them, they are likely getting the lion’s share of U.S. military ISR assets. Yet gaps still remain.

Military commanders can never have complete information about what is happening on the battlefield. Countries can never have total awareness about what is happening in their maritime domains. However, technology is increasing the opportunities available to countries to enhance their maritime domain awareness. As opportunity increases, interest and expectations rise commensurately. Greater domain awareness is vital for a range of critical national and regional issues, and countries will continue investing in ISR capabilities, hoping to close the ISR gap.

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A Patchwork of Maritime Domain Awareness

Beyond these national ISR capabilities, the Asia-Pacific region has already invested in several multilateral information-sharing structures. These include limited-scope maritime domain awareness efforts, some of which could play a role in enhancing the overall operational transparency of the South China Sea. At present, however, there are barriers to unity among these existing structures. Most are limited by their technical capacity, the political rules governing their use, or both.

Information Fusion Centre

Singapore's Information Fusion Centre (IFC) is among the most mature operational information-sharing systems in the Asia-Pacific region. The IFC has expanded over the last several years to cover other international law enforcement issues such as fishery crimes and maritime terrorism.⁴⁷ Its Open and Analysed Shipping Information System (OASIS) combines vessel information from multiple commercial tracking platforms, and it stores this information for over a million ships.

Organizationally, the IFC was established through the implementation of overlapping memorandums of understanding (MOUs) to combat piracy. Most of the IFC's 23 participants have dedicated an on-site liaison officer to the endeavor. While it is inclusive in its membership and wide in geographic scope, the IFC's operational jurisdiction is functionally narrow. The Centre expressly excludes all interstate issues from its purview. At its founding, the IFC's OASIS software did not provide for its members to share the locations of coast guard or naval vessels, even voluntarily. And its primary reliance on human liaison officers to relay real-time information manually from national commands to the IFC is not only slow and inefficient; it creates single-nodal points of failure or bottlenecks for information-sharing.

MALSINDO Patrols

The Malacca Straits Sea Patrols, also called MALSINDO or the Trilateral Coordinated Patrols, are a geographically narrow but operationally deep exercise in shared maritime domain awareness. Beginning in 2004, Indonesia, Malaysia, and Singapore started building the foundation for what would be-

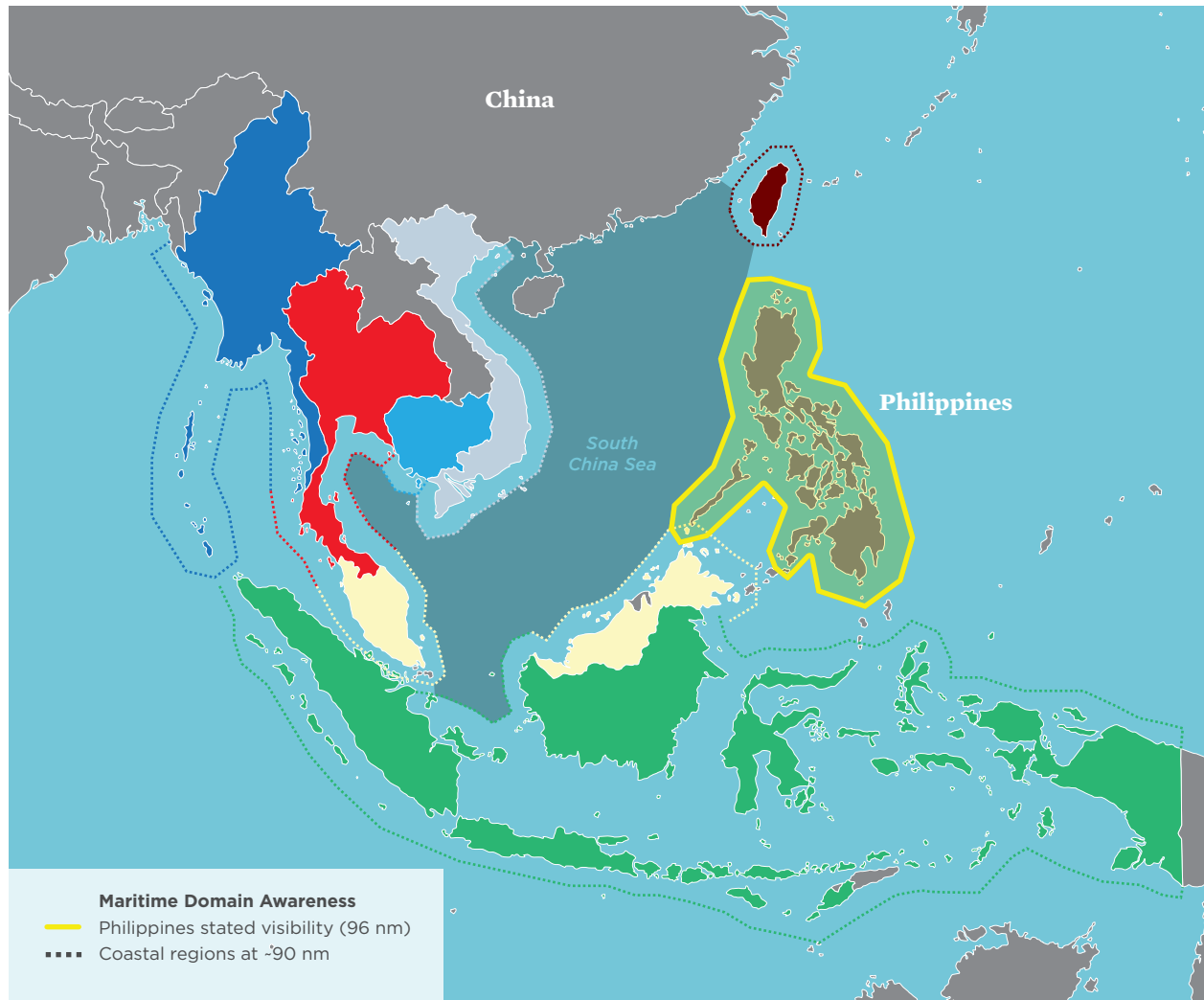
come a sophisticated operational information-sharing system. With a simple platform and constrained geographic scope, MALSINDO has iteratively added technical capabilities over time. The resulting system has been successful, contributing to a large reduction in piracy in the Malacca Strait, through which flows a quarter of global commerce and half of all oil shipments.⁴⁸ Piracy rates have fallen from 38 attacks in 2004 to an average of zero to two attacks annually.⁴⁹ Like the IFC, the MALSINDO Patrols rely on information-sharing – but on a much more localized scale.

Though MALSINDO began as an effort to deconflict patrol routes, it has evolved over time to include real-time location-sharing of both ships and aircraft, integrated aerial surveillance, an intelligence exchange system, and an information technology platform that coordinates these inputs. Despite its growing capability and success in thwarting piracy, MALSINDO patrols occur only infrequently, hindered on all sides by limited capacity to commit naval assets. The tendency of each nation, moreover, is to conduct patrols in limited areas near its own coasts but not the coasts of the other participant nations, which constrains the ability to expand or build on MALSINDO patrol success.

AHA Centre

The ASEAN Coordinating Centre for Humanitarian Assistance, or AHA Centre, was founded in 2011 by 10 ASEAN member-states after a series of disasters demonstrated the need for multilateral humanitarian assistance capabilities. The organization has focused on missions that are logistically complex and has sought to develop a stockpile of relief supplies as well as the relationships and transportation plans to distribute them.⁵⁰ While managing these complex supply chain coordination issues across national boundaries is an impressive goal, the AHA Centre suffers from insufficiently integrated operational and distribution capabilities across national boundaries.⁵¹ Most importantly, the AHA Centre does not trade in the real-time, continuously updated operational information that matters most for maintaining a regional-level awareness of activities across the South China Sea.

MARITIME DOMAIN AWARENESS IN THE SOUTH CHINA SEA



National Networks

In addition to these multilateral efforts, the Asia-Pacific region is also host to a number of nascent national maritime domain awareness networks. Among the most notable are India's Information Management and Analysis Centre (IMAC)⁵² and the Philippines' Coast Watch System.⁵³ Each of these was built with U.S. assistance or technology, is composed of dozens of disparate radar and sensor networks, and could potentially play a large role in any future regional common operating picture. Like the multilateral efforts discussed above, however, these systems still face significant technical and political constraints. The CWS, for example, was caught off guard in June 2015 when it failed to detect two intrusion incidents; one involved a Taiwanese standoff with the Philippines' coast guard and the other was a Chinese military exercise in the Phil-

ippines' EEZ.⁵⁴ National-level platforms – even the IMAC and CWS – are still in an embryonic phase, facing capacity challenges, and so strongly focused on their home coastlines that they may be difficult to reorient toward a regionally oriented architecture.

Military officials have stated that CWS gives the Philippines visibility 96 nautical miles from its shores. The map above depicts the extent of maritime domain awareness coverage the Philippines receives from this system. As illustrated here, even if other coastal states abutting the South China Sea install similar national systems, their ability to monitor this vast swath of ocean unilaterally or collectively would still be quite limited. The central part of the South China Sea would remain a situational awareness vacuum. To improve this picture, the region must move toward a multilateral, networked picture.

04 CHAPTER

The Process Elements of Maritime Awareness

IV. The Process Elements of Maritime Awareness

The South China Sea's patchwork of maritime awareness capacity already contains nascent capabilities and process norms needed to build a robust, regional architecture for maritime awareness. The tasks that remain are to generate more and better overall information coverage and to forge a shared, networked picture of activities and assets operating in the South China Sea. Such a "common operational picture" can serve many purposes and take many forms. But regardless of form or function, all manifestations of maritime domain awareness involve three process elements: data collection, data analysis, and information distribution via visual display. Maritime domain awareness fundamentally depends on and functions as an information-sharing regime among participating actors, guided by three questions. What sources of data will feed the display? Who or what will analyze and fuse the data for the display, and how? And who has what level(s) of access to the display?

Data Collection

The information inputs for a process of visualizing activities and assets in the South China Sea can, in principle, come from anywhere. Private firms such as Spire, FedEx, and FlightAware, for whom maritime awareness is crucial for business operations, draw on publicly available tracking data for aircraft and shipping vessels.⁵⁵ For U.S. military commanders, most information for a COP traditionally comes from cooperative and noncooperative sources: U.S. and allied units in the field "pushing" information updates to military commands, and ISR assets "pulling" information from various types of signals and images by using high-technology sensors. "Pushed" information is cooperative, voluntarily shared information (e.g., self-reported situational updates), while "pulled" information refers to information collected uncooperatively or surreptitiously (e.g., intelligence collection). These are the principal sources of raw data used to populate visual displays that provide situational awareness in support of decisionmaking. The sensitive sources and methods of collection used – especially when conducted by ISR assets – often necessitate high classification levels. The apparent need for classification imposes constraints on the

ability to share the data collected, which logically limits who gets access to it. This dynamic creates room for information asymmetries, misunderstandings, and misaligned perceptions, not only within the U.S. government, but between the United States and its network of allies and partners.⁵⁶

Data Analysis

Once raw data has been collected, it must be integrated with other data, interpreted, and assigned meaning. This process of analysis can occur manually through tradecraft conducted by analysts or automatically through algorithms that detect patterns and assign meaning based on programmed rule sets.

The former, analytic tradecraft, tends to be subject-specific expertise, methods, and software applications honed through investments in training and expertise-building. Experienced, well-trained analysts can be very powerful but suffer from two major drawbacks: high human capital investments and limited bandwidth. Illustrating the former, each military service trains and equips a cadre of professional intelligence analysts for up to two years before designating them operationally ready. The latter, limited bandwidth, is becoming more of a problem as advanced ISR technology has enabled more data collection than human

Regardless of form or function, all manifestations of maritime domain awareness involve three process elements: data collection, data analysis, and information distribution via visual display.

analysts can process. U.S. Air Force leaders, for example, claim the amount of ISR video data the U.S. Air Force collects in a single day is "the equivalent of a football season's worth of footage."⁵⁷

Given the large supply of potentially available data, automated analysis is a necessary and promising supplement to human-based analysis. Nongovern-

mental actors have made noteworthy strides developing algorithms that look for meaningful patterns in large masses of data that human analysts and decisionmakers then interpret and act on. Global Fishing Watch, funded by Google, has developed an algorithm that uses publicly available data from ships – Automatic Identification System and Vessel Monitoring System (VMS) data systems – and compares it to ship tracks detected by satellite radar systems to deduce who might be fishing within banned “no-take” zones or restricted fishing preserves. Commercial firms such as Spire have combined proprietary algorithms that use AIS, VMS, and other publicly available data with deployed miniature satellites and a large number of ground stations to provide accurate depictions of global sea lines of communication used for commercial shipping.

Information Distribution

The final element in an information-sharing regime focused on maritime domain awareness is information distribution – who gets access to the information that has been assigned meaning, whether by human analysts or algorithmic processes. As much as any of the high-technology collection sensors, it is the distribution network that makes the COP such a powerful decisionmaking aid for the U.S. military and coalition partners. The two most common, and logical, criticisms of attempts to expand maritime domain awareness among a group of actors are the constraints on the ability to distribute information – namely political mistrust and technological incompatibility. Both constraints on information-sharing in the maritime domain are overstated.

Trust – in the form of political will to share information collected using sensitive sources or methods – is a widely recognized constraint on information-sharing among governments.⁵⁸ But, as described above, many forms of information-sharing do not require any kind of trust or vulnerability in order to take place. And gone are the days when only governments had the capacity or authority to collect and share information; maritime domain awareness in particular has become a commercial and philanthropic endeavor,⁵⁹ making certain types of information-sharing possible even if governments choose not to cooperate.

Another constraint on information-sharing is technological: interoperability of hardware and software across participants in a regime. Not all governments operate facilities, systems, or personnel capable of receiving and processing high-resolution, streaming video feeds from a Global Hawk or the exploited collection from synthetic aperture radar sensors on U.S. surveillance aircraft. Yet commercial software and globally recognizable programming languages already facilitate information-sharing across legal and political boundaries. Corporations and NGOs concerned with domain awareness typically use a common file format through which disparate sources of data get presented on a common display through Keyhole Markup Language (KML) – which is also used for Google Maps and Google Earth – or a comparable programming language that overlays data onto map displays, making it highly cost-effective.

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Even at the intergovernmental level, classified and unclassified technological solutions have been in use with select U.S. allies and partners for years. At the unclassified level, DoD has employed a software application called the Unclassified Information Sharing/All Partners Access Network (UIS/APAN) that facilitates Web-based chat and information transfers without requiring access to DoD computer networks or hardware. UIS/APAN has been used during contingencies to coordinate information from NGOs, and foreign governments are routinely granted access to it for both HA/DR crises and military exercise coordination. UIS/APAN was, for example, the primary network for multilateral coordination of humanitarian assistance operations in the wake of 2013’s Typhoon Haiyan, which ravaged the Philippines, as well as for coordinating HA/DR information trilaterally among the United States, Japan, and South Korea.⁶⁰ UIS/APAN was also the conduit by which China was able to participate for the first time ever in part of the annual Rim of the Pacific (RIMPAC) military exercise in 2014.⁶¹

Whereas other RIMPAC participants had access to a common classified information network to coordinate exercise information, DoD would not grant China access to that system; UIS/APAN allowed China to participate despite the security limitation.⁶²

At the classified level, a system called the Combined Enterprise Regional Information Exchange System (CENTRIXS) has been used with trusted U.S. allies and partners from Australia to Afghanistan to support a common situational awareness display using information derived from classified sources. CENTRIXS has proved crucial to operations requiring command and control across multinational coalitions, which is why U.S. Pacific Command deployed it during the 2012 RIMPAC exercise to facilitate operational information exchanges among 22 national militaries.⁶³

05 CHAPTER

Three Models of Maritime Awareness

V. Three Models of Maritime Awareness

These process elements – data collection, data analysis, and information distribution – can be used to build a common operational picture of different depths and characters. The basic vision of shared, continuous, near-real-time awareness of the South China Sea via visual displays of information, which is technologically possible today but cost-prohibitive, consists of at least three layered pictures or models: open access, participatory access, and exclusive access. As captured in the table below, one can conceptualize each of these pictures of activity as “layers” of situational awareness because they complement one another, but also have distinct limitations; a complete picture of activity is only possible with all “layers” combined.

There are relative cost-benefit tradeoffs in pursuing each of these layered pictures of maritime awareness. Although discussed in greater detail below, a comparison rendered in terms of projected Maritime Security Initiative (MSI) funding (roughly \$425 million over 10 years) illustrates the point. An exclusive-access layer, for example, may be the most reliable and actionable maritime awareness solution, but it could not be established for even a single Southeast Asian military at the cost of \$425 million, given the cost of ISR platforms. By contrast, an imperfect open-access layer of maritime awareness could be constructed for the cost of building a Web-based application, on the order of \$5 million to \$10 million. For the price of less than half of MSI funding, the United States could equip more than 400,000 fishing vessels with VMS transponders, dramatically increasing open-access visibility.⁶⁴ And for less than 1 percent of MSI funding (roughly \$3 million), the United States could construct a participatory-access picture to promote information-sharing across regional partners. Enhancing ISR capacity in Southeast Asia is crucial, but for less than two-thirds of MSI funding, the United States could make huge strides in promoting regional information-sharing and increasing South China Sea transparency.

INFORMATION-SHARING LAYERS OF DOMAIN AWARENESS FOR THE SOUTH CHINA SEA

	Open Access	Participatory Access	Exclusive Access
Main Info Sources	Cooperative – VMS, AIS, ADS-B, transponders	Cooperative – unclassified info at participant’s discretion	Noncooperative – electronic and acoustic signals collection, intelligence reporting
Purpose/Mission Thread	Fisheries protection, open commerce, select transnational crime	Humanitarian assistance/disaster relief, countering proliferation, ad hoc operations	“Kill chain” operations, interdictions, conflict indicators and warning
Distribution Network	Governments, firms, and individuals	Governments	Select allies/partners; situation-dependent
Drawbacks	Limited scope, limited actionability, questionable reliability	Questionable reliability, limited to unclassified information	Expensive, limited distribution/effect, not persistent

Open-Access Domain Awareness

An open-access layer of information-sharing for the South China Sea would deliver situational awareness via Web-based maps and mobile applications. The principal data sources (inputs) are publicly available – AIS, VMS, ADS-B, and aircraft transponders, supplemented by commercial satellite imagery. The visual feed of information (outputs) would also be a public good; governments, commercial firms, NGOs, and individual fishermen would all be potential users of an open-access layer. At this level of information-sharing, concerns about free-riding – that is, participants consuming but not contributing information – are mooted by the fact that free-riding means that users will share a common baseline picture of what is happening where in the South China Sea. There is value in everyone’s sharing the same foundational picture of activities in the South China Sea, and that picture does not inherently require contributions from participating consumers. In an open-access information-sharing regime, therefore, free-riding goes from being a liability to being an asset; from a stubborn barrier of cooperation to a mechanism for reducing miscalculation, accidents, and operational uncertainty.

Variations on the open-access layer already exist. The company FlightAware tracks and makes publicly available near-real-time transmissions from aircraft. The Sea Around Us, a project of The Pew Charitable Trusts, employs its own version of a COP that helps monitor illegal fishing around Palau and Easter Island, off the coast of Chile, with little more than VMS and AIS data.⁶⁵ And as discussed above, SkyTruth uses an algorithm that identifies suspicious vessels based on their non-use of VMS and AIS transmissions.

But an open-access layer, despite its benefits to maritime commerce and having successfully cracked down on illegal fishing in specific instances, has serious limitations. First, while the above examples are proofs of concept for an open-access layer information-sharing regime for the South China Sea, they also show disunity of effort. One organization is tracking air activity, another sea-based activity, and a third is providing sporadic direct support to law enforcement but on the geographic fringe of the Asia-Pacific rather than

the South China Sea. Most importantly, nobody is integrating all of these independent insights into something more holistic and coherent.

A domain awareness model that relies on only publicly available data – even if cleverly analyzed – will be better suited to some purposes than others.

Second, a domain awareness model that relies on only publicly available data – even if cleverly analyzed – will be better suited to some purposes than others. While an open-access layer may help combat illegal fishing and some forms of transnational crime, other crucial missions may require information collected from noncooperative sources. Moreover, by virtue of data sources, an open-access layer is uniquely vulnerable to deception and evasion by lawbreakers.

Third, the greatest value-add of an open-access information-sharing regime may well be “big data” analysis – pattern recognition in large masses of data – but the insights generated by this method may not always operate on timescales that are actionable for law enforcement or other government agencies. Big-data analysis usually requires aggregating information from past events over time, which may then allow governments to employ law enforcement or the military more efficiently, to take action to disrupt what proves to be a trend based on historical evidence rather than caprice, bureaucratic inertia, or unsubstantiated theories about what works. But any discrete instance of a threatened vessel or illegal fishing, for example, requires real-time information best derived from ISR systems.

Participatory-Access Domain Awareness

A middle layer of domain awareness for the South China Sea would effectively serve as a latent information-sharing network that can be activated to facilitate cooperation when and where necessary. It would ideally operate as a Web-based platform using software that allows a common visual display of mostly unclassified information to be shared among governments. This participatory-access layer sources its information from participating governments, which can upload information anonymously or with attribution. The advantage of an anonymous upload capability is that countries can share information without the domestic political risk of being seen as cooperating with an unfriendly neighboring country. By contrast, the advantage of attributed information-sharing is that reputations for cooperative or uncooperative behavior will accrue over time as users observe the sharing track record of others; a reputational system that functions in this way incentivizes sharing. The shared technology and ability for participants to push and pull information at will offers two other benefits that make it operationally realistic. The first is that it uniquely empowers the information users, who have total control over the type and extent of information they choose to share. The second is that it allows each government to continue operating its own ISR collection platforms, sensors, and hardware. This latter innovation makes it a highly adaptable, inexpensive solution that – through its diversity of indigenous data – potentially provides a richer picture of the South China Sea.

A successful model of this type of domain awareness layer can be found at the Joint Interagency Task Force (JIATF)-South in U.S. Southern Command (SOUTHCOM). What started out as a pilot program called Cooperative Situational Information Integration (CSII) to enable Western Hemisphere partners to help the United States combat drug trafficking and organized crime now consists of a robust information-sharing regime among 14 Latin American countries and the United States. CSII is an unclassified, nonproprietary software program that facilitates information-sharing among Latin American governments using a Google Map background to display and track activities of interest that cross sovereign borders. Each government operates its own radars, coastal patrols,

and maritime surveillance systems. As a default, none of the nationally collected information is shared. Instead, each government decides when and what to share with neighboring governments, and CSII allows each to do it anonymously.

Several governments within the CSII information-sharing scheme are generally unfriendly toward one another, yet CSII has become a low-cost (around \$3 million) virtual bridge among nations that facilitates regional cooperation even beyond the original counternarcotics mission. As of this writing, SOUTHCOM aims to make CSII part of a larger and more enduring Regional Domain Awareness (RDA) initiative, but the Joint Staff has yet to validate the requirement that would make it a DoD program of record.

The advantage of attributed information-sharing is that reputations for cooperative or uncooperative behavior will accrue over time as users observe the sharing track record of others; a reputational system that functions in this way incentivizes sharing.

For all its promise, a participatory-access layer of domain awareness is also an incomplete solution. The chief limitation is the scope of participation: Government users are important, but much of the activity in the South China Sea is commercial, and interstate friction tends to originate with the illicit or misunderstood actions of individuals, not governments. A participatory-access layer is also of questionable reliability. The extent and quality of situational awareness will depend greatly on the willingness of participating governments to share, which raises classical concerns with free-riding if the sharing is allowed to occur anonymously. And because a participatory-access layer is limited to unclassified information, governments may be constrained from sharing information they deem sensitive.

Exclusive-Access Domain Awareness

The exclusive-access domain awareness layer is the traditional military conception of a COP involving high-technology sensor-based intelligence collection and battlefield awareness for precision operations. It functions by the same process as other domain awareness layers – collection, analysis, and distribution via visual display – but the data are typically collected using sensitive technical means shared only on classified government systems.

The prevalence of exclusive-access domain awareness cases involving the United States is a statement of its potential utility. In Afghanistan, CENTRIXS became the targeting and situational awareness backbone for coalition operations in Afghanistan to share classified information with 48 nations fighting alongside the United States. The U.S.-South Korea alliance operates a tightly integrated bilateral warfighting command that shares and fuses nationally collected information from nationally owned ISR assets to form a single picture of the delicate military balance on the Korean Peninsula. With less of a warfighting emphasis, the United States also operates an exclusive-access domain awareness layer with Australia and Japan. These are trusted U.S. allies that operate largely interoperable military equipment and with whom the United States routinely conducts military exercises and real-world operations. Commanders and operators rely on an exclusive-access layer for timely and—to the extent possible—precise information with which to conduct targeted strikes, maneuver forces, adapt to adversary movements, or refine collection priorities.

Nevertheless, exclusive-access domain awareness is highly problematic for a number of reasons. First, the enormous cost associated with collecting noncooperative information from sensors and satellites makes it prohibitively expensive for even most advanced industrial nations. In the 10-year period after September 11, 2001, DoD spent \$67 billion on ISR programs,⁶⁶ yet ISR demand today still far outpaces available capability.⁶⁷ The cost of a single Global Hawk UAV exceeds \$200 million, and that excludes the expenses for maintenance and the processing, exploitation, and dissemination (PED) of intelligence it collects.⁶⁸

Second, the necessary tradeoff for exquisite precision intelligence collection is limited breadth or persistence. Whereas an open-access layer casts a wide geographic net of information collection without additional cost or effort, ISR collection – much of which comes from ships and aircraft equipped with collection sensors – must be narrowly targeted in, over, or around the site of collection. The SPY-1D radar, for example, found on many U.S. Navy ships, as well as Japan's newest Atago-class destroyer, can track up to 200 contacts within a maximum range of 175 nautical miles, and track sea-skimming vessels up to only 45 nautical miles.⁶⁹ Most ISR operates in this way, with limited capability requiring forethought about positioning it for maximum effect, and ultimately trading off its availability among competing priorities (in the Strait of Hormuz versus the South China Sea, for instance).

The necessary tradeoff for exquisite precision intelligence collection is limited breadth or persistence.

Finally, the highly exclusionary nature of an exclusive-access layer – distributing information only among key allies and partners on classified, interoperable hardware – limits the potential value of the information collected. If another country does not operate interoperable classified hardware – CENTRIXS, for example – then it will be deprived of information that may be of greater use to it or the region than to the United States alone. An exclusive-access layer of maritime awareness also presumes that partner governments will be able to take action based on information received, but they may lack both the analytical capacity to derive actionable insights from intelligence collection and the operational capacity by military or law enforcement to take action in a timely manner.

06 CHAPTER

Strategies for Improving South China Sea Situational Awareness

VI. Strategies for Improving South China Sea Situational Awareness

Enhancing the operational transparency of the South China Sea is a complex task with no single or obvious solution. How should the United States go about expanding the circle of access to situational awareness information while increasing the volume and quality of operational information available as well? As underscored in the previous section, each layer of maritime awareness has unique data collection and information distribution requirements. Accordingly, the types of effort and expense needed to

enhance one layer may be different from – and even potentially rob the available resources from – another layer. This section therefore considers multiple approaches to building enhanced maritime domain awareness for the South China Sea, recognizing that no singular approach is going to be sufficient and that policymakers may need different options at different times, given political or budgetary constraints.

CONSTRUCTING A COMMON OPERATIONAL PICTURE OF THE SOUTH CHINA SEA: FOUR APPROACHES

Type of Approach	What It Entails	Key Stakeholders	Rough U.S. Cost	Types of Domain Awareness	Limitations
Concert of Stakeholders	Work with external stakeholders to coordinate maritime awareness efforts; jointly establish collection and capability requirements for different countries	Australia, India, Japan, South Korea, and possibly NATO members	Medium	Participatory and Exclusive Access	Difficult to coordinate; requires subordinating defense industry competition for the SE Asian market; Chinese opposition
Hub-and-Spoke 2.0	U.S.-centered model of collecting and distributing info; U.S. capacity-building	Select U.S. allies/partners	High	Participatory and Exclusive Access	Extremely high cost and commitment from the U.S., making it unsustainable long-term; limited network of info-sharing to only trusted partners; perceptions of containing China
Institutional Bridging	Brokering info-sharing arrangements among existing maritime awareness architectures in the region	Information Fusion Centre, CWS, IMAC, National Maritime Security Information Centre (NMIC), MALSINDO/Eyes in the Sky	Low	Open and Participatory Access	Some ASEAN members do not want to build up the IFC; does little to address capacity issues
Inclusive Access	Expanding maritime awareness through regional institutions and private-sector partnerships	International Maritime Organization, Asia-Pacific Fishery Commission, NGOs, private firms, possibly China	Low	Open Access	Lowest-common-denominator approach; cannot address high-end precision info needs; most vulnerable to deception/spoofing

Concert of External Powers Approach

The United States is not the only external power interested in South China Sea transparency or in improving the maritime security capacity of ASEAN nations. Several U.S. allies and partners – Australia, India, Japan, and even South Korea (hereinafter the “Concert Nations”) – have their own defense relations in Southeast Asia as well and make use of their local ties to advance their respective interests, which include promoting exports to support their respective defense industrial bases. At best, the involvement of outside powers in this manner is inefficient and risks duplication of effort while potentially neglecting strategically important maritime security requirements of recipient governments.

South China Sea military and coast guard operations, arms sales and financing, and access agreements involving outside powers all need to be coordinated and deconflicted. Rather than toil independently and in occasional competition with others, the United States can leverage the willingness that Concert Nations have already shown to share the overall burden of building maritime awareness capacity in the South China Sea and more efficiently determine where its own contributions are most needed.

How It Would Work

A Concert approach would convene a series of Track 1 and Track 1.5 meetings involving the Concert Nations, including the United States, with the common goal of building regional maritime domain awareness capacity in Southeast Asia. Each government would ideally come with a writ to report back to its home government. The group would need to address several questions that can be decided quickly, but whose implementation and oversight would require ongoing work.

- What maritime surveillance activities and transactions are each of the Concert Nations already conducting in the region, and what activities are planned?
- What, if any, sustainment activities (analyst training, facilities construction, information-sharing requirements, equipment maintenance, etc.) do Concert Nations conduct after an arms sale transaction?

- What are the near-term and long-term ISR collection requirements for an expanse as large as the South China Sea?
- What areas within the South China Sea most require persistent surveillance coverage?
- What national constraints exist on sharing ISR collection with ASEAN nations, and to what extent can they be relaxed?
- What are the local ISR needs of each Southeast Asian country? Given already planned sales and financing arrangements, what capability gaps remain unfilled?
- In the near term, which Concert Nations are willing to entertain a joint schedule of limited-scope ISR and surface patrol missions?
- In the longer term, how do you wean ASEAN governments off of Concert Nation ISR collection as their indigenous capacity improves? And how do you ensure maritime awareness continues to be shared when the information comes from ASEAN governments and not Concert Nations?

Jointly answering these questions as a concert of concerned powers provides a foundation for a collaborative approach to maritime transparency. The Concert Nations can do more than compare notes on the problem and issue joint statements. They can jointly determine the region’s operational needs, surveillance priorities, possibilities for expanding collection distribution, and optimal divisions of labor for arms sales/financing, training, and surveillance operations. In effect, the Concert approach would result in a de facto regime for maritime capacity-building in Southeast Asia. This kind of collective consultation and decisionmaking may also help keep outside powers vested in ongoing U.S. transparency and capacity-building initiatives for the South China Sea, which makes international narratives about such activities more easily align with U.S. intentions.

The United States is not the only external power interested in South China Sea transparency or in improving the maritime security capacity of ASEAN nations.

Drawbacks

A Concert approach to building maritime awareness capacity is not without troubles, the greatest of which is that it would be a purely voluntary arrangement involving the Concert Nations. Deconflicting arms sales, for example, may require subordinating defense industry competition for the Southeast Asian market, which countries may be unwilling or unable to do. Moreover, given the players involved, China may accuse the group of unlawfully intruding into what it claims as its territorial waters, and some Concert Nations may be reluctant to draw China's ire. Indeed, Chinese land reclamation and other assertive activities in the South China Sea may well be within the scope of what the Concert Nations decide are appropriate mission threads for coordinated ISR activity and information-sharing in the region, raising a possible dilemma: Some ASEAN governments may wish to avoid the appearance of collaboration with outside powers against China, whether or not that is the case. Finally, a Concert approach is a potentially high-impact approach in the long term, but there is little it could do to achieve immediate operational impact. None of this suggests forgoing an attempt at establishing a Concert approach, but it does caution counting on it as *the* approach to resolving the region's maritime awareness deficiency.

Hub-and-Spoke 2.0 Approach

The case can be made that the United States is uniquely endowed with the organizational knowledge, doctrine, military hardware, and resource capacity to enhance maritime awareness in the South China Sea. It might even be argued that the United States cannot afford to rely solely on the capacity-building of other Concert Nations given its growing importance to the United States, and even if it supports a Concert approach, a large burden will still fall to the United States. It would therefore make sense that the United States might materially lead the effort to enhance maritime awareness through capacity-building and information-sharing. Indeed, the Pentagon's 2015 Asia-Pacific Maritime Security Strategy suggests the United States already frames its joint military exercises and foreign military financing/foreign military sales (FMF/FMS) as contributing to a U.S.-led approach to maritime transparency in Southeast Asia.

How It Would Work

A U.S.-centric approach would focus on the exclusive-access layer of domain awareness, which could proceed in one of two ways. The first would set up an actual COP geographically scoped to the South China Sea, a version of which may already reside in PACOM's Joint Operations Center, and then grant access to the display through CENTRIXS for a broader audience that would include most or all ASEAN governments. This would primarily entail internal U.S. bureaucratic wrangling about what types of ISR collection and analysis to share with whom, followed by diplomatic outreach to the recipient governments to gauge their interest.

The United States is uniquely endowed with the organizational knowledge, doctrine, military hardware, and resource capacity to enhance maritime awareness in the South China Sea.

The second is to equip ASEAN governments with more and better-quality information about happenings in the South China Sea on a largely bilateral basis, recognizing that the extent of information-sharing may depend on the specifics (trust, prospect of reciprocity, need, etc.) of each relationship. Even without having ASEAN governments share the same physical display of information, this implicitly produces a more common picture of what is happening where in the South China Sea than exists today. But putting better information in the hands of ASEAN governments requires filling Southeast Asia's ISR gap noted above, through a combination of increased U.S. surface patrols and ISR missions, FMF cases for surveillance assets, and radar and data analysis facility construction.

In 2015 the United States announced that it intended to increase its surveillance and patrol missions in the South China Sea, though the baseline and scope of increase remain publicly unclear.⁷⁰ As greater surveillance capacity comes to the region as part of a larger U.S. force posture shift to the Pacific, the United States would need to work out a way to share the collection output – the situational awareness – that comes from its en-

hanced patrols and surveillance with its regional partners. For instance, when the U.S. Navy's MQ-4C Triton reconnaissance UAV makes its first deployments to US-PACOM in FY2017,⁷¹ DoD could negotiate advance information-sharing agreements with Singapore, the Philippines, Vietnam, and others that will permit each to have access to analyzed output of MQ-4C Triton missions in the South China Sea, ensuring a richer shared situational awareness picture than each has today on its own.

As the Pentagon's Asia-Pacific Maritime Security Strategy advertises, the United States is already doing much to improve the maritime awareness capacity of select Southeast Asian countries. The United States has aided Malaysia with coastal surveillance radar stations. It is providing assistance constructing the Philippines Coast Watch System. It is transferring a number of small patrol vessels to the Philippines. And it is supporting Indonesia's effort to enhance MDA through a number of activities. But these efforts are a pittance compared with what is needed for actionable situational awareness. Most maritime Southeast Asian militaries still lack aerial reconnaissance, rudimentary electronic warfare and signals intelligence, and airborne early warning capabilities; all have only limited maritime patrol and reconnaissance capacity. Current U.S. efforts improve regional capability only on the margins.



Early warning ISR capabilities, such as those provided by this E-2C Hawkeye operating over the Pacific Ocean, are still lacking among many Southeast Asian countries. (U.S. Navy Photo/Master Chief Spike Call)

Drawbacks

The drawbacks of a purely U.S.-led, U.S.-centric approach are significant: cost, a high risk of generating a “China containment” narrative, and the limited value of ISR collection that can only be shared with a narrow cross-section of partners.

The associated costs of the United States’ trying to fill Southeast Asia’s ISR gap and single-handedly furnishing exclusive-access domain awareness for its allies and partners are a burden that the United States cannot realistically bear. The absolute cost of U.S.-run ISR missions is significant, but the opportunity cost of dedicating ISR collection to the South China Sea necessarily decreases collection against other priority targets in Northeast Asia, the Middle East, or Northern Africa. The United States may be a global power with global interests, but it has limited resources; it cannot be everywhere at once. The South China Sea is important, but there is a limit to how much the United States can siphon resources from other global operations. And any meaningful increases in defense appropriations dedicated specifically to the South China Sea – should Congress even allow that – rub up against an uncomfortable reality: The strategic planning community in Washington may view the South China Sea as an interest over which it must be prepared to fight China, but U.S. public opinion about Chinese military power (in the South China Sea or anywhere else) remains far down the list of the threats Americans see from Beijing, which are principally economic.⁷²

The associated costs of the United States’ trying to fill Southeast Asia’s ISR gap and single-handedly furnishing exclusive-access domain awareness for its allies and partners are a burden that the United States cannot realistically bear.

Moreover, many partner nations cannot afford the price tag of acquiring modern U.S. equipment or the significant ancillary costs for logistics, training, maintenance, and the PED for collected intelligence from that equipment. As of 2013, the acquisition of a single Global Hawk UAV cost over \$222 million,⁷³

which is more than 40 percent of the Philippines’ entire 2015 defense budget.⁷⁴ This means the sale of the most advanced ISR assets would require generous U.S. subsidies for a sustained period of time – probably 10 years at minimum given the time it takes to establish programs of record and integrate a system into regular operations. So even U.S. attempts to build the capacity of key partners on a bilateral basis will require extensive cost increases. This means that fully funding the U.S. Maritime Security Initiative (\$425 million over 10 years) may only provide a foundation for maritime awareness, not a complete picture.

A U.S.-only approach to furnishing maritime awareness for the region also runs a significant risk of ceding the regional narrative that U.S. actions help keep the region stable, which China regularly disputes and attempts to reframe as U.S. encirclement of China.⁷⁵ If maritime domain awareness takes on the appearance of a U.S.-led military scheme, it will nudge regional perceptions to more closely fit the erroneous Chinese narrative of containment. The battle for narrative control is a meaningful one, and it is affected not only by U.S. messaging, but also local perceptions of the overarching U.S. approach to the region. Southeast Asian governments have historically welcomed U.S. military presence in the region as a hedge against Chinese ambitions,⁷⁶ and it is incumbent on the United States to ensure that its actions in Asia align with that local strategic need. A U.S.-only approach could increase the political costs to regional states of joining the network.

Institutional Bridging Approach

A third approach to enhancing shared maritime domain awareness would involve bridging and brokering activities to forge information-sharing ties among existing maritime surveillance networks in the region. This approach maximizes the value of the existing maritime awareness capacity of U.S. allies and partners. The U.S. role would primarily entail leveraging its resources and relationships to create a more integrated picture of the South China Sea among ASEAN governments.

How It Would Work

Three intersecting lines of effort would help connect the region's fragmented maritime domain awareness architectures: distributing a shared software application that facilitates information-sharing without requiring new hardware; using FMF, Maritime Security Initiative funding, and the surveillance picture already resident at PACOM as "carrots" to encourage regional information-sharing; and reaching out to key maritime awareness organizations in the region to discuss systematic information exchanges among them.

The ongoing success of SOUTHCOM's Regional Domain Awareness initiative in facilitating cooperation among otherwise reluctant Latin American governments offers a low-cost technical solution that can be exported to PACOM with little reconfiguration. Putting CSII – the shared Web-based software application that serves as the "architecture" of RDA – in the hands of Southeast Asian partners gives recipient governments the means to share operational information without necessitating any changes to how they do business or what equipment they operate. Alternatively, the United States could provide financial backing for the expansion of information-sharing and visualization software that already exists locally in Southeast Asia. Singapore and Indonesia operate a common Web-based application called Project SURPIC to monitor vessels in the Singapore Strait. The United States might enter talks with Singapore about expanding both the geographic coverage and number of participants involved in Project SURPIC, offering funding to support expansion if Singapore and others are willing.

The second line of effort would more intelligently leverage U.S. FMF projects in the region to nudge its Southeast Asian partners toward greater information-sharing with one another. FMF cases routinely include contingencies intended to serve U.S. political and economic interests, requiring everything from end-user compliance with technology transfer prohibitions and proliferation controls to U.S. human rights law. Yet FMF cases involving maritime security in Southeast Asia have not historically included any contingencies for information-sharing with neighboring governments. The United States, for example, provides security assistance for the Philippines' Coast Watch System, but there is no agreement in place that the Philip-

pinos will be required to share information with or grant access to other maritime awareness organizations. As the United States considers transferring radar or other ISR technology to Southeast Asian governments, it can stipulate that information collected be distributed to other designated organizations or countries as a condition of transfer.

The third line of effort in an institutional bridging approach would involve outreach to regional and national organizations responsible for maritime awareness with the goal of opening or expanding the flow of operational information among them. This could be made an agenda item at the Western Pacific Naval Symposium (WPNS), in which all maritime Southeast Asian nations participate, and could be further pursued at the bilateral level through U.S. delegations seeking to negotiate information-sharing agreements. The priority engagements given enduring interests in the South China Sea and geographic coverage of their systems would be with Singapore's Information Fusion Centre, India's Information Management and Analysis Centre, the Philippines' CWS, and Indonesia's National Maritime Security Information Centre (NMIC). Even in cases where nascent linkages are already being discussed absent the United States, as is underway between India and Singapore's IFC, no operational capability has yet been established and the United States might be able to facilitate improved or more rapid connectivity. It may seem a strange role for the United States to attempt to broker information-sharing between third-party organizations, but the U.S. Maritime Security Initiative – which authorizes DoD to use \$425 million over 10 years to enhance maritime security in Asia – gives the United States a unique ability to negotiate local information-sharing among existing maritime awareness centers in the region in exchange for U.S. financial support for facilities, radars, and analytical capacity at the region's various centers.

Drawbacks

An institutional bridging approach to enhancing maritime awareness of the region suffers a number of limitations. One is the risk that this approach could not be executed as intended; ASEAN governments simply may not be incentivized by U.S. funding or offers of military construction to enhance cooperation with one another. During our research

for this project, interviews with anonymous officials from multiple Southeast Asian governments corroborated the basic, if unsurprising, finding that the current fragmentation of the region's information-sharing architecture has much to do with the mistrust among neighbors that endures within ASEAN. MALSINDO Patrol Network, Eyes in the Sky, and a number of ASEAN transnational security initiatives prove that regional cooperation has been possible despite mistrust, but only in accordance with a slow, gradual, and highly constrained model of consensus-building that makes it difficult to fill existing cooperation gaps.

ASEAN governments simply may not be incentivized by U.S. funding or offers of military construction to enhance cooperation with one another.

Given the constraints of mistrust, moreover, the ability to enhance the region's shared maritime awareness will necessarily be limited to open-access and participatory-access models, which excludes the precise and actionable situational awareness of an exclusive-access model of maritime awareness. And even if individual maritime awareness architectures are connected technologically and via information-sharing agreements, there is no reason to expect the sharing of sensitive intelligence collection among states that do not trust one another to any great degree.

An institutional bridging approach also does little to address the limited maritime awareness capacity in the region. Even if all of the region's national maritime awareness architectures were connected during the Scarborough Shoal incident in 2012, it is doubtful that anyone would have had sufficient capacity to recognize and inform the Philippines that Chinese coast guard vessels were operating just over the horizon from where Filipino law enforcement intercepted a Chinese fishing vessel. As discussed above, there is a considerable shortfall in regional maritime awareness capacity, and stitching the region's extant architectures together does not by itself remedy that.

Inclusive Approach

A fourth approach to enhancing shared maritime awareness of the South China Sea largely eschews reliance on traditional conceptions of international cooperation. An inclusive approach could bypass some of the constraints of dealing with governments by working with networks of international organizations, NGOs, and commercial firms to deliver a baseline of South China Sea situational awareness as a shared public good. Given its scope, inclusiveness, and the types of stakeholders involved, this approach is the most likely to accommodate Chinese participation and the least likely to alienate ASEAN governments or feed China "containment" narratives.

How It Would Work

Setting up an open-access picture of South China Sea activity would require building a Web-based application that could be accessed by interested parties potentially ranging from private firms involved in commercial shipping to states and organizations whose missions emphasize maritime awareness, such as the IFC. Rather than the U.S. State Department or Department of Defense hosting an open-access application, though, U.S. funding would be better used to allow hosting responsibilities to fall under the auspices of the Western Pacific Naval Symposium, the ASEAN Defense Ministers Meeting-Plus (ADMM+), or even Singapore's IFC. All three involve both ASEAN governments and China.

Publicly available Web-based applications already exist that show AIS tracks and limited details about the identified ships. And a number of private firms already provide services that analyze and integrate multiple streams of public tracking data to give accurate and near-real-time pictures of maritime spaces. What remains is to match international security and economic needs for maritime awareness with largely off-the-shelf commercial capabilities and analytic services. The State Department has recently pioneered a proof of concept along these lines called "mFish." The mFish application claims to help underserved fishing communities conduct sustainable fishing practices and connect with markets and each other through little more than mobile phone technology and voluntary reporting of GPS locations and illegal fishing incidents by individual fishermen. The mFish initiative, launched

in June 2014, illustrates a model for how open-access domain awareness can function: through government sponsorship and defined mission threads, combined with commercial technology and nongovernmental partners capable of delivering a product of common (and public) interest.

Building out an effective inclusive approach entails maximizing the sources of data collection, settling on means for delivering value-added analysis of data, and the legitimacy of a host for a Web-based application whose interests extend beyond those of the United States. Several lines of engagement, outreach, and negotiation will be necessary.

First, and in addition to incorporating public data, the United States could engage in outreach to the International Maritime Organization or the Asia-Pacific Fishery Commission (APFIC) to request that VMS transponders be required for anyone to receive fishing permits in Asia. To offset the cost of this requirement for fishermen, the United States could draw funds from its Maritime Security Initiative.

Second, the United States might also engage China to request that it share access to its indigenous BeiDou navigation satellite system – the real-time tracking data it collects and maintains for more than 30,000 Chinese-registered fishing vessels.⁷⁷ Adding a large number of VMS and BeiDou data sources to other public data enriches the situational awareness picture of an open-access approach, but only with sufficient analysis.

Third, therefore, the United States would also need to engage with technology firms that specialize in big-data analysis to develop algorithms tailored to the various mission threads needed in the South China Sea.

Fourth, drawing inspiration from the mFish model, the United States could initiate a conversation with the technology sector about what it would take to give commercial vessels in the South China Sea the ability to report instances of harassment by other commercial vessels or by foreign coast guard and navy services. Over time, a grassroots-accessible mobile upload capability will crowdsource visual displays of patterns of harassment, safe passage, and friction.

Finally, the United States would need to engage with prospective regional hosts of an open-access awareness application – the WPNS, ADMM+, and IFC. Each regional body has formal meeting agendas that could, at U.S. urging, accommodate a discussion about managing an inclusive, open-access application for maritime awareness in the South China Sea.

The inclusive nature of an open-access approach and the public data on which it relies makes it more vulnerable than other approaches to spoofing and spurious or misleading insights.

Drawbacks

An open-access approach to expanding maritime awareness suffers three limitations. First, it does not inherently require greater cooperation or information-sharing among Southeast Asian states, and by providing a common baseline picture of the South China Sea, it is possible that in isolation from other approaches it actually removes incentives for greater regional cooperation. Second, an open-access approach serves a limited function, contributing to an open-access model of maritime awareness but not to models requiring more active information-sharing and actionable intelligence. There are times when insights derived from pattern analysis on public data can be actionable – which the example of SkyTruth serves well – but it does not serve the same purpose of operational surveillance; it cannot be relied upon to execute precision operations. Third, the inclusive nature of an open-access approach and the public data on which it relies makes it more vulnerable than other approaches to spoofing and spurious or misleading insights. Transmissions of AIS and other signals can potentially be manipulated for purposes of deception, or outright jamming that can block data collection altogether.

07 CHAPTER

Getting Real: A Road Map for the Maritime Security Initiative

VII. Getting Real: A Road Map for the Maritime Security Initiative

As the previous section outlines, making operational transparency of the South China Sea a reality requires a wide array of diplomatic, military, and commercial activity. There is no silver bullet, and the goal of perfect, real-time shared awareness may always remain elusive. Still, drawing on all four approaches described here as a foundation, there are a number of tasks that the United States can begin today to significantly enhance information-sharing about and awareness of who does what in the South China Sea.

Nontraditional Outreach

- **Set Up a Big-Data Task Force:** The secretary of defense, in partnership with the State Department's Bureau of Political-Military Affairs and Office of Global Partnerships, should convene a task force of technology company and NGO representatives to brainstorm how commercial-sector solutions can enhance maritime awareness in the South China Sea in support of the cooperative mission threads identified in this paper: IUU fishing, the transnational crime complex, and HA/DR.



In 2012 the Republic of Singapore Navy frigate RSS *Stalwart* deployed alongside U.S. guided-missile destroyers USS *Gridley* (center) and USS *Stockdale* (far right). (U.S. Navy/Mass Communication Specialist Seaman Apprentice Nicolas C. Lopez)

- **Issue a Call for an “Anti-Gray-Zone” App:** The Defense Innovation Unit Experimental (DIUx) – a new Silicon Valley outpost of DoD – should issue a request for proposals (RFP) or a broad agency announcement (BAA) with three functional requirements. First, develop a mobile application that allows commercial vessels transiting the South China Sea to self-report GPS locations, safe passage experiences, and instances of harassment at sea by foreign governments or nongovernment actors. Second, cue the nearest law enforcement entity from friendly or neighboring governments for a real-time emergency response. Third, create a “back end” that accrues and analyzes patterns in reporting data to better position maritime law enforcement and predict most likely safe passage routes over time.
- **Propose VMS Transponders for Regional Fishing Vessels:** The U.S. representative to the Asia-Pacific Fishery Commission should propose requiring VMS transponders on all legally permitted fishing vessels operating in Asian international waters as a baseline standard and best practice. Leveraging Maritime Security Initiative funding, DoD and the State Department can incentivize support from other member states by creating a fund to subsidize or offset the cost (\$500 to \$1,000 each) of equipping vessels with the new standard.

Internal U.S. Decisions

- **Bring CSII to PACOM:** During the Pentagon’s next Program Budget Review, PACOM should submit an “issue paper” requesting the expansion of CSII software to Asian governments. The Joint Staff would need to validate the requirement and establish it as a “program of record” – falling under the name Regional Domain Awareness in SOUTHCOM – but it is low-risk and low-cost (~\$3 million) and has high potential to strengthen practices of information-sharing across Southeast Asian governments.
- **Use FMF as an Information-Sharing “Carrot”:** As a measure to promote a larger and richer ISR information-sharing network in Southeast Asia, the Office of the Secretary of Defense (OSD)’s Office of Security Cooperation, in partnership with the State Department’s Bureau of Political-Military Affairs, should jointly determine how to establish information-sharing contingencies as part of FMF cases involving the transfer of U.S. ISR-related technologies to partner governments in Southeast Asia.
- **Disseminate Collection from New ISR Deployments:** As PACOM prepares to receive MQ-4C Triton reconnaissance UAVs in 2017, it should work with the Defense Intelligence Agency and the undersecretary of defense for intelligence to determine the extent to which the processed information collected from new ISR missions conducted by these UAVs can be disseminated to a wider array of regional players. Because situational awareness information can be a strategic asset supporting South China Sea stability, there should be a prejudice *against* withholding intelligence information from allies and partners on the basis of protecting sources and methods.
- **Rebalance Global FMF:** The global distribution of U.S. FMF (which includes transfers of ISR and patrol assets) has not recalibrated in response to the U.S. strategic prioritization of the Asia-Pacific as part of a longer-term policy of rebalancing. As of 2015, only 1 percent of FMF supported capacity-building in the Asia-Pacific. Meaningful change will require sustained attention from the secretary of defense and secretary of state. The Defense Security Cooperation Agency, OSD’s Office of Security Cooperation, and the State Department’s Bureau of Political-Military Affairs should make collective recommendations to the two secretaries on where global compromises in FMF can be made in order to allocate a more realistic proportion of U.S. financing in support of the U.S. rebalance to Asia.

- **Start Filling Southeast Asia’s ISR Gap:** As a corollary to the above recommendation to rebalance global FMF, the United States should be prioritizing FMF/FMS for certain types of ISR capabilities to certain recipients to expeditiously fill existing regional ISR gaps. In some cases, this may require making exceptions to export control regulations. Without advocating for the sale of specific platforms to specific customers, priority capability transfers include:
 - » Airborne early-warning capability for Indonesia, the Philippines, and Vietnam;
 - » Maritime patrol and reconnaissance capability for Indonesia, the Philippines, Vietnam, and Malaysia; and
 - » Aerial reconnaissance capabilities for Indonesia, the Philippines, Vietnam, Malaysia, and Singapore.
 - » It should also be considered whether the Philippines and Vietnam merit developing an electronic warfare and signals intelligence capability as part of a long-term force modernization effort.

Diplomatic Tasks

- **Start a Multilateral Dialogue to Coordinate Capacity-Building:** In bilateral dialogues with Australia, India, Japan, and South Korea, the State Department’s and OSD’s regional policy offices should propose forming a concert among all of them to jointly establish shared maritime awareness requirements and coordinate capacity-building activities. As needed, these should be supplemented with – or even driven by – Track 1.5 meetings to explore sensitive capability-, information-, or cost-sharing possibilities.
- **Negotiate a Regional MDA Network:** Through visits to the region and Track 2 interlocutors, U.S. representatives should probe the ability to bridge the region’s fragmented maritime surveillance architecture. The State Department’s and OSD’s regional policy offices should lead coordination of the effort, which will also need to involve the PACOM Joint Operations Center. Numerous incentives are available for U.S. negotiators to offer to promote information-sharing across the IMAC, CWS, and IFC: sharing track information with PACOM’s Joint Operations

Center information, distributing new information collected from forthcoming MQ-4C UAV reconnaissance missions, and extending the offer for regional MDA hubs to use CSII as the technical information-sharing bridge.

- **Broach BeiDou Data-Sharing with China:** At the next Strategic & Economic Dialogue, the U.S. delegation should raise with China the importance of sharing the tracking information it maintains on Chinese fishing vessels as a strategic signal to the region of a willingness to be both cooperative and transparent. The technology that its BeiDou navigation data relies on is not sensitive, and releasing the locations of commercial vessels does not undermine Chinese military interests.

All Strategy Is Local

Establishing greater situational awareness in the South China Sea has become a strategic imperative. DoD’s Maritime Security Initiative is a laudable initial response to the complex ways in which the South China Sea security environment is changing. But it cannot be static; it needs to subsequently explain what types of actions will be undertaken by whom, on what timeline, and for what purposes. There must be, in other words, a continuously justified “theory of victory” that relates what the United States says and does in maritime Asia to larger U.S. goals; without that, there is a high risk of strategic drift, bureaucratic inertia, and excessive militarization in the region. The approaches outlined in this report and the immediate recommendations in this concluding section offer concrete ways to relate the ends and means of U.S. policy in maritime Asia. As any strategy should, it presents real choices that involve real risks and costs in order to pursue what statements of U.S. policy claim is worth pursuing: a stable, liberal, and consequently more transparent order in the Asia-Pacific region.

List of Acronyms & Endnotes

List of Acronyms

ADIZ	Air defense identification zone
AHA Centre	ASEAN Coordinating Centre for Humanitarian Assistance
ADMM+	ASEAN Defense Ministers Meeting Plus
APFIC	Asia-Pacific Fisheries Commission
ASEAN	Association of Southeast Asian Nations
ADS-B	Automatic dependent surveillance - broadcast
AIS	Automatic identification system
BAA	Broad agency announcement
CNAS	Center for a New American Security
PLA	Chinese People's Liberation Army
CENTRIXS	Combined Enterprise Regional Information Exchange System
COP	Common operating picture
CSII	Cooperative Situational Information Integration
DSCA	Defense Security Cooperation Agency
EEZ	Exclusive economic zone
FMF/FMS	Foreign military financing/foreign military sales
GPS	Global Positioning System
HADR	Humanitarian assistance and disaster relief
IUU	Illegal, unreported, and unregulated [fishing]
IMAC	India's Information Management and Analysis Centre
NMIC	Indonesia's National Maritime Security Information Centre
IFC	Information Fusion Centre
ISR	Intelligence, surveillance, and reconnaissance
JIATF	Joint Interagency Task Force
KML	Keyhole Markup Language
MALSINDO	Malaysian, Singaporean, and Indonesian joint patrols
MDA	Maritime domain awareness
MOU	Memorandum of understanding
MTCR	Missile Technology Control Regime
OSD	Office of the Secretary of Defense
OASIS	Open and Analyzed Shipping Information System
PED	Processing, exploitation, and dissemination
PSI	Proliferation Security Initiative
ReCAAP	Regional Cooperation Agreement on Piracy and Armed Robbery against Ships in Asia

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RDA	Regional Domain Awareness
RPOA	Regional Plan of Action to Promote Responsible Fishing Practices
RFP	Request for proposals
RIMPAC	Rim of the Pacific military exercises
CWS	The Philippines' Coastal Watch System
CENTCOM	U.S. Central Command
DoD	U.S. Department of Defense
PACOM	U.S. Pacific Command
SOUTHCOM	U.S. Southern Command
UIS/APAN	Unclassified Information Sharing/All Partners Access Network
UAV	Unmanned aerial vehicle
VHF	Very high frequency (radio transmission standard)
VMS	Vessel Monitoring System
WPNS	Western Pacific Naval Symposium

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