



# Competition in New Domains

## Keeping the “Fog of War”:

### How to Apply Technology to Enhance the Denial Posture of the U.S.-Japan Alliance

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## **Introduction**

Everyday life in modern society is underwritten by technology. The current way of life is a product of technological evolution and innovation. International politics has been transformed by technological change as well. The information revolution is an “icon” of globalization. Following it, emerging technology such as AI and quantum technology is expected to transform the world.

Technology itself, however, does not necessarily dominate the process of strategy. Strategy defines the way in which technology is applied. In considering how to apply emerging technology in the era of great power competition, strategic conditions and context play an important role, especially at the higher level of strategy such as grand strategy and military strategy.

In the context of strategic competition in Asia, there is a clear contrast in grand strategy and geography between China and the U.S.-Japan alliance, which should utilize its comparative advantages including how to apply existing and emerging technology to defense strategy. From that perspective, the alliance should utilize technology to “keep” the fog of war (complexity of military conflicts), rather than “lift” it. This paper identifies the strategic conditions facing the U.S.-Japan alliance and discusses recommendations for the application of emerging technology to meet the challenges of an increasingly complex security environment.

## **Strategy and Technology**

### *Technology as a Layer of Strategy*

Strategy is one of the important foundational concepts for statecraft, but defining it is not necessarily an easy job. A broadly agreeable definition here would be “a combination of ‘ends,’ ‘ways,’ and means.”<sup>2</sup> “Ends” is the situation which the state seeks to realize. “Means”

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<sup>2</sup> Lawrence Freedman, *Strategy: A History*, kindle edition, (Oxford University Press, 2013).



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refers to specific tools to achieve ends and actions using these tools. And “ways” implies how to combine these tools and actions. Strategy is a systemic logic combining “ends,” “ways,” and “means” to indicate what a country wants to achieve and how it wants to achieve it.

The ends, ways, and means are linked in a layered way. For a state, “grand strategy” is the strategy at the highest layer. In the national security realm, national security strategy would be located at the second layer following the nation’s grand strategy, and military strategy would constitute a third layer. Not just defense, but technological strategy, economic strategy, and diplomatic strategy would also be located in these lower layers following grand strategy. In these layers of strategies, a grand strategy outlines the goals and broad measures that the state intends to achieve, and strategies at the lower layers are actually ways and means of the grand strategy, even though these strategies have their own combination of ends, ways, and means.

Where is technology located in these layers? Technology influences the potential of the tools. It is about ways and means, rather than ends. And also, it determines a range of a nation’s achievable goals. The ends of a grand strategy are basically based on the aspiration of a decisionmaker.<sup>3</sup> But the aspiration needs to be balanced with available resources, which includes technology. In this sense, technology affects grand strategy. Edward Luttwak provides a useful view on technology in strategy. He depicts the hierarchy of strategy as five levels incorporating technology: the technological level, the tactical level, the operational level, the theater strategy, and the grand strategy.<sup>4</sup> The feature of this arrangement is that the technological level forms an independent layer.

The other four levels move down from grand strategy, to theater strategy, the operational level, and lastly the tactical level, but the technological level is not necessarily below the tactical level. In the other four levels, ends, ways, and means are determined respectively. However, in the technological level, ends, ways, and means are not set, so the technological level is different from the other four levels. Technology may change the means available at other levels, with a corresponding change in the range of ends available. Technology affects the way in which other levels of strategy are organized in this way.

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<sup>3</sup> John Lewis Gaddis, *On Grand Strategy*, kindle edition, (Penguin Books, 2019), p.20.

<sup>4</sup> Edward N. Luttwak, *Strategy: The Logic of War and Peace* (The Belknap Press of Harvard University Press, 2001).



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### *How much does Technology Define the “Ends” of Strategy?*

While technology plays a unique role in strategy, technology itself does not define the ends of grand strategy. At the grand strategy level, the ends are formulated through the consideration of the balance of power in international politics and the state of international norms, and other political variables. The technology determines the range of achievable ends, but technology cannot narrow down specific objectives. In other words, technology, like economic power and the geographical environment, is one of the factors that defines the range of ends, ways, and means in strategy, but does not define the actual ends of the strategy. In general, technology can affect the tools used to play the game but not the game itself, with some exceptions.

In history, there have been cases where technological progress fundamentally changed the range of ends, though it seldom happens. Steamships and railways are two exceptions. Steamships enabled mass and high-speed transportation at sea, and steam-propelled warships gave great military superiority to European powers at that time. With the technological revolution of steamships, European major powers could set out to build a worldwide colonized empire as an end of their strategy. Without this technological revolution, the history of the nineteenth century would have looked very different, as European major powers would not have been able to expand their territories and colonies all over the world. Furthermore, these powers would have been unable to come up with the strategic objective of building an overseas empire in the first place.

The railway also realized mass and high-speed transportation on the ground and created a transportation network without depending on maritime transportation. Railways enhanced the means of continental powers and expanded the available range of ends. This brought about a major game change at the grand strategy level, which was reflected in Halford John Mackinder’s “Heartland Theory.”<sup>5</sup> He considered railways to have provided a definitive comparative advantage for continental powers and argued the interior of Asia and Eastern Europe had become the strategic center.

In a somewhat different way, atomic science also brought about a significant strategic change known as the “nuclear revolution,” and the notion of nuclear deterrence emerged to lessen the likelihood of wars between major powers. The emergence of nuclear weapons

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<sup>5</sup> Halford John Mackinder, *Democratic Ideals and Reality: A Study in the Politics of Reconstruction* (Franklin Classics, 2018).



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fundamentally changed the game of international politics and affected the range of ends, and also created the distinct intellectual concept of “nuclear strategy.” This fundamentally transformed the utility of war as a tool of statecraft, as Bernard Brodie pointed out shortly after the first nuclear strike. He argued that the purpose of military power has changed from “win the war” to “avoid the war,” under the fear of nuclear devastation.<sup>6</sup> In this way, nuclear weapons marginalized the significance of the use of military force to “fight and win” and instead made “detering major war” a prioritized end of strategy.

These game-changing technological developments share some commonalities. The steamship and railway deeply transformed the patterns of movement of people and goods, which changed the meaning of geographical conditions. In other words, the technology of railways and steamships changed the “map” on which international politics is based. And the nuclear revolution brought a different “shape” and changed the nature of war, which is an important tool of international politics. But generally speaking, technology does not define ends. This is the case with the information revolution, discussed in the following section.

### *The Information Revolution and Strategy*

The information revolution has greatly changed human social life, and the military sphere is not an exception. As was the case for the information revolution, which is the most recent and significant example, technology often transforms the way of war. The impact of the information revolution on war was actively debated in the U.S. strategic community from the late 1990s to the early 2000s, as “Revolution in Military Affairs (RMA)” or “transformation.”<sup>7</sup> The characteristics of the RMA can be summarized as improved battlefield awareness, precision attacks through the use of precision-guided weapons, and greater use of broadband networks to share information inside and outside of the battlefield and to share information from “sensor” to “shooter.” William Owens, who was the Vice Chairman of the U.S. Joint Chiefs of Staff and one of the initiators of these discussions, published the book *Lifting the Fog of War*.<sup>8</sup> As the title of this book symbolically indicates, the application of the information revolution to the military would be expected to eliminate the “fog of war” that Clausewitz pointed out in the nineteenth century.

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<sup>6</sup> Bernard Brodie, “Implications for Military Policy,” in Frederick S. Dunn, Bernard Brodie, Arnold Wolfers, Percy E. Corbett, and William T.R. Fox, *Absolute Weapon: Atomic Power and World Order* (Harcourt Brace and Company, 1946), p.76.

<sup>7</sup> National Defense Panel, “Transforming Defense: National Security in the 21st Century,” (December 1997).

<sup>8</sup> Bill Owens with Ed Offley, *Lifting the Fog of War* (Farrar, Straus and Giroux, 2000).



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The U.S. military demonstrated the tremendous lethality of the military application of the information revolution in the Gulf War, Kosovo, Afghanistan, and Iraq. Now, China also has developed its application of the information revolution. China has developed highly accurate theater ballistic missiles, which until 2018 the United States was unable to develop because of the INF treaty, and has developed its own reconnaissance-strike complex. Moreover, China's development of precision-guided munitions (PGMs) has demonstrated that the United States no longer has a monopoly on precision-guided missiles.<sup>9</sup> Due to the proliferation of PGMs, long-range precision missiles will be utilized by more than one party in a war, unlike in the Gulf War. This new strategic reality is known as the "PGM regime."<sup>10</sup>

In this way, technology expanded the toolkit for the ways and means of China's strategy. At the same time, technology has not changed the game of international politics itself. The information revolution coincided with the end of the Cold War and the advancement of globalization during the 1990s. These parallel changes make it difficult to discern the distinct impact that the information revolution had on international politics. If the Cold War had not ended in the late 1980s, or if "great power competition" between the United States and China had begun in the mid-1990s, the impact of the information revolution on the world would have been completely different. In this sense, the information revolution did not change the range and the way to formulate the ends of a strategy. Revolutionary technological change may cause fundamental change of the range of ends of strategy, as was the case for the steamship, but this was not the case for the information revolution.

### *Grand Strategy Matters*

Globalization accelerated by the information revolution has changed the way of human life. But classical power politics has not been wiped out. China's rapid economic development and military modernization has made China assertive, as its activities in the South China Sea, East China Sea, and Taiwan clearly demonstrate. And the resurgence of Russia and the autocratic tendency of the Putin administration have created tensions in Europe since 2014, when Russia annexed Crimea. Moreover, Putin even started a war against Ukraine in February 2022. Given the current international security environment, which has fundamentally changed since the post-Cold War era, the United States and its allies recognize the era of great power

<sup>9</sup> Recent analysis on China's precision guided strike forces, see Department of Defense, "Military and Security Developments Involving the People's Republic of China," (November 2021), <https://media.defense.gov/2021/Nov/03/2002885874/-1/-1/0/2021-CMPR-FINAL.PDF>.

<sup>10</sup> Thomas G. Mahnken, "Weapons: The Growth & Spread of the Precision-Strike Regime," *Daedalus* Vol. 140, Issue 3, (2011, Summer), pp. 45–57.



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competition has returned.

What kind of grand strategy should the United States and its allies employ to manage great power competition? Theoretically, there are multiple choices. One extreme strategy is setting the regime change of China and Russia as a goal. At the other end of the spectrum is conceding to China and Russia and accepting their “sphere of influence” to their desired extent. In the middle of these extremes, multiple strategies can be sought. One strategy is to physically block China and Russia’s expansion through cooperation among the United States and its allies, and other like-minded countries, without aiming at regime change but formulating global and regional norms that are comfortable for liberal and democratic countries.

Now, the United States and its allies seek such a middle option between extremes, as represented by Japan’s “Free and Open Indo-Pacific” vision. This choice in strategy was not determined by technology. Political or values-based considerations are drivers for the current strategies of the United States and its allies.

The way to apply technology, especially its defense application, will be determined by this basic choice of strategy, even though information technology has a deep impact on the way of human life. If the United States and its allies seek regime change of autocratic countries, then technology will be expected to develop capabilities suitable for invasion or direct threat to the competitor’s regime. On the other hand, if the United States and its allies choose to concede to China and Russia’s expansion, the application of technology for defense would be limited.

### **Diagnosis of the Strategy-Technology Relationship in Great Power Competition**

#### *The Shape of the Great Power Competition “Chessboard”*

The ongoing great power competition between China and the United States has cast a great shadow over every issue of security policy. The application of emerging technology is not an exception. In the case of the U.S.-Japan alliance, technology should be applied in a way that enhances the comparative advantages of Japan and the United States. What Japan and the United States do will affect what China will do, and vice versa. And this interactive process is not as fair and square as chess, as the same number of chess pieces and the shape and size of the chessboard is the same. In international politics, such a situation rarely occurs. Some



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countries have more power than others (following the analogy of chess, some countries have more chess pieces than others), and since no enforceable referee exists, some countries even break rules determined by international law. In short, a “chessboard” in international politics is not fair and square. The first thing to do when thinking about strategy is to recognize the shape and characteristic of the “chessboard.” Without that, an appropriate policy agenda cannot be determined. This is considered during “net assessment,” and it is very important to think about when formulating a strategy for long-term competition.<sup>11</sup> While thorough net assessment requires enormous resources and efforts, this paper tries to develop a rough sketch of grand strategy and the strategic impact of geography, to identify the shape and characteristics of the chessboard for competition between the U.S.-Japan alliance and China.

Table 1 shows a rough sketch of the chessboard, focusing on grand strategy and geographical characteristics of China, Japan, and the United States.

**Table 1:** Rough sketch of grand strategic and geographic characteristics of the “chessboard”

	China	Japan	The United States
Grand Strategy	Challenging the Status Quo	Status Quo	Status Quo
Geography	Strategic Depth	Lack of strategic depth; Ocean barrier	Ocean barrier; Tyranny of distance/strategic depth
Military Posture	Advantage of in-theater military balance and theater missile forces	Lack of theater missile forces; Inferiority of in-theater military balance	Inferiority of in-theater military balance (depends on deployment situation); Superiority in total military balance; Superiority of nuclear forces

One clear contrast exists in grand strategy. Regardless of the location—East China Sea, Taiwan, or South China Sea—China intends to challenge the status quo, with some uncertainties about how ambitious it will be regarding “beyond Taiwan” issues, while Japan and the United States want to maintain the status quo. Geography also indicates a significant contrast. In East Asia, China enjoys strategic depth, which is provided by the vast size of its territory, while Japan lacks strategic depth, because of its archipelago geography. China’s strategic depth provides incomparable invulnerability as China can build multiple airbases deep inside of its territory. Thus, outside powers would need to overcome dense air defenses to

<sup>11</sup> Thomas G. Mahnken, ed., *Net Assessment and Military Strategy: Retrospective and Prospective Essays*, (Cambria Press, 2020).



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attack them. The United States enjoys strategic depth on the one hand, but it is a double-edged sword, because the United States needs to overcome the “tyranny of distance” on the other hand. In other words, distance may protect the United States but will also make it harder to operate given logistical challenges.

Combining grand strategy and geographic characteristics, one important strategic insight is apparent. To change the status quo, China will need to send People’s Liberation Army (PLA) troops across the ocean barrier. On the other hand, Japan and the United States (and Taiwan also) can utilize the ocean barrier to maintain the status quo. The benefit of this combination of grand strategy and geographical characteristics is significant. While China needs to implement successful amphibious operations (defeating Japanese and U.S. air and naval forces) to change the status quo, Japan and the United States need only to repel China’s invasion force. Even a stalemate would lead to a successful defense of the status quo.

### *Denial Strategy*

The characteristics of the military balance show another contrast between China and the U.S.-Japan alliance. Looking at a simple comparison of defense expenditures, the United States seems to enjoy significant military superiority, because U.S. defense expenditures were three times as large as China’s defense expenditures in 2021.<sup>12</sup> However, this conclusion is too simple and a misinterpretation of the regional reality. First, China deploys almost all of its military forces on the Chinese mainland, while the U.S. military presence is globally distributed. Second, in East Asia, China enjoys favorable in-theater military balance. This reality, combined with China’s strategic depth and its superiority of theater missile forces (a product of China not having signed the INF treaty) paints a more complex picture. On the other hand, the United States would enjoy a favorable military balance if it could concentrate its military forces in the theater from all over the world.

This difference between in-theater and global military balance makes time an important factor. At the early phase of a war in East Asia, like in a Taiwan Strait conflict, China’s superiority in in-theater military balance will give it a significant advantage. In this phase, China can deploy all of its forces near Taiwan, while the United States must respond to China’s military challenge only with its pre-deployed military forces in the theater. Combined with the advantage of surprise attack by its quantitatively superior ballistic and cruise missiles,

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<sup>12</sup> The International Institute for Strategic Studies, *Military Balance 2022: The Annual Assessment of Global Military Capabilities and Defence Economics* (International Institute for Strategic Studies, 2022).



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China would enjoy a favorable military balance in the early phase of a conflict, which may last several months.

To offset this unfavorable in-theater military balance, the United States needs to mobilize its military forces from other parts of the world. This may require a certain degree of time, like six months or more, as was the case for Operation Desert Shield in 1990. After completing the global mobilization, the United States would regain a favorable military posture in the Western Pacific and could launch counter-offensive operations. In short, the military balance between China and the U.S.-Japan alliance will shift in accordance with the timeline. The longer the conflict continues, the more likely the United States will regain a regional military advantage, although China will enjoy superiority in the short term.

Recently, the Japanese and U.S. strategic communities have reached a consensus that a strategic denial posture will be an efficient military strategy.<sup>13</sup> Strategic denial posture prioritizes capabilities to physically block China's expansion, while downplaying capabilities to hold China's mainland at risk, like a heavy amphibious invasion capability. This military strategy perfectly fits the current grand strategy, which intends to block China's expansion but not to pursue regime change. This thinking puts a premium on ground based anti-ship and anti-air capabilities, in addition to sea-based and airborne anti-ship capabilities, as a key component of denial military posture. And denial strategy would be suitable for "buying time" for U.S. global mobilization. But to implement this denial strategy successfully, one thing needs to be considered: the lethality of China's theater strike capability. If China has the capability to find, tag, and track a moving platform both on the ground and at sea, both ground-based and sea-based denial capabilities of the U.S.-Japan alliance may be neutralized. Therefore, how to mitigate the effectiveness of China's PGM regime will be an important issue to address.

### **How to Apply Technology to Reinforce a Denial Strategy**

#### *Limitations of the PGM Regime*

Precision-guided missiles strengthen China's anti-access/area denial (A2/AD) capabilities. At the same time, the effect of long-range PGMs can be limited under certain conditions. The accuracy of PGMs depends on information: without accurate and timely information of the target's location, the PGM cannot effectively destroy the target. This is more

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<sup>13</sup> Elbridge Colby, *The Strategy of Denial: American Defense in an Age of Great Power Conflict* (Yale University Press, 2021).



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true about movable targets, such as transporter-electron launchers of missiles.

Considering such an “Achilles heel,” in a war between great powers with significant counter-space, cyber, and electro-magnetic warfare capabilities, each side will make the maximum effort to deny information about target location. If these campaigns to make enemy sensors “blind” succeed, the party with blinded sensors cannot successfully target and destroy enemy assets using PGMs. And if both sides conduct successful blinding campaigns, both sides cannot effectively employ long-range precision guided missiles. However, even in such a “mutually blinded” situation, the location of fixed targets can be detected by peacetime surveillance activities, and therefore airstrips and ground-based radar systems can be destroyed.

### *Keeping the Fog of War*

The proliferation of the PGM regime represents the continued trajectory of military technology development demonstrated by the Gulf War in 1991. But a PGM’s effectiveness relies on Intelligence, Surveillance, and Reconnaissance (ISR) capabilities and information sharing through networks. As explained above, if ISR sensors do not work or the network is not reliable because of cyberattacks, one cannot launch a precision strike.

The impetus for “RMA” was to develop ISR capabilities and a network to share target information to “lift” the fog of war. In this context, sensor- and network-related technology determines the effectiveness of PGMs. Efforts to realize RMA were based on the belief that technological development can make removal of the fog of war possible, through high-speed and broad bandwidth networks and high-resolution (including space-based) sensors. However, this is just one side of the coin. Technology can also be applied to “keep” the fog of war. Stealth technology enables low-observability aircraft and other vehicles that are not easy to detect. Counterspace technology can neutralize space-based sensors and networks. Cyberattacks can increase the degree of distrust of the information in the network and one cannot launch PGMs based on unreliable target information. Electro-magnetic warfare capabilities, such as jamming and spoofing, also can deceive an adversary’s sensors and jam precision navigation based on the Global Positioning System (GPS).

How technology, especially emerging technology, affects the fog of war will determine the future effectiveness of the PGM regime. Machine learning, a part of artificial intelligence (AI), will improve sensor resolution especially for mobile objects. Therefore, it will contribute to reducing the fog of war. On the other hand, one industrial application of AI, “materials



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informatics,” which makes manufacturing novel materials very effective utilizing machine learning, may create new stealth materials or other military-applicable materials. Also, additive manufacturing (3D printing) may drastically decrease the cost of manufacturing low observatory platforms. AI may also simultaneously work in both directions. Machine-learning-based jamming would be effective to make the adversary’s sensor blind, but machine-learning-based electronic countermeasures could also neutralize such jamming. Similar potential two-way effects would also apply in the case of cyberattacks. Whether AI-based cyberattacks can beat AI-based cyberdefense, or vice versa, is a difficult question to answer. Quantum technology also can work both ways. In short, the effect of emerging technology on the future of the fog of war is unknown.

### *Keeping the Fog of War or Lifting the Fog?*

Characteristics of grand strategy and geography are an important variable for determining whether to keep or lift the fog of war. As observed in the previous section, China’s grand strategy has a tendency to challenge the status quo, while the U.S.-Japan alliance’s grand strategy is to maintain the status quo. To implement that grand strategy, the U.S.-Japan alliance can take advantage of the ocean barrier separating the United States and China. A denial strategy emphasizing the role of ground-based missile assets would be one means toward that end.

However, if China’s PGM regime works very well, through accurate and real-time target acquisition including mobile platforms, the vehicles for denial strategy could be neutralized. If China deploys accurate high-resolution sensors in space and air, and target information is shared between the sensor and shooter in real-time, even mobile launchers of ground-based anti-ship missiles and anti-air missiles would be vulnerable to China’s strike forces, and denial strategy would be very difficult to employ.

On the other hand, if Japan and the United States can succeed in blinding China’s sensors and degrading the reliability of its network, China cannot effectively launch its long-range PGMs.<sup>14</sup> This means that for the U.S.-Japan alliance, in terms of denial operations, the thicker the fog of war, the better. With more dense fog of war, military assets of Japan and the United States can be protected, through the fog’s impact to limit the range of sensors.

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<sup>14</sup> Stephen Biddle and Ivan Oelrich, “Future Warfare in the Western Pacific: Chinese Antiaccess/Area Denial, U.S. AirSea Battle, and Command of the Commons in East Asia,” *International Security* Vol. 41, No.1 (Summer 2016), pp.7-48.



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Of course, to implement a denial strategy, the alliance would need to acquire target information of Chinese military assets. But considering geographic characteristics, the prioritized target of the alliance would be China's vessels at sea and the air assets escorting them. Since China's grand strategy is to change the status quo, it would need to dispatch amphibious forces going across the Taiwan Strait or East China Sea. If the U.S.-Japan alliance can intercept these amphibious forces, the alliance can achieve the strategic objective to maintain the status quo. While fixed facilities such as airstrips could be destroyed by China's salvo of their ballistic missiles, if mobile anti-ship assets can survive, the alliance can deny China in achieving its strategic objective. Therefore, the alliance does not necessarily need to launch deep strike against China's mainland. Moreover, unlike China, the alliance does not need to "lift" the fog of the war inside China's mainland. But to intercept China's amphibious forces, the alliance needs to lift the fog of war at sea.

In summary, despite the proliferation of PGMs, the lethal effect of long-range PGMs is limited without long-range reliable sensors. If technology can lift the fog of war, long-range PGMs can have a formidable effect even against a relocatable target, while if the fog of war is kept, the effect of long-range PGMs will be limited. Whether emerging technology will lift it or keep it is still unclear, but investment decisions should be determined based on strategic considerations about which is favorable for the U.S.-Japan alliance. Considering the strategic situation, since the alliance would take a denial posture against China's bid to challenge the status quo, keeping the fog of war over alliance assets will provide precious strategic benefit. Therefore, Japan and the United States should set investment priorities for defense technology to keep the fog of war by blinding China's sensors and degrading the reliability of China's network.

### **Policy Recommendations**

1. *Focused application of existing technology and investment in emerging technology for blinding and degrading China's sensors and network*

The first thing to do is to enhance counterspace, cyberattack, and electro-magnetic spectrum capabilities to make China's sensors blind and China's network unreliable. If this is realized, the lethality of China's precision guided missiles will be significantly degraded. In Japan, space, cyber, and electro-magnetic spectrum capabilities were set as major components of defense forces in the National Defense Program Guidelines of 2018. This paper recommends that Japan should formulate more concrete objectives for these capabilities, specifically to



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degrade China's battlespace awareness capabilities in the Western Pacific. More specifically, Japan and the United States should develop blinding and dazzling capabilities through laser illumination against China's space-based sensors and enhance cyber-strike capabilities to degrade the reliability of China's information network.

In addition, some of China's precision guided ballistic missiles and hypersonic missiles may utilize satellite navigation. Especially, for hypersonic missiles, inertia guidance systems are less accurate considering their high maneuver in the atmosphere. Therefore, jamming capabilities against satellite navigation, such as China's Northern Star and Russia's Glonass, would be one important option to degrade China's precision-guided missiles.

These efforts can be conducted by existing technology. But emerging technology should be utilized as well. With a clear strategic objective to degrade China's sensors and network, the development and application of emerging technology should be more efficiently pursued.

### *2. Investment of emerging technology for maritime battlespace awareness*

One of the most important components of denial posture is the "denial" capability against China's maritime and amphibious forces. But China will also strive to develop these capabilities, specifically to blind the alliance's sensors and to degrade its network. To neutralize China's efforts for blinding and degrading, the alliance needs to invest significant resources in countermeasures.

To do this, the alliance should utilize the strategic advantage of its denial posture. The U.S.-Japan alliance requires target acquisition capabilities at sea, but it does not necessarily need to extend this to China's mainland. Therefore, the alliance can focus on developing battlespace awareness capabilities for the Western Pacific, East China Sea, and South China Sea including the Taiwan Strait with countermeasures against China's efforts for disruption.

Conventionally, space-based sensors and airborne sensors loaded on manned aircraft would be major pillars of such a capability. But these sensors would be vulnerable against China's disruption. To counter this vulnerability, the alliance should invest more in unmanned airborne sensors including inexpensive and light models, such as those that have been utilized recently during the war in Ukraine. Of course, the maritime environment requires more range and resiliency against bad weather conditions but combining swarming technology and light



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drones will create some resiliency and can make China's efforts to disrupt the alliance's sensors more complex.

### 3. *Enhancing law enforcement organizations' cyber and space resiliency*

This is more about existing technology, but it is important. The showdown between the Chinese and Japanese coast guards in the East China Sea has continued since 2010. One serious concern for the U.S.-Japan alliance is an escalation from a situation in the gray zone. In the gray zone, the military organization (in this case the Self-Defense Forces or SDF) plays a supporting role, while the law-enforcement organization such as the coast guard and the police are expected to play the main role. The challenge for the law-enforcement organization in a gray zone situation is that it is generally more vulnerable to China's disruptive tactics using the non-kinetic options of space and cyber. If China conducts GPS jamming, for example, coast guard vessels and helicopters will struggle with navigation. And in such a situation, they cannot even identify where the line of territorial water is and will face difficulties in dealing with China's challenge to the status quo.

Escalation control is also critically important in a gray zone situation and requires micromanagement by political leadership. However, if China conducts heavy jamming to disrupt communications, including uplink jamming against communication satellites, and shuts down communication links to provide precise information about the situation to the central government in Tokyo, China will have a decisive strategic advantage over Japan.

To avoid such a situation, the resiliency of the Japanese Coast Guard against China's counterspace, cyberattack, and electro-magnetic capabilities should be enhanced, in addition to the measures for the SDF.

## **Conclusion**

Technology is an important ingredient of defense policy. Technology can be a catalyst for transforming "ways" and/or "means" of strategy. For example, ballistic missile defense (BMD), which is an application of cutting-edge technology, transformed the Japanese SDF. After introducing BMD, the JSDF was able to conduct organizational reform for joint operations, and this transformed operational culture in the SDF.<sup>15</sup> At the same time, technology

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<sup>15</sup> Sugio Takahashi, "The Japanese Perception of the Information Technology-Revolution in Military Affairs: Toward a Defensive Information-Based Transformation," in Emily O. Goldman and Thomas G. Mahnken, eds., *The Information Revolution in Military Affairs in Asia* (Palgrave Macmillan, 2004), pp.81-95.



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does not dominate strategy. Even technology from the information revolution, in the context of ongoing great power competition, does not determine “ends,” though it is a critical enabler of “ways” and “means.” In this sense, technology is a tool to achieve “ends” of strategy.

Theoretically, there could be a wide range of grand strategies, from regime change to concession to the autocratic country’s expansion. In reality, both Japan and the United States have not adopted such extreme options. The current grand strategy for the U.S.-Japan alliance is defined by a desire to block Chinese expansion in the Indo-Pacific. In the military sphere, denial strategy is key to accomplishing this end. This paper argues that the application of technology should enable such a denial strategy and proposes three policy recommendations: blinding and degrading China’s sensors and information network; investing in technology for maritime battlefield awareness; and enhancing law enforcement organization’ cyber and space resiliency.

With consistent efforts to develop sophisticated technology since the end of the Cold War, China has filled the technological gap that existed between China and the United States and Japan. The U.S.-Japan alliance can no longer take technological advantage for granted and should prioritize strategic investments in technology to shift the balance of power and further its capacity to maintain regional security.