

# For Your Situational Awareness

## Autonomous Systems and Constabulary Tasking

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In an influential 1980 essay, Barry Buzan observed how trouble and dispute at sea obtains, not only from issues of naval rivalry and military balance but also the growing awareness that the world's oceans are not an inexhaustible source of resources. Overfishing and pollution jeopardize stocks of desirable fish. The volume of world shipping has increased so that there is now traffic chaos in congested waters. Demand has created a competitive rush to exploit the limited oil and industrial raw material resources in the seabed.<sup>1</sup>

In the Asia-Pacific—perhaps more than in any other part of the world—sea trade has increased, the exploitation of marine resources has increased, and tension over the demarcation of resources, especially fish, has increased. There is also the problem of large-scale crime.

In a 2013 report, the United Nations Office on Drugs and Crime detailed transnational crime in East Asia and the Pacific. Very often, the sea is a means for the smuggling of counterfeit goods and fraudulent medicines, for the trafficking of heroin, methamphetamine, and other drugs, for trafficking enslaved persons, for illegal migrant smuggling, and for the smuggling of illegal wildlife and illegal wood products.<sup>2</sup>

But unlike the North Atlantic Treaty Organization, no formal, regionwide collective security agreement unites nations in the Indo-Pacific. Rather, states are joined by a variety of multilateral or bilateral agreements. The Boe Declaration on Regional Security illustrates this point. On 5 September 2018 in Nauru, the Pacific Islands Forum, including Australia, recognized an expanded concept of security, including human, cyber, and environmental security and framed regional responses to emerging security issues. The Boe Declaration offers a “vision for the Pacific as a region of peace, harmony, security, social inclusion and prosperity so that all Pacific people can lead free, healthy and productive lives.”<sup>3</sup> In addition, Pacific Island nations supported an aerial surveillance program to be implemented through memoranda of understanding. But in certain crucial respects, the Boe Declaration and the memoranda are insufficient and merely prolong a collage of ineffective approaches to security cooperation.

Accepting (as Bateman and colleagues have) that “regional cooperation is fundamental to the maintenance of good order at sea in Southeast Asia,” and accepting (still following Bateman) that “effective multilateral institutions are required through which the requisite cooperation can be developed,”<sup>4</sup> this article looks at constabulary operations.

We contemplate a regional intelligence-gathering and -sharing convention. Such a convention would systematize and regulate the collection, analysis, and sharing of intelligence data. Such a convention is likely to become progressively more important as we realize the potential of autonomous systems to gather data.

### **Constabulary Operations**

Following Ken Booth, we recognize “constabulary tasking”<sup>5</sup> as a basic function of navies and as an essential responsibility of nations. Among the oldest<sup>6</sup> and most consequential of naval tasks,<sup>7</sup> constabulary operations are as much a responsibility as a right.<sup>8</sup>

The spectrum of constabulary tasking requires gathering intelligence about merchant shipping, the trafficking of contraband and people, fish stocks and fishing vessels, oil and gas platforms, and warship movements<sup>9</sup> so that states might work to secure conditions in which the peaceful use of the sea can be equitably and safely carried on.

However, what is plain in theory is blurred in practice.<sup>10</sup> For example, ships deployed on constabulary tasking might be involved in the benign supervision of national fisheries, securing them from irresponsible citizen fishers and from poachers. But anodyne, superintendent fisheries patrolling might not be benign. There are many cases of hot pursuit, gunfire, and apprehension. Navies have come to blows over fish, ships have been damaged and sunk, and sailors have been killed. Contested boundaries in the South China Sea demonstrate that a fisheries patrol might be very far from benign.<sup>11</sup> The point is that, in practice, constabulary operations are constabulary, but *at the same time* they are “presence” missions, a form of political gesture or gunboat diplomacy, linked inextricably to warfighting potential.<sup>12</sup>

The significance of this observation is in the scope of regional cooperation. Conceivably, a regional security convention *might* describe a far-reaching, inclusive, regional security arrangement. Arguably, there are reasons to commend such a broadly strategic relationship with objects to prosecute a wide-spectrum constabulary operations in the cause of “good order.” There are two models. The first is the Malacca Straits Patrols; the second is the Trilateral Maritime Patrols.

The Malacca Straits Patrols have been undertaken since 2004 by Malaysia, Indonesia, and Singapore, later joined by Thailand. Aiming to counter the threat of piracy in the Strait of Malacca, the patrols offer a year-round naval presence. The

participating governments offer coordinated surface and air patrols with an exchange arrangement for intelligence. The Trilateral Maritime Patrols is a similar agreement to defend against maritime crime in the Sulu and Celebes Seas. The three participating nations, Indonesia, Malaysia, and the Philippines, coordinate patrols and share intelligence.

Even though they demonstrate the feasibility of regional interstate cooperation, the Malacca Strait Patrols and the Trilateral Maritime Patrols are designed narrowly to defend against maritime crime. Our focus is equally constricted: the possibility of a convention that would systematize intelligence collection and sharing. The problems of operationalizing a response are beyond the scope of this article.

### **Maritime Security and Good Order**

Among the buzzwords of international relations, the term “maritime security” enjoys no definitive meaning.<sup>13</sup> Rather, “maritime security” is what W. B. Gallie described as an “essentially contested concept,” an ill-defined yet paradoxically well understood idea characterized by “endless dispute” about the proper meaning.<sup>14</sup>

The idea of maritime security implies defense from military threat. But the idea is larger and more inclusive than this.<sup>15</sup> Beyond military threat, the idea of maritime security entails a more general need for “good order.”<sup>16</sup> Following this reasoning, the 2014 United Kingdom National Strategy for Maritime Security recognizes risk from terrorist attacks against cargo or passenger ships; disruption to vital maritime trade routes as a result of war, criminality, piracy, or changes in international norms; cyberattack on maritime infrastructure or shipping; the transportation of illegal items by sea, including weapons of mass destruction, controlled drugs, and arms; and the risk of people smuggling and human trafficking.<sup>17</sup> Similarly, the Council for Security Cooperation in the Asia Pacific says:

Good order at sea permits countries to pursue their maritime interests and develop their marine resources in an ecologically sustainable, and peaceful manner following international law. Hence, a lack of good order at sea is evident [in] illegal activity at sea or inadequate arrangements for the safety and security of shipping.<sup>18</sup>

Good order is maintained since navies<sup>19</sup> and other agencies<sup>20</sup> prosecute constabulary tasks to enforce international laws and etiquettes. In part, these are laws and etiquettes that safeguard the oceans as a means of trade. Peter Gretton makes the point when he says:

World economic progress depends largely on the free exchange of goods and raw materials by sea. Without economic progress, the abolition of poverty and the raising of living standards will be impossible. Mankind will relapse into anarchy.

Freedom of movement on the seas brings great benefit to the Western world. Any obstruction is damaging; [thus] attempts to limit the extent of international waters and to control the international waterways must be resisted.<sup>21</sup>

In another sense, constabulary tasking defends against resources conflict and transnational organized crime.

### **Resources Conflict and Transnational Crime**

In *Mare Liberum* (1609), Grotius contended that the sea was an inexhaustible source of resources. Per John Seldon, our modern consciousness of the sea's limits is different. In *Mare Clausum* (1635), Seldon said: "Yea, the plentitude of such seas is lessened every hour, no otherwise than mines of metal, quarries of stone or gardens when their treasures and fruits are taken away."<sup>22</sup>

Since we recognize the seas' limits, we recognize the potential for resources conflict. This potential is complicated by the United Nations Convention on the Law of the Sea (UNCLOS), which establishes exclusive economic exclusion zones stretching 200 miles from the coast; it thus magnifies the prospect of disputed frontiers at sea and escalates the need for states to secure good order.<sup>23</sup>

In the Indo-Pacific, resources conflict is focused on fish. Eighty-four percent of the global population engaged in fisheries resides in the Indo-Pacific. Of an estimated 4.6 million global fishing vessels, the Indo-Pacific is home to a fleet of 3.5 million vessels, or 75 percent of the worldwide fleet.<sup>24</sup> Predictably, under the pressure of intensive fishing, Indo-Pacific fish stocks have maintained a declining trend since 1974.<sup>25</sup> This decline is compounded by the pressure of illegal fishing, which accounts for more than 15 percent of the world's wild fish catch.<sup>26</sup>

Regionally, the Indo-Pacific has seen the rise of bilateral tensions over fish. Thailand is one of the most significant fishing states in Southeast Asia, and local disagreements between fishers have escalated tensions between Malaysia and Thailand. Cross-border raids and the killing of Thai fishermen by Malaysians have been reported. Thai illegal fishers have impacted diplomatic relationships between Thailand and regional neighbors such as Myanmar and Indonesia. Moreover, in 2021, India and Sri Lanka were in a fisheries dispute regarding the Palk Bay area, which jeopardizes the food security of this coastal region. Compounding the issue is the increasing presence of large, modern fishing fleets from Japan, China, Korea, and Taiwan in regions known formerly for smaller-scale subsistence fishing practices. Modern technology allows incredible catch rates, against which the traditional fishermen cannot compete. Compounding the problem, under-resourced regional navies cannot prevent this type of advanced poaching.<sup>27</sup>

Resources conflict is aggravated by the rise of transnational crime, which is enabled by global trade agreements. With development of legitimate economic flows, there is the growth of a parallel criminal economy. This criminal economy involves the movement of illicit drugs and other goods, illicit wildlife, counterfeit products, and human trafficking.<sup>28</sup> Regionally, transnational crime might unfurl under cover of the Association of Southeast Asian Nations (ASEAN) economic community.

To respond constructively, states must invest in the apparatus and methods of maritime security and in technical capacity. States must also recognize the importance of regional partnerships. Good order is not the problem or the responsibility of any one state but the responsibility of all states.

Systems of globalized trade offer criminal groups an opportunity to operate across borders. Under cover of high-volume legitimate cross-border flows of goods, people, and money, contraband flows cycle through continents. For this reason, constructive intervention must be at the scale of the problem; national responses must be integrated into international strategies and formalized in an agreement, described in more official terms as a “concord” or “convention.”

## A Convention

A *convention* establishes the framework of law that scaffolds practical responses. The convention envisaged here would structure the sharing and analysis of information gathered by autonomous systems. Such cooperation would better enable nations to secure good order at sea.

The model convention and the main instrument in the fight against transnational organized crime, the UN Convention Against Transnational Organized Crime, opened for signature by Member States at a high-level conference convened in Palermo in December 2000 and entered into force on 29 September 2003. The Convention is supplemented by three Protocols: the Protocol to Prevent, Suppress, and Punish Trafficking in Persons, Especially Women and Children; the Protocol Against the Smuggling of Migrants by Land, Sea, and Air; and the Protocol Against the Illicit Manufacturing of and Trafficking in Firearms, Their Parts and Components, and Ammunition.

The Convention signifies recognition by UN Member States of the need for international cooperation to defend against transnational crime. States that ratify the Convention commit to take measures, including the creation of domestic criminal offenses, the adoption of extradition agreements, and the adoption of law enforcement cooperation agreements.

## ***Autonomous Systems***

Autonomous surveillance systems might be used cooperatively, as a *mutual* tool to advance good order at sea.

The search for Malaysian Airlines flight MH370 hints at the prospective utility of autonomous systems at sea. In 2014, the search for the missing aircraft was the most comprehensive search ever undertaken at sea.<sup>29</sup> But it was a search confounded by the domain. It was uneconomic and unfeasible for manned platforms to comb such a vast area. Unconstrained by fatigue, autonomous platforms might well have sustained the search for more hours per day, over a greater area, and at a bearable cost.

The United States Navy recognizes the way autonomous aircraft systems might bolster maritime domain awareness.<sup>30</sup> Similarly, the Royal Australian Navy has developed the Robotics, Autonomous Systems, and Artificial Intelligence (RAS-AI) Strategy 2040. This strategy recognizes the opportunities in technology and the need for collaboration with allies and other agencies.<sup>31</sup>

## ***What It Takes***

Maritime domain awareness requires constant surveillance. Thus, persistence—the ability to stay on mission for long periods of time—is a requirement of an autonomous system. To ensure persistence, autonomous platforms could be used in conjunction with satellite-based systems. Another way of boosting endurance could be by use of air-to-air refueling.<sup>32</sup> Another way to secure persistent surveillance is to work in conjunction with regional partners.

This highlights the requirement that systems be easily interoperable, or able to transfer data seamlessly to a central system for integration. Interoperability speaks to the idea that individual platforms are deployed as part of a larger system of sensors, potentially controlled by an autonomous software platform. Interoperability speaks to the collection, processing, analysis, and dissemination of data.<sup>33</sup>

Interoperability entails the need for suitable sensors. This includes radar, electro-optical systems, and sensors to detect radar and/or radio transmissions. A platform need not have all these capabilities, though a combination would make such a platform more flexible. Indeed, the use of different systems, including both aerial and surface platforms, would allow for greater flexibility.

## ***Autonomous Air Platforms***

Autonomous air (and surface) systems might complement satellite and ground-based radar, but we do not explore this sort of operation.<sup>34</sup>

The Royal Australian Navy currently operates the Schiebel S-100 Camcopter and the Boeing Insitu ScanEagle. The S-100 is useful in the maritime tactical role, identifying contacts of interest to determine whether these contacts require further attention and tracking, but is less useful as a surveillance platform as it does not meet the endurance requirement.

ScanEagle is more utile and suited to a variety of constabulary taskings, including long-endurance intelligence surveillance and reconnaissance, ocean mapping, and communications relay. ScanEagle was deployed aboard HMAS *Newcastle* during a deployment to the Middle East region during Operation MANITOU in 2017, where it conducted surface search operations in the western Indian Ocean looking for possible narcotics smuggling dhows, as well as tracking and monitoring contacts of interest before interdiction by the ships' boarding party. ScanEagle was used in conjunction with the ship's MH-60R helicopter, showing the potential of autonomous-crewed teaming, albeit at a very basic level with the two platforms operating independently but cooperatively.

The Royal Australian Air Force (RAAF) is acquiring six MQ-4C Triton unmanned air systems.<sup>35</sup> Triton, a maritime version of the venerable Global Hawk, can sustain missions up to 24 hours and is equipped with a sensor suite for detection and tracking 360-degree views for over 2,000 nautical miles.<sup>36</sup> This is exactly the kind of persistence needed for maritime domain awareness taskings.

Additionally, the RAAF is breaking ground with its Loyal Wingman program. The Loyal Wingman, "a pathfinder for the integration of autonomous systems and artificial intelligence to create smart human-machine teams," has successfully completed its first test flight.<sup>37</sup> It has been designed to fly, as a partner, with crewed aircraft. This opens numerous possibilities, including surveillance, where the Loyal Wingman could be paired with an aircraft such as the P-8 Poseidon. The P-8 could provide wide-area coverage while the Loyal Wingman was tasked to investigate contacts of interest: ships acting suspiciously or encroaching into disputed areas, for example.

Further potential of the autonomous system is demonstrated by the MQ-25 Stingray. A project between the US Navy and Boeing, the MQ-25 Stingray is a next-generation unmanned aerial refueling aircraft. The MQ-25 will have the capability to deliver up to 6,800 kg (15,000 lbs.) of fuel to a distance of 926 km (500 nm) and can refuel the F/A-18 Super Hornet, EA-18G Growler, and F-35C fighter jets, significantly extending their range and time in the air.<sup>38</sup> Significantly, on 4 June 2021, during a test flight, a MQ-25 successfully and safely transferred jet fuel to a US Navy F/A-18 Super Hornet, making it the first UAV [unmanned aerial vehicle] to refuel another aircraft.<sup>39</sup>

The MQ-25 demonstrates potential in the combination of UAV and traditional aircraft. When UAVs refuel aircraft such as the P-8 Poseidon, the potential for super long-endurance maritime domain awareness missions is obvious. And there is the possibility of machine-machine teaming. For example, a UAV like the Loyal Wingman might partner with an MQ-25 for refueling. Such teaming would allow autonomous systems with already long endurance to have even greater persistence, cover even greater distances, and (feasibly) gather a greater volume of information.

The significance of the capability lies beyond the combination of different systems from the one nation. The larger potential is in the conjunction between nations, where platforms cooperate to gather data, analyze data, and compile a regional common operating picture.

### ***Autonomous Surface Platforms***

Beyond autonomous air systems, significant advances have been made in autonomous surface vessels. Small remotely controlled surface vessels have been in use by various navies around the globe for decades, such as the Singapore Navy's *Protector*, an armed RHIB-sized patrol craft that has been deployed operationally in the North Arabian Gulf.<sup>40</sup> However, larger autonomous surface vessels have not come into their own until very recently. The United States Navy has been working on several different programs. First, there is the Medium Displacement Unmanned Surface Vessel program. Two medium displacement vessels are in service: *Sea Hunter* and *Sea Hawk*.

In late 2018, *Sea Hunter* sailed from San Diego to Pearl Harbor and back, a round trip of 5,200 miles, completely autonomously.<sup>41</sup> The Ghost Fleet Overlord Unmanned Surface Vessel program has also enjoyed success. The Ghost Fleet Overlord unmanned vessels *Nomad* and *Ranger*—each larger than *Sea Hunter* and *Sea Hawk*—have completed journeys from the East Coast to the West Coast of the United States, transiting through the Panama Canal with a reported 98 percent autonomy.<sup>42</sup>

Looking further ahead, the US Defense Advanced Research Projects Agency has a project for a No Manning Required Ship (NOMARS). The NOMARS project seeks designs for a future unmanned ship that “aims to challenge the traditional naval architecture model, designing a seaframe from the ground up with no provision, allowance, or expectation for humans at sea.”<sup>43</sup> None of these current projects is focused on integrating weapons onto the platforms—only sensors and other systems, making them ideal for surveillance work.

Autonomous surface platforms do not have the sensor range of aerial systems, but they have the capacity to work when weather precludes aerial systems from flying or from offering effective surveillance.

In addition, surface platforms offer a presence that is beyond an air platform. The unmistakable physical presence of a surface platform in high-interest or contested areas could be of value in monitoring contested fishing grounds or resource exploration areas.

Just as aerial systems can be teamed to operate in conjunction with manned platforms, manned surface platforms could utilize smaller autonomous surface vessels. A large manned platform could utilize these smaller autonomous vessels to cover a wider area, including in shallow coastal, littoral, estuarine, and riverine environments that are inaccessible to deeper-draught manned platforms. The ability for small autonomous systems to operate in such an environment would be invaluable, especially defending against activities such as piracy, smuggling, and trafficking in people.

### ***Autonomous Systems—Software***

The artificial intelligence (AI) algorithms that make sense of big data to build a common operating picture and enable better decision-making are critically important. This article contemplates a convention or agreement to frame cooperative data analysis so regional partners might better undertake mutual constabulary tasking.

In Australia, several Defence Cooperative Research Centres have been established to link industry with researchers and the Department of Defence.<sup>44</sup> The first of these centers to be established was Trusted Autonomous Systems.<sup>45</sup> A program of note here is the Cognitive Intelligence Surveillance Reconnaissance program led by Boeing Australia. Approved in March 2019, “this project will examine the embedding of machine learning techniques on board an uninhabited system to better understand and react to the environment. The project will design and test cognitive artificial intelligence algorithms to enable sensing under antiaccess conditions and to navigate and conduct advanced behaviours in contested environments.”<sup>46</sup>

While operations envisaged in this article do not involve contested environments, an autonomous system will still need to react to the environment. It will be important to determine which contacts are of interest and worthy of further investigation and which contacts can be assigned lower priority.<sup>47</sup>

Importantly, software and systems are upgradable, so platforms may become more capable over time as systems are upgraded. This has the benefit of cost-effectiveness and fewer worries over platform obsolescence. This in turn ensures that maritime domain awareness remains an affordable mission profile for the stretched defense budgets of the region.

As with all new technologies, it is hard to predict where autonomous systems will be in the future. What is clear is that autonomous systems will surely play a larger part in the surveillance and constabulary missions that are critical to good

order. Intelligence gathered by these systems must be collated, analyzed, and distributed to inform operational plans and strategies.

### ***Intelligence Fusion***

In 2000, the Japanese government invited representatives to a conference that came to be the seed for the Regional Cooperation Agreement on Combating Piracy and Armed Robbery Against Ships in Asia (ReCAAP). Formalized on 11 November 2004 with 21 contracting parties, including Australia, the ReCAAP offers a significant example of collaboration in the Information Sharing Centre in Singapore.

The Information Sharing (or fusion) Centre is the region's first multilateral anti-piracy and armed robbery establishment. The center facilitates the intelligence collation and statistical analysis and enables the generation of cooperative best practice in operations to defeat piracy and armed robbery at sea. Beyond the collection, analysis, and sharing of intelligence gathered by the contracting parties, the ReCAAP fusion center engages with a variety of nongovernment agencies committed to the extinction of piracy. The fusion center thus serves as an excellent model, as it demonstrates the feasibility and the benefit of systematized information exchange and the power of a common will to tackle a global problem.

### ***The Common Will***

This article contemplates a convention to regulate the cooperative use of autonomous systems so regional partners might better undertake constabulary tasking. Such a convention would symbolize a common political will to put down resource conflict and transnational maritime crime.

Edward Luttwak speaks to this idea when he outlines his theory of suasion. Outlining the political uses of sea power, Luttwak speaks to political influence that obtains from a practical capability and from the symbolism of national intent.<sup>48</sup> Where Luttwak spoke of ships, arguably similar influence might obtain from the capability of autonomous systems and collaborative data analysis. This is because a convention concerning information-gathering and -sharing would enable a coordinated constabulary response (practical capability) and demonstrate a mutual political will (symbolism of intent).

The practical wherewithal of a convention is demonstrated in the UNCLOS. In part VII, articles 100–105, the UNCLOS deals with piracy, defining the act (article 101) as “any illegal act of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship or a private aircraft, and directed: (i) on the high seas, against another ship or aircraft,

or against persons or property on board such ship or aircraft; (ii) against a ship, aircraft, persons or property in a place outside the jurisdiction of any State.”

Recognizing piracy as a transnational problem, the UNCLOS made it feasible for states to collaborate in a transnational solution. Such a solution was, at least in part, in Operation MALSINDO against piracy in the Malacca Strait.<sup>49</sup> MALSINDO was an initiative between Malaysia, Singapore, Indonesia, and, later, Thailand. A system of communication and coordination made it feasible for ships from participating nations to operate effectively against pirates and thus to uphold the general good order.

Saying this, we recognize some acts are offenses against all people and against all nations. In his *Commentaries* on the laws of England, Blackstone says: “The crime of piracy, or robbery and depredation upon the high seas is an offence against the universal law of society; a pirate being . . . hostis humanis generis.”<sup>50</sup> *The pirate has renounced the benefit of all society, and all society is against him.*

The modern idea is in the claim of universal jurisdiction. Speaking to this claim, the Israeli Supreme Court in the Eichmann trial (*Attorney General of the Government of Israel v. Eichmann*, 36 IRL 5) cited the long jurisprudence that maintains that some crimes are not offenses against the law of one nation but offenses against the law of all nations (*delicta juris gentium*). The doctrine of universal jurisdiction came to more recent prominence and found ratification in a set of three constitutional law judgments by the House of Lords. The judgments confirmed that certain crimes are against the law of all nations<sup>51</sup> and implied that all nations should defend against these crimes.

## Conclusion

“Maritime security” enjoys no definitive meaning. But it is understood to involve ideas of good order and to depend upon partnership—a shared commitment to political and economic stability, equal justice, and human flourishing.

Good order is advanced when nations prosecute constabulary operations, which are described by Ken Booth as operations concerned with the “maintenance of public order” to the extent of the economic exclusion zone, much like the civil police keep the streets safe.<sup>52</sup> Of these constabulary tasks, the “coast guard” responsibility is described as the most important and is acknowledged to be one that might be undertaken by a navy or by a navy in combination with other agencies. Constabulary tasking can be, at least in part, a mutual endeavor undertaken by regional partners.

Recognizing that the spectrum of constabulary tasks calls for substantial intelligence-gathering and data analysis, we have contemplated a regional convention or agreement. Such a convention, we propose, would systematize and

regulate the operation of autonomous systems, which are so important in the intelligence-gathering role. 🌐

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