

ENSURING JAPAN'S FUTURE AIR SECURITY: RECOMMENDATIONS FOR ENHANCING THE JASDF'S READINESS TO CONFRONT EMERGING THREATS

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EXECUTIVE SUMMARY

This study is intended to examine the state of the air security situation around Japan and analyze the country's preparations for its future air defense in response to emerging threats. The report focuses particularly on scrambles, known as air policing, which are conducted by fighter aircraft in peacetime and gray-zone situations. Recently, the number of scrambles conducted by the Japan Air Self-Defense Force (JASDF) has been rapidly increasing, mainly because of China's coercive efforts to change the territorial and sovereign status quo. China has been applying "salami slicing" tactics in the ocean, gradually expanding its activities further into the Pacific in a piecemeal fashion. It has also been pursuing a similar strategy in the air by changing the quantity and quality of its air activities since declaring the establishment of a new Air Defense Identification Zone (ADIZ) in the East China Sea in 2013. China's peacetime expansion strategy poses a qualitatively different threat to its neighbors than they experienced during the Cold War. Amid China's ongoing military buildup, the People's Liberation Army (PLA) increasingly relies on non-traditional platforms to conduct its operations, especially unmanned aerial vehicles (UAVs). Japan's constitution and domestic laws place a significant constraint on its military's ability to respond using force to such new threats. However, even removing this legal restraint would be insufficient to effectively counter China's salami slicing strategy. More importantly, Japan must work with the United States to pursue a coordinated response to China's new coercive measures in peacetime and gray-zone situations.

Based on the above considerations, this report underscores the need for Japan to develop a new method of air policing. In so doing, it first examines the characteristics of the current homeland air security situation around Japan and addresses the challenges and dilemmas of air policing. Second, the air security situations of the United States, the United Kingdom, and Norway are briefly addressed, in an attempt to draw on lessons learned from these countries' challenges that are applicable to Japan. In the United States, the Air National Guard, a component of the world's strongest air force, holds responsibility for scramble missions. The Civil Air Patrol, funded by the U.S. Air Force budget, plays a complementary role in patrolling the vast U.S. mainland, although it does not carry out scramble missions. The United Kingdom has a similar geographical

situation to Japan and employs noteworthy methods in its air policing procedures. Norway is on the frontline of NATO's defense against Russian aircraft. Third, by analyzing the behaviors and strategies of the leadership in China and Russia, this paper seeks to ascertain the future intentions of these countries, particularly in the air domain. Finally, specific recommendations are provided as to how Japan can enhance its future air security to limit China's ability to expand its air activities further into surrounding waters while avoiding further escalation. Namely, Japan should:

- adopt separate approaches to its scramble responses, to deal with different political motives behind Russian and Chinese air activity in the vicinity of Japan;
- diversify the number and types of sensors and countermeasures, including the deployment of new technologies to cope with UAVs, using UAVs in scramble missions, and employing air refueling aircraft during scramble missions; and
- explore the establishment of an indigenous "Civil Air Patrol" to expand the scope of aerial observation and provide a career pathway for a new generation of JASDF pilots.

INTRODUCTION

In fiscal year (FY) 2016, the *Koku-Jieitai*, known as the Japan Air Self-Defense Force (JASDF), conducted more scrambles than it has since 1958, in response to potential intrusions of the country's territorial air space, mainly by Chinese and Russian aircraft. In total, the JASDF launched 2,336 fighter jets as part of 1,168 scrambles in FY2016.¹ Although in FY2017 the total number of scrambles conducted by the JASDF decreased to 904, this number remains high.² In fact, the JASDF has carried out the most scrambles in the world in recent years, which has taken a notable toll on the JASDF, exhausting its limited human resources and equipment. At the same time, the JASDF faces a new nonconventional threat from unmanned aerial vehicles (UAVs).

Japan should consider adjusting its methods of air policing to accommodate the particular threats it faces, drawing on other countries' experiences. Specifically, this paper examines applicable lessons learned from the air policing methods of the United States, the United Kingdom, and Norway. Because of the unique factors affecting Japan, the JASDF must consider separate approaches in how it responds to potential air intrusions from aircraft originating from Russia and China. Given that no major changes are expected regarding Russia's air activity and the country's intentions toward the Far East region in the near future, Japan can likely maintain its "traditional" scramble methods against Russian aircraft and potentially even reduce its scramble activity by pursuing a policy of "strategic silence" that takes into account the nature of the threat.

On the other hand, China is trying to change the territorial and sovereign status quo in peacetime and in gray-zone situations by expanding its military operations in a way that does not lead to conflict with other countries, essentially allowing it to "win without fighting." This has been especially true in the East China Sea. Since the Senkaku Islands (known in China as the Diaoyu Islands) were nationalized in 2012, Japan Coast Guard (JCG) vessels and JASDF aircraft have been working overtime to monitor and trail every Chinese intrusion at sea and in the air. Therefore, it is important for Japan to develop effective countermeasures against China's expansionist strategy, which relies on incremental "salami slicing" tactics to advance its power projection in peacetime and gray-zone situations. It is worth noting, however, that the JCG and JASDF, which primarily bear the burden of responding to China's coercive efforts, have been strictly constrained by constitutional and domestic legal restrictions that limit the first use of force against enemy fighters in many of these situations. This issue should be considered in evaluating potential future countermeasures against China.

This paper lays out specific tactical recommendations for scramble missions conducted by the JASDF in peacetime and gray-zone situations for two reasons. First, military leaders should examine tactics that can effectively counter China's salami slicing strategy while acting within the legal constraints mentioned above. Second, these tactical recommendations for the JASDF provide an important supplement to the suggestions provided by studies on the PLA Air Force (PLAAF) produced in the United States, which tend to address the issue of China's air activities from a more strategic level. For example, recent RAND Project Air Force (PAF) analyses of the PLAAF are extremely valuable because of the strategic-level insights they provide into China's longer-term

^{1 &}quot;Statistics on scrambles through fiscal year 2016," (Tokyo: Ministry of Defense, April 13, 2017), http://www.mod.go.jp/js/Press/press2017/press_pdf/p20170413_02.pdf.

^{2 &}quot;Statistics on scrambles through fiscal year 2017," (Tokyo: Ministry of Defense, April 13, 2018), http://www.mod.go.jp/js/Press/press2018/press_pdf/p20180413_07.pdf.

efforts to enhance the power projection capabilities of its expeditionary force.³ In contrast, studies of the PLAAF in Japan focus first on the present air security situation, given Japan's close proximity to China. In other words, because the JASDF must confront China's air activities on a daily basis, Japan is more attuned to the nuances of gradual changes in PLAAF behavior, and it uses these observations to predict future changes.

To address future threats, this paper proposes three main recommendations for the JASDF, two near-term and one long-term. First, in the short term, Japan needs to urgently consider the introduction of necessary measures and technologies for coping with UAVs in air policing. Specifically, Japan should consider methods and technologies to confirm whether UAVs are really "unmanned," ways to disable or exploit the signals that comprise the UAVs' command and control, and kinetic mechanisms to "capture" UAVs that violate territorial air space. Second, Japan should consider the use of aerial refueling aircraft to lengthen mission duration and enhance effectiveness. Third, in the long term, Japan should consider operating UAVs itself in air policing operations, both to counter the PLA's increased number of UAVs operating in the East China Sea and to provide a more cost-effective means of conducting intelligence, surveillance, and reconnaissance (ISR), and scramble operations in the future.

Finally, it is worth exploring the establishment of a Japanese Civil Air Patrol to create a diversity of observation options and to demonstrate to the public the country's strong willingness to defend its sovereignty.

CHAPTER ONE: THE AIR SECURITY ENVIRONMENT AROUND JAPAN

I. The characteristics of the air security environment around Japan

1. Geopolitical situation

Japan occupies one of the most geopolitically challenging regions in the world, as it is surrounded by the ocean and confronts three potential competitors. On January 19, 2018, the U.S. Department of Defense (DoD) released the summary of its National Defense Strategy, which defines China and Russia as long-term strategic competitors and characterizes North Korea and Iran as rogue regimes. Japan confronts three of these four countries in its immediate region. In addition, China exhibits unbridled ambition to expand its military activities not only toward the East China Sea, but also into the Pacific Ocean.

Looking at the map of Japan from the perspective of China, the Japanese archipelago serves as a sort of "lid" that prevents China from foraying into the Pacific Ocean. A long chain of islands, which runs southward from Japan to the Philippines, lies just off China's coastline. The Japanese archipelago encloses the Yellow Sea and the East China Sea, and its westernmost island is located only 60 nautical miles (NM) from Taiwan's east coast. For China, the stark geographic reality is that the most direct routes to the Pacific high seas pass through choke points formed by Japanese islands. To many

³ Cristina L. Garafola and Timothy R. Heath, "The Chinese Air Force's First Steps Toward Becoming an Expeditionary Air Force," (Santa Monica, CA: RAND Corporation, 2017), https://www.rand.org/content/dam/rand/pubs/research_reports/RR2000/RR2056/RAND_RR2056.pdf; Mark Cozad and Nathan Beauchamp-Mustafaga, "People's Liberation Army Air Force Operations over Water: Maintaining Relevance in China's Changing Security Environment," (Santa Monica, CA: RAND Corporation, 2017), https://www.rand.org/content/dam/rand/pubs/research_reports/RR2000/RR2057/RAND_RR2057.pdf.

Chinese strategists, Japan is an island barrier obstructing China's entry into the oceanic thoroughfare, restricting their nation's rightful maritime ambitions.⁴

During the Cold War, under the U.S. containment policy, Japan played an important role as a breakwater in the Far East against the expansionist Soviet Union because of its geopolitical position.⁵ In recent years, however, Japan's strategic focus has shifted from the north to the southwest, as it has become increasingly important to protect the country's southwestern islands in the face of China's increasingly coercive activity.

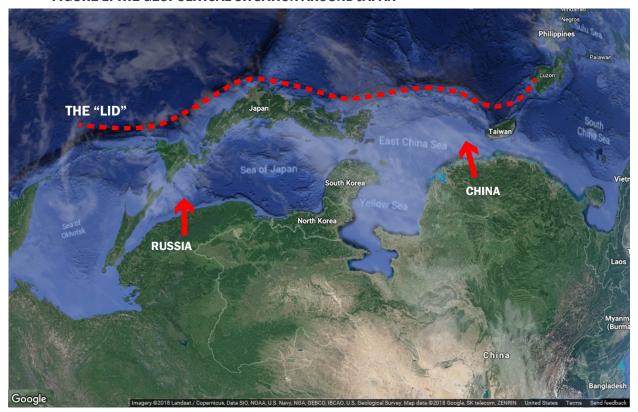


FIGURE 1: THE GEOPOLITICAL SITUATION AROUND JAPAN

2. JASDF objectives and capabilities

Since its establishment, the core of the JASDF's mission has been to conduct scrambles. Changes in the number of scrambles over the years, conducted in response to potential airspace intrusions, are related to the nature of the threat environment in each era. During the Cold War, the JASDF's role in responding to airspace violations in the Far East region, where the former Soviet Far Eastern Air Force was highly active, was essential to deterring the aviation activities of the Soviet Union Armed Forces.⁶ After the collapse of the Soviet Union, the number of scrambles dropped temporarily. However, under Vladimir Putin's regime, Russia's air activity has ramped up again. China has also increased its air activities amid the country's rapid economic growth and the overall development of its military capabilities, likely reflecting the political ambition of the country's leaders.

⁴ Toshi Yoshihara, "Troubled Waters: China and Japan Face Off at Sea," World Affairs, January 1, 2014, http://www. worldaffairsjournal.org/article/troubled-waters-china-and-japan-face-sea.

⁵ Yoshikazu Watanabe, Masanori Yoshida, and Masayuki Hironaka, "The U.S.-Japan Alliance and Roles of the Japan Self-Defense Forces: Past, Present, and Future," (Washington, DC: Sasakawa Peace Foundation USA, 2016), 4, https:// spfusa.org/wp-content/uploads/2017/01/US-Japan-Alliance-JSDF.pdf. 6 Ibid., 26.

Scrambles seek to maintain Japanese sovereignty of its airspace against other countries' political and military encroachment by aerial vehicles. To conduct scramble missions. Japan has set up an Air Defense Identification Zone (ADIZ) beyond its territorial airspace, where it operates fighter jets to intercept unknown aircraft flying toward Japan's territorial airspace. Japan's ADIZ includes an overlapping ADIZ between Japan and China near the Senkaku Islands, since China declared the establishment of a new East China Sea ADIZ in November 2013.

Northern Territories Japanese territorial airspace ROK ADIZ "East 6 Japan ADIZ Ogasawara Senkaku Islands Islands Taiwan AD 00 0 Yonaguni Island The ROK expanded its ADIZ in December 2013 ADIZ: Air Defense Identification Zone Philippines ADIZ

FIGURE 2: AIR DEFENSE IDENTIFICATION ZONES (ADIZ) OF JAPAN AND ITS NEIGHBORING COUNTRIES

Source: Defense of Japan 2017, 321, Fig.III-1-2-5

The JASDF is the only organization capable of carrying out scramble missions in Japan because of its sensor technologies, high-performance fighter aircraft, command and control systems, and highly-trained personnel. Under international law, countries have complete and exclusive sovereignty over their territorial airspace. Launching scrambles against aircraft intruding into this airspace is an exercise of this sovereign right to maintain public order, and the Self-Defense Force (SDF) is the only entity that has the legal mandate to carry out these actions. Therefore, the JASDF is primarily responsible for conducting the actions based on Article 84 of the Japanese SDF Law.⁷

Since 1958, the JASDF has taken every possible measure to prevent unidentified aircraft from intruding into Japan's territorial airspace by scrambling its fighter aircraft. To accomplish this task, Japan operates seven tactical fighter bases: one in Hokkaido

^{7 &}quot;Defense of Japan 2017," (Tokyo: Japan Ministry of Defense, 2017), 320, http://www.mod.go.jp/e/publ/w_ paper/2017.html.

(Chitose), three in Honshu (Misawa, Komatsu, and Hyakuri), two in Kyushu (Tsuiki and Nyutabaru), and one in Okinawa (Naha). The JASDF uses the F-15, the F-4 (to be eventually replaced by the F-35), and the F-2 for scramble missions. The JASDF also operates radar sites in 28 locations throughout the country as well as early warning aircraft equipped with surveillance sensors.

3. Number of scrambles conducted by the JASDF

Table 1 shows country-specific data for Japan's scramble missions. In comparison with Russian aircraft, the activities of Chinese aircraft have been skyrocketing in recent years. In FY2016, there were 851 scrambles against Chinese aircraft. Whereas the five-year average of scrambles between FY2003-07 stood at 37 per year, the recent five-year average between FY2013-17 has grown to 560 per year, representing an increase of roughly 15-fold. Although in FY2017 the number of scrambles against Chinese aircraft decreased slightly to 500, the figure remains high.⁸

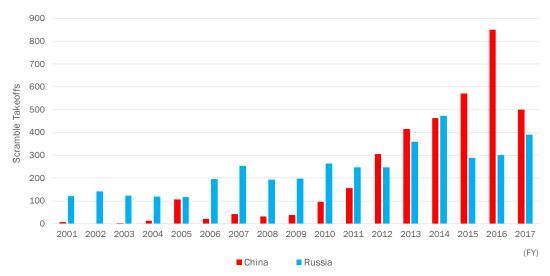


TABLE 1: JAPANESE SCRAMBLES IN RESPONSE TO RUSSIA AND CHINA

Source: Joint Staff Office "Statistics on scrambles through fiscal year 2017", Ministry of Defense, April 13, 2018. Joint Staff Office "Statistics on scrambles through fiscal year 2013", Ministry of Defense, April 23, 2014. Joint Staff Office "Statistics on scrambles through fiscal year 2008" (In Japanese), Ministry of Defense, April 23, 2009.

Table 2 shows the relationship between the number of Japanese scrambles in response to Chinese aircraft and the leadership in Beijing at the time. President Hu Jintao was the leader of China from 2002 to 2012. During his tenure, the scramble frequency slightly increased. However during Xi Jinping's regime, the number has been increasing steadily and rapidly. Because Xi's command and control over the PLA was not absolute at the beginning of his tenure, it is difficult to attribute the uptick in air activity at that time to Xi's political motives. In addition, Japan's nationalization of the Senkaku Islands in 2012 triggered a strong response from China's hardliners (including members of the PLA) who argued that "war against Japan is inevitable." This position conflicted with some political leaders, including Xi, who desired a less confrontational approach toward Japan. Consequently, while China's air incursions tend to be politically motivated, given these circumstances, it is unclear whether the rise in air activity seen early in Xi's tenure

^{8 &}quot;Statistics on scrambles through fiscal year 2017."

⁹ Bonji Ohara, *Chugoku-no-gunjisenryaku* [Japanese] (Tokyo: Toyokeizai-shinpousha, 2014), 71. 10 Ibid.

came at his direction. For example, the dramatic rise in Chinese aerial activity in the vicinity of Japan in 2005, during Hu's tenure, when Japanese scrambles against Chinese aircraft increased from 13 the previous year to more than 100, is likely attributable to hardliner pressure following the Japanese government's decision to award oil and gas drilling rights in a disputed maritime area to a Japanese firm. Nevertheless, now that Xi has consolidated his power base and assumed greater control over the military following institutional reform, it is likely the PLA's air activities will more directly reflect his political motives going forward.

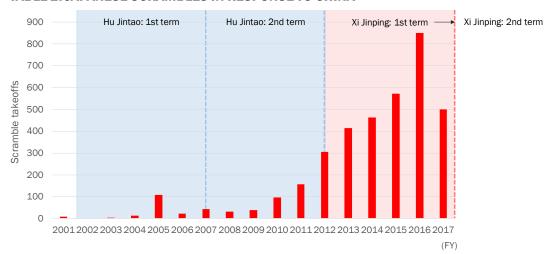


TABLE 2: JAPANESE SCRAMBLES IN RESPONSE TO CHINA

Source: Joint Staff Office "Statistics on scrambles through fiscal year 2017", Ministry of Defense, April 13, 2018. Joint Staff Office "Statistics on scrambles through fiscal year 2013", Ministry of Defense, April 23, 2014. Joint Staff Office "Statistics on scrambles through fiscal year 2008" (In Japanese), Ministry of Defense, April 23, 2009.

Table 3 depicts the relationship between the number of Japan's scrambles in response to Russia and the leadership in Moscow. Compared with China, the overall trends are more stable. However, in comparison to President Vladimir Putin's first and second presidential terms, Russian air activity increased significantly during his third term. Putin made domestic rebuilding his top priority during his first two presidential terms, suggesting that Russia's recent increased air activity reflects the country's economic growth and domestic stability. While Russian leadership faces few political constraints that would restrain the country's future air activity, deteriorating prospects for economic growth, particularly in the domestic natural gas industry, would likely prevent the rapid expansion of Russia's air activities.

¹¹ James L. Schoff, "Uncommon Alliance for the Common Good: The United States and Japan After the Cold War," (Washington, DC: Carnegie Endowment for International Peace, 2017), 125, https://carnegieendowment.org/files/CEIP_Uncommon_Alliance_final_full.pdf.

Putin: 1st term
Putin: 2nd term
Medvedev: 1st term
Putin: 3rd term
Putin: 3rd term
Putin: 4th term

TABLE 3: JAPANESE SCRAMBLES IN RESPONSE TO RUSSIA

Source: Joint Staff Office "Statistics on scrambles through fiscal year 2017", Ministry of Defense, April 13, 2018. Joint Staff Office "Statistics on scrambles through fiscal year 2013", Ministry of Defense, April 23, 2014. Joint Staff Office "Statistics on scrambles through fiscal year 2008" (In Japanese), Ministry of Defense, April 23, 2009.

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017

II. JASDF air policing challenges and dilemmas

1. Significance of peacetime scramble missions

To maintain a safe environment during peacetime, the most important role of the military is to deter the actions of potential adversaries by demonstrating its readiness and capabilities. Peace and order are not assured and must be maintained and managed. Consequently, scramble readiness is a practical and critical consideration for preventing invasion, as one of the opportunities when a country can show its strong will to protect the sovereignty of its territorial airspace. Unlike in the maritime world, there is no right of innocent passage in a country's territorial airspace. This is mainly due to the high speed of aircraft and their strike-range capability. Therefore, each country protects its 12NM of territorial airspace from its coasts by using fighter jets to counter unknown aircraft.¹²

2. Challenges

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a. Demonstrating a will to protect sovereignty and independence

Japan is comprised of a little over 6,800 islands and is surrounded by a wide sea area that includes the world's sixth-largest Exclusive Economic Zone (EEZ). Japan must demonstrate a strong will to protect the sovereignty of its territorial airspace above these islands. To confront China's coercive and increasing number of air activities in the East China Sea, Japan has increased the number of F-15 fighter squadrons based at Naha Air Base in Okinawa from one to two since January 2016. In addition, Japan is strengthening its ISR capability around the East China Sea to deal rapidly with unknown aircraft flying toward these remote islands. Japan relies on a continuous early warning and surveillance system around the East China Sea provided by the E-767 AWACS (early warning and control aircraft) and the E-2C (early warning aircraft). In addition, an E-2C squadron unit was reassigned to Naha Air Base in April 2014 to strengthen continuous early warning and surveillance. In 2017, to further enhance its defense posture toward the southwest, Japan upgraded the Southwestern Composite Air Division to a larger Southwestern Air Defense Force.

¹² While skepticism and controversy remain as to whether 12NM is sufficient to protect a country's territory from long-range air-to-ground missiles and even more advanced bombs, this issue is beyond the scope of this research paper.

13 "Defense of Japan 2017." 318.

^{14 &}quot;Defense of Japan 2014," (Tokyo: Japan Ministry of Defense, 2014), 183, http://www.mod.go.jp/e/publ/wpaper/2014.html.

b. Avoiding escalation

While scramble missions first aim to prevent any intrusion of unknown aircraft into Japanese territorial airspace, they also seek to avoid escalation. Tensions between countries can easily be raised in the air. The air forces of democratic countries, including Japan, maintain strict discipline and rules of engagement for scramble missions. Each pilot follows a carefully choreographed series of procedures. However, there have been several incidents in the past caused by the unlawful acts of Chinese aircraft. For instance, in April 2001, a PLA Navy (PLAN) F-8 fighter suddenly headed toward a U.S. Navy EP-3 reconnaissance aircraft and collided with it, causing the F-8 to crash into the ocean. The EP-3 made an emergency landing on China's Hainan Island at the PLAN's airfield and China detained the 24 crew members for 11 days. 15 This incident proved how easily airborne mishaps can develop into diplomatic problems, as the newly inaugurated George W. Bush administration faced its first major foreign policy crisis.¹⁶ Although there have not been any accidents more recently, there have been frequent cases in which PLAAF fighters abnormally approached aircraft of the JASDF and the Japan Maritime Self-Defense Force (JMSDF), which were flying normal patrol missions over the East China Sea. 17 PLAAF fighters are also speculated to have conducted dangerous acts several times by approaching U.S. aircraft at a high speed over the East China Sea in June 2016 and in May 2017.18

3. Dilemmas

a. Exhausting resources of the JASDF and negatively impacting training opportunities

As noted above, the JASDF launched more than 2,300 fighter jets for scramble missions in FY2016. Obviously, such a high number of scrambles will adversely affect opportunities for fighter pilots to perform other training intended to improve or maintain their combat skills. Although scramble missions are critically important, they do not provide sufficient training for the pilots on state-of-the-art weapon systems or aggressive combat maneuvers.

b. Legal constraints

As mentioned above, countries have complete sovereignty over their territorial airspace, and do not allow the right of innocent passage. Therefore, it is an accepted international practice when this sovereignty is infringed upon by foreign military aircraft to either expel the aircraft, force it land, or even shoot at the aircraft if it refuses the prior actions. However, legal constraints make it extremely difficult for Japan to execute the harshest of these options. Although the Japan Self-Defense Force is a recognized military internationally, 60 years after its establishment, its use of force remains severely restricted by domestic laws. Also, the Japanese public views its role in ensuring national

¹⁵ Shirley A. Kan et al., "China-U.S. Aircraft Collision Incident of April 2001: Assessments and Policy Implications," (Washington, DC: Congressional Research Service, October 10, 2017), https://fas.org/sgp/crs/row/RL30946.pdf. 16 Ibid.

^{17 &}quot;Defense of Japan 2017," 189.

¹⁸ Ibid.

¹⁹ For example, a Turkish F-16 shot down a Syrian Air Force Mig-23 in March 2014. Turkey insisted the jets were warned to turn back at least four times, starting about 10 miles from the border. Turkey's F-16 also shot down a Russian Su-24 in November 2015. According to Turkey, the aircraft was fired upon while in Turkish airspace because it violated the border after being warned to change its heading 10 times over a period of five minutes before entering the airspace.

defense as secondary to its responsibility for carrying out disaster relief operations.²⁰ Because Japan regards scrambles as a peacetime duty, the use of force is limited to that of a police action.²¹ Although a minimum use of force is allowed in air policing activities as a police action—just enough for Japanese aircraft to protect themselves—it is a different situation than the use of unlimited force to protect sovereignty.²² In reality, however, it is almost impossible for the JASDF to shoot down military aircraft that invade Japan's airspace or to take other forms of hostile action, as other countries do.²³

Because the JASDF is constrained by domestic laws, its range of options in handling potential air intrusions is much more limited than other countries. This limitation has reduced the effectiveness and deterrent effect of scramble missions. However, this constraint can also be an advantage, if used to undercut Chinese arguments that Japan's air policing activities are provocative. For example, in June 2016, the Chinese Defense Ministry claimed that two JASDF F-15 fighter aircraft approached two PLAAF Su-30 fighters at high speed and illuminated them on radar in the East China Sea ADIZ. China also claimed that flares fired by the JASDF aircraft in response to the reaction of the PLAAF fighters was a provocative action. Given public knowledge of the constraints under which JASDF aircraft operate, China's attempt to sway international opinion against Japan was unsuccessful.

c. Asymmetric competition

The JASDF will necessarily find ways to conduct scrambles to accommodate the current scale of air activities. However, if China increases its unconventional air activities, for instance by increasing the number of UAVs or light airplanes it uses to conduct air operations or by becoming more reliant on ship-launched aircraft, Beijing would gain an asymmetric advantage over Tokyo. Japan would be forced to spend comparatively more of its budget to launch expensive fighter jets against these cost-effective light aircraft or UAVs. For example, U.S. F-35As and F-15Cs had estimated hourly operating costs of \$28,455 and \$23,124 respectively in 2016, while the Predator and Reaper class UAVs had an hourly operating cost of only about \$550 and \$850.²⁴

d. Replacement of fighter aircraft may inflict other harms

Given the high operational expenses of defense equipment, cost-effectiveness will be a key consideration for future competitiveness. Japan has been replacing its aging F-4 aircraft with the F-35, which will increase costs considerably for each hour of flight. In addition, China and Russia may try to collect signals intelligence on the new F-35 fighter jets to enhance their own capabilities. Since the F-35's ability to collect, analyze, and share data is a powerful force multiplier enhancing all assets in the battlespace, competitors are very much interested in gathering this signals information. Taking these circumstances into account, the use of F-35s for scramble missions needs to be carefully considered.

²⁰ Sadamasa Oue, "Kenpoukaisei-de-Jieitai-wo-guntai-ni-seyo" [Japanese], (Tokyo: Japan Forum for Strategic Studies, January 2018), 72, http://www.jfss.gr.jp/index.php/Home/Index/kiho_page/id/197.

²¹ Yoshikazu Watanabe, Masanori Yoshida, and Masayuki Hironaka, "The U.S.-Japan Alliance," 26.

²² Ibid.

²³ Ibid.

^{24 &}quot;Fiscal Year (FY) 2016 Department of Defense (DoD) Fixed Wing and Helicopter Reimbursement Rates," (Washington DC: Office of the Under Secretary of Defense, October 2, 2015), https://comptroller.defense.gov/Portals/45/documents/rates/fy2016/2016 f h.pdf.

III. Suggestions from U.S. experts

Admiral Dennis Blair, who served as commander of the U.S. Pacific Command (USPACOM, now the U.S. Indo-Pacific Command, or USINDOPACOM) before retiring from the Navy in 2002, suggests that Japan should pursue a policy of "strategic silence." 25 During an interview with the author, he insisted that Japan needs patience to ignore some of the aircraft operating near its airspace in a strategic way. For instance, if the JASDF identifies an aircraft as a reconnaissance plane, it may choose to ignore that aircraft. While this may seem as though it could jeopardize Japan's security, the United States, in fact, applies this practice in its own homeland air defense against Russia.²⁶ Admiral Blair's suggestion may be well-suited for Japan's approach toward Russia as well. However, the same strategy may not be as effective in dealing with Chinese aircraft. China's flights toward the Senkaku Islands or the East China Sea intend primarily to present a fait accompli—if the JASDF ignores China's air activity, it may potentially fuel Chinese propaganda.

James Schoff, a senior fellow at the Carnegie Endowment for International Peace's Asia Program, suggests that Japan should use a forward airfield (near the Senkaku Islands) for its scramble operations.²⁷ In an interview with the author, he pointed out the long distance between Naha and the Senkaku Islands. In addition, Schoff emphasized that the deployment of fighter aircraft closer to the Senkaku Islands would send a strong message to China indicating Japan's intent to protect its sovereignty. However, the only airfield suitable for fighter aircraft in the area is a private field located on Shimoji Island, creating an unsettled legal question as to whether military aircraft could use a civilian airfield.

CHAPTER TWO: METHODS OF AIR POLICING IN OTHER COUNTRIES

I. The United States of America

The Air National Guard (ANG) is responsible for the air defense of the entire United States. 28 As the name implies, the ANG conducts standby missions under the direction of a state governor, but after taking off for scrambles, the mission is carried out under Title 10 (a federal mission activated under 10 U.S.C. 12301(d)).²⁹ Since scramble missions provide for national defense, the pilot becomes active duty under the command of the U.S. Northern Command (USNORTHCOM) during the flight.³⁰ In other words, with regard to scramble missions, the ANG has a seamless relationship with the U.S. Air Force (USAF). Currently, the United States uses 16 air bases for air scramble missions and operates F-15, F-16, and F-22 aircraft.31 According to an ANG officer who works under the ANG director at the Pentagon, and who is also an F-15 pilot, the United States selects the location of its scramble bases not only based on the size of the coverage area, but also the density of the population and the location of political and economic centers. Hence, the scramble bases are concentrated in the country's northeast and

²⁵ Interview with Admiral Dennis Blair, December 12, 2017.

²⁶ Interview with an Air National Guard officer, January 4, 2018.

²⁷ Interview with James Schoff, February 6, 2018.

^{28 &}quot;Air National Guard," U.S. Air Force, http://www.af.mil/About-Us/Fact-Sheets/Display/Article/104546/air-nationalguard/. (In Alaska, the U.S. Air Force is partly responsible for scramble missions.)

²⁹ Interview with an Air National Guard officer, January 4, 2018; Reserve components generally, 10 U.S.C. § 12301 $(1952), \ https://policy.defense.gov/portals/11/Documents/hdasa/references/10\%20USC\%2012301.pdf.$ 30 Ibid.

³¹ Ibid.

are more scattered in the south.³² The United States focuses its air policing activities primarily within its territory rather than responding to foreign threats (as is the case in the United Kingdom, Norway, and Japan) owing to the country's comparatively larger domestic general aviation community.

The ANG has not released statistics on the annual number of scrambles. However, according to the latest set of unclassified statistics on sortie flights from FY2010, the ANG carried out more than 1,300 sorties that year to protect U.S. airspace.³³ Since it is common to launch a pair of fighter jets during a scramble mission, it can be inferred that more than 650 scrambles were conducted that year. In practice, however, most unauthorized intrusions into restricted airspace are erroneously caused by private light planes such as Cessnas.³⁴ Consequently, the ANG has tried to reduce the number of scrambles by working with the Federal Aviation Administration (FAA) to alter the identification procedure for rogue aircraft. According to the ANG officer, the total number of scrambles has declined compared to 2010.

1. Strategic silence against Russian aircraft

The ANG officer also mentioned that USNORTHCOM may apply strategic silence in dealing with Russian aircraft.³⁵ For example, for long-range bombers like the Tu-95 heading toward the mainland of the United States, USNORTHCOM may not launch fighter jets in response.³⁶ There is no doubt that the Tu-95 is completely monitored by radar, and it will be intercepted by fighters if it shows unusual movement. The decision about whether or not to dispatch the scramble aircraft is not consistent, however, allowing the United States to maintain strategic unpredictability against Russia.³⁷

2. Application of auxiliary volunteer forces (Civil Air Patrol)

It should be noted that there is a unique structure in the United States that contributes to the flexibility of air-centric, non-combat missions using the Civil Air Patrol (CAP) as the U.S. Air Force auxiliary. CAP is a federally chartered nonprofit corporation for the public good that, among other things, assists the USAF in fulfilling its non-combat programs and missions, and to carry out missions assigned by the USAF secretary as the official auxiliary of the air force.³⁸ Currently, CAP is comprised of approximately 60,000 members, organized in 1,535 units in 52 "state" wings (the 50 states, Puerto Rico/U.S. Virgin Islands, and the District of Columbia), in eight regions.³⁹ CAP owns over 500 Cessna aircraft and over 900 vehicles to execute these missions.⁴⁰

The ANG conducts scramble missions while still performing many other Air Force-related roles and missions. The CAP assists with the ANG's training by posing as a slow-moving

³² Ibid.

^{33 &}quot;Air National Guard." U.S. Air Force.

 $^{34\,}$ Interview with an Air National Guard officer, January 4, 2018.

³⁵ The U.S. Northern Command has the authority to launch and control fighters on scramble missions.

³⁶ Interview with an Air National Guard officer, January 4, 2018.

³⁷ The Treaty on Open Skies, which has been in effect since January 1, 2002, may allow unarmed aerial surveillance flights over the territory of its participants (the United States and Russia have ratified the treaty). However, the surveillance aircraft must pass specific certifications and pre-flight inspections, so the Tu-95 bomber cannot be used in accordance with this treaty.

³⁸ Interview with a U.S. Air Force Lt. Colonel Jeremy Hodges, November 6, 2017.

³⁹ Jeremy Hodges, "Using auxiliary forces to accomplish strategic objectives," *Air and Space Power Journal* 32, no. 2 (Summer 2018): 50-59, https://www.airuniversity.af.mil/Portals/10/ASPJ/journals/Volume-32_Issue-2/V-Hodges.pdf. 40 Ibid.

target when training the fighter pilots. Although CAP does not have the authority or capability to intercept aircraft, it complements the ANG's mission by conducting a variety of non-combat missions under the umbrella of "emergency services." As an example, during the 9/11 terrorist attacks, all aircraft over the U.S. mainland were ordered to land, but four hours later, CAP aircraft were allowed to take off for aerial observation missions to assess damages. 42

The USAF's budget for the CAP in FY2017 was about \$40 million, which has been increasing proportionally with the USAF's overall budget each year. The Federal Emergency Management Agency (FEMA) also requests CAP assistance for disaster relief missions through USNORTHCOM and provides funding for these missions at an exponentially lower cost than is required to use military assets. The CAP budget is used to conduct training flights (including orientation flights for cadets and ROTC cadets), aerial observation missions, search and rescue missions, disaster relief missions, and intercept training missions (for USAF fighter training).

The CAP also plays a major role in youth outreach and building aviation enthusiasm. The CAP has sent many cadets to the USAF and a virtuous cycle has been created wherein the skilled pilots who retire from the USAF can volunteer with the CAP to educate candidate pilots.⁴⁵

II. The United Kingdom

Geopolitical similarity and geostrategic dissimilarity with Japan

Similar to Japan, the United Kingdom is surrounded by the ocean and is comprised of many islands. It is essential to protect the sovereignty of those islands and their territorial airspace. However, there is a clear dissimilarity with Japan regarding the threat facing the United Kingdom and the country's distance from that threat. Since the Cold War, the United Kingdom's major strategic state competitor has remained Russia, a considerable distance away. In contrast, Japan faces two state competitors and one rogue regime in relatively close proximity. When Russia carries out long-distance flights toward Britain, their aircraft usually fly over the Norwegian Sea. Consequently, the Royal Norwegian Air Force (RNORAF) will react first to the potential threat. Therefore, in terms of air policing, there are notable strategic differences between the United Kingdom and Japan.

The European scramble measures taken by the Royal Air Force (RAF), preparation for Quick Reaction Alert (QRA)

The RAF has continued QRA missions 24 hours a day, 365 days a year since the 1950s. ⁴⁶ In recent years, the RAF reduced the number of QRA bases from three to two, all located on the country's east coast. ⁴⁷ The RAF currently operates from RAF Coningsby, which is

⁴¹ Ibid.

⁴² Ibid.

⁴³ Interview with a U.S. Air Force Lt. Colonel Jeremy Hodges, November 6, 2017.

^{44 &}quot;Civil Air Patrol Involved in Certain Missions, but DHS Should Assess the Benefits of Further Involvement," (Washington, DC: United States Government Accountability Office, November 2012), https://www.gao.gov/assets/650/649765.pdf.

 $^{45\,}$ Interview with a U.S. Air Force Lt. Colonel Jeremy Hodges, November 6, 2017.

 $^{46\,}$ Interview with a Royal Air Force officer, October 13, 2017.

⁴⁷ The three bases were RAF Leuchars, RAF Leeming, and RAF Coningsby.

located in the south, and RAF Lossiemouth in the north. 48 Looking at the total land area, although the United Kingdom is approximately 65 percent the size of Japan, the United Kingdom has a NATO commitment to defend the alliance's air defense region, which expands well beyond national boundaries over the sea. Recently, the RAF updated its QRA fighter aircraft from the Tornado F3 to the Typhoon. As a result, the RAF executes QRA missions with greater air-to-air capability.

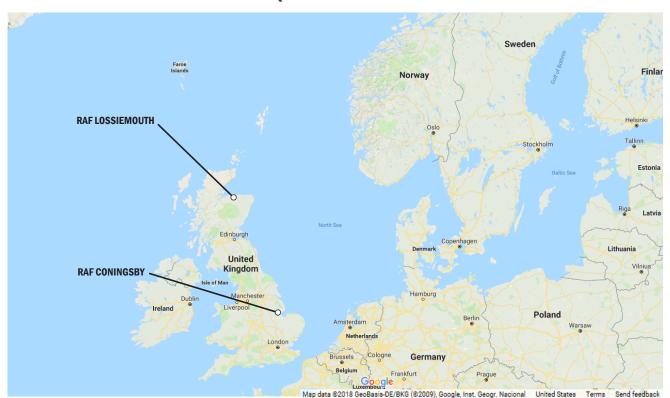


FIGURE 3: TWO BASES FOR RAF'S ORA

The main threat to U.K. air security comes from Russian aircraft. As noted above, they usually fly over the Norwegian Sea, and the Royal Norwegian Air Force conducts the initial response. Russian aircraft also fly over the Baltic Sea, yet never fly over the Denmark Strait. Therefore, the RAF's main focus for conducting QRA missions is over the Norwegian Sea, providing ample time to prepare for interception. Of course, pilots and operators maintain their readiness for immediate takeoffs not only to intercept aircraft from Russia, but also to intercept other aircraft piloted by state and non-state actors.

It is worth noting that the RAF usually launches air refueling aircraft for QRA missions as well, so that fighter jets can maintain sufficient fuel to complete the long-duration flights. Like the fighter aircraft, the tanker aircraft and crews are also on standby to conduct QRA missions. The missions against Russian aircraft are conducted under the command and control of NATO, and the operators of these missions generally maintain high situational awareness provided by the NATO operation center. The NATO operation center also decides whether to use the tanker aircraft. Given U.K. air refueling capabilities and its upgraded fighter aircraft, the decision to reduce the number of QRA bases from three to two is unlikely to negatively impact the country's air defense readiness.

⁴⁸ The RAF maintains the facilities' QRA functionality so that the RAF can rebuild QRA capability easily and quickly in case of a change in circumstances.

III. Norway

The Royal Norwegian Air Force's QRA

The most critical geopolitical situation for the RNORAF is the country's close proximity to Russia. Norway is the first country to respond with QRA missions against Russian aircraft flying toward the Norwegian Sea.⁴⁹ In order to accomplish QRA missions, the RNORAF currently operates one QRA base (Bodo Air Force Base) and uses F-16 aircraft.⁵⁰ As in the United Kingdom, QRA missions in Norway are conducted under NATO's chain of command. The Combined Air Operations Centre (CAOC) in Germany issues the quick reaction order.

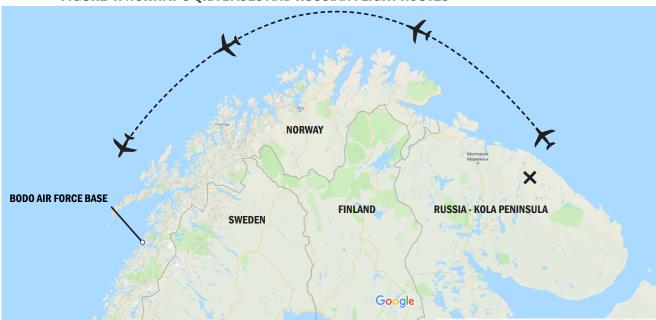


FIGURE 4: NORWAY'S QRA BASES AND RUSSIAN FLIGHT ROUTES

It should be noted that the RNORAF conducts significantly fewer QRAs than Japan. The RNORAF conducted 37 QRAs in calendar year (CY) 2017, 20 in CY2016, and 30 in CY2015.⁵¹ In the Cold War era, the average number of QRAs was about 100 to 200 per year.⁵² In comparison, the JASDF scrambled 390 times against Russian aircraft in FY2017, 301 times in FY2016, 288 times in FY2015, and 473 times in FY2014.

Sometimes, Russia operates aircraft over the Baltic Sea when flying toward the west, in which case the Baltic Air Policing mission (described later) established by NATO countries will respond. Although NATO does not release the number of QRA missions in the Baltic Sea, it publicly released intercept statistics from September 2014 to December 2014. Within these three months, NATO fighter aircraft intercepted Russian

⁴⁹ Both Norway and Finland border Russia, whereas Sweden does not. Neither Finland nor Sweden border the Barents Sea or the Norwegian Sea, and would have to fly over Norwegian territory to access those areas. Consequently, Norway is the only country that will launch aircraft to identify Russian flights as they come out of the Kola Peninsula in western Russia.

⁵⁰ Interview with a Royal Norwegian Air Force colonel, January 18, 2018.

⁵¹ Ibid.

⁵² Ibid.

aircraft 70 times.⁵³ Therefore, if adding together the estimated number of QRA missions in both the Norwegian Sea and the Baltic Sea, the total could be approximately equal to the number of Japan's scrambles against Russia. This comparison suggests that the magnitude of Russian air activity west and east of its borders is nearly the same.

With regard to this comparison, it is important to note that countries consider classified their criteria for launching scramble missions. However, every country likely conducts scramble missions when an unknown aircraft is confirmed by radar and has a possibility of becoming a threat to the country. Moreover, both the JASDF and the RNORAF launch multiple scrambles in response to long-range aircraft. Like Japan, the RNORAF has not carried out the aforementioned strategic silence against Russian aircraft. Therefore, these similar criteria for scrambles between the Japanese and Norwegian air forces make this comparison of Russian flights to its east and west reasonable.

Norway acquired a total of 72 F-16s in the 1980s and recently began replacing its F-16s with F-35s. The country plans to purchase up to 52 F-35s and use them for QRA missions as well. Therefore, the RNORAF may face problems such as the cost effectiveness of using the latest fighter aircraft and the possibility that adversaries may seek to collect signals intelligence on the jets, a dilemma similar to that which faces Japan.

The Norwegian strategy for Russian aircraft

In an interview with the author, a Norwegian Air Force officer noted that, "In terms of the Russian strategy, while utilizing NATO as a deterrent, Norway is making various restraints to show that it will not become a threat to Russia more than now." Norway has maintained a good relationship with Russia by exercising restraint in several matters. For example, Norway has not allowed the establishment of a permanent allied force station in the country and does not conduct joint exercises with its allies east of the 24th meridian east. In fact, Russian aircraft normally do not follow flight paths unnecessarily close to Norway over the Norwegian Sea. Norway's self-imposed restrictions have seemed to help the country avoid conflict with Russia.

IV. NATO air policing in the Baltic Sea

NATO air policing, a collective peacetime defense mission, ensures the safety of airspace surrounding NATO countries, and this collective defense approach formed the core of NATO's founding treaty.⁵⁷ Estonia, Lithuania, and Latvia have become NATO members since 2004, but because of their limited defense capacities, other NATO countries (17 countries so far) lead air policing in the Baltics on a rotating basis.⁵⁸ For instance, Norway was responsible for the QRA in the Baltic Sea from May through August of 2015.⁵⁹ The RNORAF deployed about 65 soldiers and other personnel to Siauliai Air

^{53 &}quot;End of 2014 Marks Hand-Over of NATO's Baltic Air Policing," NATO, January 1, 2015, https://ac.nato.int/page5931922/end-of-2014-marks-handover-of-natoE28099s-baltic-air-policing.

⁵⁴ Interview with a Royal Norwegian Air Force colonel, January 18, 2018.

⁵⁵ Ihid

⁵⁶ Ibid. By enforcing these restrictions when it comes to NATO's presence in the eastern areas of Norway, the country demonstrates restraint and a defensive posture. The fact that Norway operates on a regular and predictable basis in the Barents Sea and Norwegian Sea region helps to reduce tension and the need for Russia to "show off." The situation in the Baltic Sea is somewhat different, as documented by various incidents where Russian aircraft have harassed both Swedish and NATO aircraft and vessels.

^{57 &}quot;NATO Air Policing," NATO Allied Air Command, https://ac.nato.int/page5931922/-nato-air-policing.

^{59 &}quot;Baltic Air Policing," *Norwegian Armed Forces*, June 28, 2016, https://forsvaret.no/en/exercise-and-operations/past-operations/baltic-air-policing.

Base in Lithuania.⁶⁰ The mission involved four Norwegian F-16 fighters, two of which were on constant alert. In parallel with the implementation of Baltic air policing by the RNORAF, the United Kingdom deployed Eurofighter Typhoon units to the Amari Air Base in Estonia for their Baltic air policing mission.⁶¹

CHAPTER THREE: THE INTENTIONS OF CHINA AND RUSSIA

I. China's intentions

On October 18, 2017, at the 19th Chinese Communist Party (CCP) Congress, Xi Jinping delivered a speech outlining his vision for the country's future. He announced goals for the completion of the PLA's modernization by 2035 and the transformation of the PLA into a first-tier force by 2050. He also stated China's intent to become a major political and economic power on the world stage by 2049. In his first speech as president in March 2013, Xi called for the realization of a "strong China Dream," a phrase no Chinese leader had ever used before. 62 China's leaders are extremely careful with their language, especially in public. Xi has since made repeated references to the "China Dream" in his speeches. Xi referred to 2049 as the date the dream will be realized—100 years after Mao Zedong's ascension in China and the formation of the communist state. 63

Although previous Chinese leaders tried to hide their ambition and put China's "100-year marathon" goal aside, Xi has declared clearly his desire to pursue this aim. Of course, this goal is also a response to domestic circumstances, pursuing nationalism to maintain unity. China's leadership has been marked by factional infighting between moderates and hardliners. In November 2013, China unexpectedly announced the establishment of the East China Sea ADIZ, a measure pushed by China's hardline faction. As this case illustrates, China's external actions are often driven by domestic considerations.

Since Deng Xiaoping, every Chinese leader has demanded that the PLAAF strengthen its capabilities, modernize its aircraft, and conduct its operations further outside the country. In addition, Xi has called for the PLAAF to support PLA efforts to defend China's maritime interests and expand the range of its overwater operations since 2014. Accordingly, the PLAAF is seeking ways to develop its long-distance maritime power projection. Accordingly, the PLAAF is seeking ways to develop its long-distance maritime power projection. Accordingly, the PLAAF is seeking ways to develop its long-distance maritime power projection. Accordingly, the PLAAF is seeking ways to develop its long-distance maritime power projection. Accordingly, the PLAAF is seeking ways to develop its long-distance maritime power projection. Accordingly, the PLAAF is seeking ways to develop its long-distance maritime power projection. Accordingly, the PLAAF is seeking ways to develop its long-distance maritime power projection. Accordingly, the PLAAF is seeking ways to develop its long-distance maritime power projection. Accordingly, the PLAAF is seeking ways to develop its long-distance maritime power projection. Accordingly, the PLAAF is seeking ways to develop its long-distance maritime power projection. Accordingly, the PLAAF is seeking ways to develop its long-distance maritime power projection.

⁶⁰ Ibid.

^{61 &}quot;NATO Air Policing," NATO Allied Air Command.

⁶² Michael Pillsbury, *The Hundred-Year Marathon: China's Secret Strategy to Replace America as the Global Superpower* (New York: Henry Holt, 2016), 27.

⁶³ Ibid.

⁶⁴ Bonji Ohara, Chugoku-no-gunjisenryaku [Japanese], 71.

⁶⁵ Cristina L. Garafola, "The Evolution of the PLA Air Force's Mission, Roles and Requirements," in *China's Evolving Military Strategy*, ed. Joe McReynolds (Washington, DC: The Jamestown Foundation, 2016).

⁶⁶ Mark Cozad and Nathan Beauchamp-Mustafaga, "People's Liberation Army Air Force Operations over Water," 7. 67 Ibid.

⁶⁸ Timothy R. Heath, "An overview of China's national military strategy," in *China's Evolving Military Strategy*, ed. Joe McReynolds (Washington, DC: The Jamestown Foundation, 2016).
69 Ihid.

fundamental component of the National Strategy.⁷⁰ The 2013 edition of "The Science of Military Strategy (SMS)," an authoritative Chinese publication detailing the strategic approach the Chinese military will take in the coming years, discusses the measures needed to convey forces abroad in order to carry out the PLAAF's core missions.⁷¹ To fulfill the China Dream, the PLAAF will likely play a more active role in the future.

China is pursuing a salami slicing strategy of incremental power projection into the ocean through a variety of means, from requisitioning fishing boats to directing its surface action forces. Beijing is similarly trying to apply this salami slicing to the sky as well. Admiral Tomohisa Takei, former chief of staff of the JMSDF, believes China can slowly but steadily implement this strategy. As an example, China took time to expand its power projection into the South China Sea to avoid suddenly alarming other countries. It took advantage of the vacuum created by the absence of U.S. and Russian forces to gradually expand its own presence until it had changed the status quo to the point that other countries could do relatively little to push back. Similarly, when China's short-duration aerial activities go unchallenged, there is an implicit acceptance on the part of other countries of Beijing's activities, further emboldening China to extend the duration and scale of its air activity until it changes the status quo. Countries should recognize that the nature of Chinese air activity is evolving.

According to a Japan Joint Staff press release, in FY2016, there were a total of 26 cases of Chinese intrusions into the Pacific, including long-range flights by Chinese fighter jets from the Sea of Japan to the Pacific Ocean, between Okinawa and Miyako Island, for the first time. In 2017, the PLAAF's H-6 bombers were confirmed for the first time flying northeast above the Pacific Ocean all the way to the waters off the coast of the Kii Peninsula near Osaka. In addition, in FY2017, the Japanese Ministry of Defense announced 43 unusual Chinese flights, including 36 flights over the Miyako Strait to the Pacific Ocean, the most ever. Furthermore, in April 2018, in the Pacific Ocean south of Yonaguni Island, several fighters were first observed to be flying from China's Kuznetsov-class aircraft carrier "Liaoning." In summary, China is continuously changing the quantity and quality of its air activities toward the Pacific Ocean. While the PLAN, China Coast Guard, and militia have already made strides in changing the status quo in the East China Sea and the South China Sea using salami slicing tactics, the PLAAF is now pursuing the same strategy in the air.

II. Russia's intentions

Russia balances sharp ambition and concern for its western border, while simultaneously maintaining air activities toward the east. With the number of Japanese scrambles roughly equal to the combined total over the Norwegian and the Baltic Seas, Tokyo has launched a fairly large number of fighter jets for scramble missions each year against Russian aircraft. Russia's air activities may intend to interfere with the United States, as Russia has always closely monitored the United States through the Pacific Ocean and

⁷⁰ Ibid.

⁷¹ Cristina L. Garafola and Timothy R. Heath, "The Chinese Air Force's First Steps Toward Becoming an Expeditionary Air Force." 1.

⁷² Tomohisa Takei, "*Kaijo-boueisenryaku-no-aratana-jikann-to-kuukan*" [Japanese], (Tokyo: Japan Maritime Self-Defense Force Command and Staff College Review, November 2016), 7, http://www.mod.go.jp/msdf/navcol/SSG/review/6-1-s/6-1-s01.pdf.

⁷³ Ibid.

^{74 &}quot;Statistics on scrambles through fiscal year 2016."

^{75 &}quot;Statistics on scrambles through fiscal year 2017."

the Sea of Okhotsk. Cracking the U.S.-Japan alliance by disturbing air security around Japan seems to be Russia's highest priority to the east. Russia claims that the global missile defense system of the U.S. military, including Japan's sites, will compromise strategic stability created by U.S. and Russian nuclear deterrence. Therefore, Russia likely will continue to conduct the same scale of air activities and will try to fracture the friendship between Japan and the United States. In addition, until this strategic goal is achieved, it is unlikely that Russia will cease its air activities. However, unlike China, Russia has no strong desire to change the status quo related to disputed islands with Japan. Nevertheless, control over the Northern Territories remains an irritant in bilateral ties, as Russia illegally continues its effective control of the islands. While there has been a small increase in Russian air activity toward Japan since Putin took office in 2000, a reflection of improvements in Russia's political and economic standing at the time, slowing economic forecasts, attributable to a weaker domestic natural gas industry, are likely to create an environment not conducive to a rapid expansion of air activities.

III. Appearance of UAVs over the ocean

UAVs could provide an asymmetric advantage to China and Russia that would allow them to challenge traditional Japanese and U.S. military capabilities. In the near future, Russia and China are likely to increase UAV flights toward the East China Sea, the Sea of Japan, and the Pacific Ocean. In particular, China's use of UAVs could threaten Japan's security and sovereignty. According to a Japan Joint Staff press release, the JASDF scrambled against what appeared to be a UAV of an unknown nationality flying over the Senkaku Islands for the first time in September 2013. Some media outlets reported this UAV to be a BZK-005 operated by China. In May 2017, a Chinese government vessel that entered Japan's territorial waters near the Senkaku Islands launched what appeared to be a small drone-like object that intruded into Japan's territorial airspace. In April 2018, Japan launched a fighter jet against a Chinese UAV, believed to be a BZK-005 flying over the East China Sea.

China is investing heavily in UAV technologies to support an assortment of ISR and combat-related missions. The CH-5 appears to resemble the U.S. MQ-9, and is said to be capable of flying for up to 30 hours and carrying a substantial weapons package. In addition, China operates propeller-driven UAVs such as the CH-3 and CH-4, and also sells these drones to several countries. Chinese drone companies occupy the largest share of the world's commercial drone market. These companies' technologies probably will be applied to the PLA's UAVs. China has already established multiple UAV brigades and a variety of lower-level organizations operating various types of UAVs.

^{76 &}quot;Statistics on scrambles through fiscal year 2013," (Tokyo: Ministry of Defense, April 23, 2014), http://www.mod.go.ip/js/Press/press2014/press_pdf/p20140423_02.pdf.

^{77 &}quot;Statistics on scrambles through fiscal year 2017."

^{78 &}quot;Suitei-chugokuki-no-Higashi-shinakai-ni-okeru-Hikou-ni-tsuite" [Japanese], (Tokyo: Ministry of Defense, April 18, 2018), http://www.mod.go.jp/js/Press/press2018/press_pdf/p20180418_01.pdf.

⁷⁹ Brendan S. Mulvaney and Kenneth W. Allen, *PLA Aerospace Power: A Primer on Trends in China's Military Air, Space, and Missile Forces*, (Maxwell AFB, AL: China Aerospace Studies Institute, October 24, 2017), 22. 80 Ibid.

⁸¹ Ben Brimelow, "Chinese drones may soon swarm the market — and that could be very bad for the US," *Business Insider*, November 16, 2017, http://www.businessinsider.com/chinese-drones-swarm-market-2017-11.

⁸² According to the drone survey company Droneii, six Chinese companies ranked among the top 10 most popular drone companies in the world, with the Chinese company DJI capturing roughly 65 percent of the global drone market. See "Top20 Drone Company Ranking Q3 2016," *Droneii*, October 2, 2016, https://www.droneii.com/top20-drone-company-ranking-q3-2016.

^{83 &}quot;Armed Forces Overviews," Scramble, 2018, http://www.scramble.nl/orbats/china/airforce.

China's future UAV development poses a major threat to Japan. The PLA will likely seek to develop new models with stealth characteristics to evade its adversaries' air defenses. In addition, China revealed the SW-6 "marsupial," whose folding wings would allow it to launch from large aircraft. This could be a prime candidate for China's drone "swarm warfare." At the Guangzhou Airshow in February 2017, China demonstrated a record-breaking formation of 1,000 UAVs. Military experts quoted in Chinese media at the time highlighted that this technique could be used to create a distributed system with payload modules mounted on small drones. In addition, China is also developing UAVs powered by solar energy. Other developments could allow a group of UAVs with extended cruising time, operated autonomously by artificial intelligence (AI), to occupy an adversary's airspace for an extended period of time, thereby changing the status quo. An unchallenged UAV flight could be an assertion of sovereignty and, therefore, an unmanned platform could pose a greater sovereignty threat than a manned platform.

CHAPTER FOUR: TOWARD THE STABILITY OF AIRSPACE AROUND JAPAN AND THE NEED TO REFORM SCRAMBLING METHODS

I. Things to consider to confront air intrusions by UAVs

Chinese salami slicing tactics to change the status quo using a non-traditional platform, such as UAVs, is a very serious threat facing Japan and the United States in peacetime and gray-zone situations. The potential of UAVs to engage in swarm warfare and operate autonomously for extended periods of time using Al could present a significant challenge to Japan if sufficient preparations are not made to confront such a threat. Japan must explore measures to counter such emerging technologies.

Identification

To conduct scramble missions against UAVs properly, countries must consider several factors. First, the country needs to confirm whether the UAV is unmanned to respond appropriately. Once an aircraft is confirmed to be unmanned, and if the aircraft enters another country's territorial airspace, options to deal with the threat are narrower than in cases when it cannot be determined whether the aircraft is manned or unmanned. This is especially important when dealing with peacetime gray-zone situations. Visual identification will be the first method to identify whether a UAV is manned or unmanned. Recent UAV models can be distinguished by their lack of a canopy and to some extent based on their size. However, visual identification alone is not sufficient to confirm that new, modernized aircraft do not have a specific canopy, and remote-operated models, possibly modified by China, would further complicate identification methods.

In addition, China is dominating the commercial drone market, and it is expected that the development rate of new unfamiliar models will accelerate. As a result, it is important not only for Japan, but for all countries conducting air policing missions during peacetime, to consider measures to confirm whether a target aircraft is manned or unmanned. For example, developments in infrared sensors have advanced such that

⁸⁴ Brendan S. Mulvaney and Kenneth W. Allen, PLA Aerospace Power, 22.

⁸⁵ Ben Brimelow, "Chinese drones may soon swarm the market."

⁸⁶ Elsa Kania, "Chinese Advances in Unmanned Systems and the Military Application of Artificial Intelligence—the PLA's Trajectory towards Unmanned, 'Intelligentized' Warfare," (testimony, U.S.-China Economic and Security Review Commission, Washington, DC, February 23, 2017), 10, http://www.uscc.gov/sites/default/files/Kania_Testimony.pdf. 87 Ibid.

there is a high possibility they could positively identify a human body inside the aircraft. Collecting command and control signals of UAVs could also help identify whether it is an unmanned aircraft. Countries should consider equipping fighter planes or other platforms with these identification devices. Today, disaster relief efforts to search for people inside collapsed buildings or buried underground is helping promote advances in this type of technology. As UAVs pose a threat to many countries now, identification will become increasingly critical. To deal with aircraft capable of flying a few miles in one minute, simplifying the reaction time will become ever more critical.

Neutralization

One potential approach to mitigate the threat posed by UAVs is an electronic system that disables (unguided) UAVs by cutting off or interrupting their communication signals. This could entail radio interference, GPS interference, and software exploitation. ⁸⁸ The final option, in particular, is a versatile counter-drone technique that effectively hacks rogue drones in-flight to control them. ⁸⁹ This offers more flexibility than shooting drones out of the sky by reducing the risk of escalation. It would also be very effective for countering a group of small drones.

Countries could also attempt to capture UAVs that violate their territorial airspace. The PLA has focused on operations under complex electromagnetic conditions, in which UAVs operating via satellite control could be especially vulnerable to interference, whether through jamming or hacking. Given its recognition and apparent exploitation of these vulnerabilities, it is possible that the PLA might focus on progressing rapidly toward autonomy. It kinetic measures, though relatively unsophisticated, will likely continue to be a last resort. Although methods for capturing UAVs are not yet well-established, possible tactics might include using robotic arms or a capture net. The UAV must be captured without critical damage, so it does not escalate the situation during a peacetime gray-zone situation.

A third possible solution could involve assistance from Japan's maritime assets. Close cooperation is needed between the JASDF, the JMSDF, and the JCG to effectively deal with UAV launches. One influential PLA strategist from the Academy of Military Science has argued that advanced UAVs could be used for power projection in long-distance operations. The PLAN might employ ship-based and carrier-based UAVs. Schina is also developing technology to conduct massive UAV "swarm" operations and may employ such tactics even in peacetime as China has employed similar tactics in the past using fishing boats near the Senkaku Islands to reinforce the country's disputed sovereignty claims. Recent models of counter-drone tools weigh less and possess intelligent characteristics. For example, the latest device weighs only 7 pounds and has a passive detector that picks up the frequency that the drone is using and also can disable frequency-hopping drone controllers. Once hit, the drone begins to waver and either slowly drift to the

⁸⁸ Jon Hegranes, "The Past, Present And Future Of Anti-Drone Tech," Forbes, January 26, 2018, https://forbes.com/sites/forbestechcouncil/2018/01/26/the-past-present-and-future-of-anti-drone-tech/#757378a352d6.

⁸⁹ Ibid.

⁹⁰ Elsa Kania, "Chinese Advances in Unmanned Systems," 12.

⁹¹ Ibid.

⁹² For example, the Open Works Engineering Skywall automatic drone capture system physically captures a drone in a net and bring it to the ground safely under a parachute.

⁹³ Elsa Kania, "Chinese Advances in Unmanned Systems," 14.

⁹⁴ Todd South, "This new counter-drone weapon can take down advanced drone communications with less power, weight," *Army Times*, July 16, 2018, https://www.armytimes.com/news/your-army/2018/07/16/this-new-counter-drone-weapon-can-take-down-advanced-drone-communicators-with-less-power-weight/.

ground or return to its controller. 95 Sailors would carry this advanced equipment to deal with UAVs from their ships to drive drones away or capture them.

Consider the use of UAVs for scramble missions

Countries must reconsider the structure of air policing missions. The use of UAVs would make it possible to prolong surveillance times and enable Japan to counter the possible future asymmetry created by Chinese UAV operations. However, there are several points to consider when using UAVs for air policing missions. First, UAV sensor and mobility capabilities must be sufficient to intercept, identify, and monitor the target aircraft, and sufficient airspeed will be needed to ensure a rapid interception. However, the use of more powerful engines could require a tradeoff because added weight and greater fuel consumption could negatively impact the UAV's flight-duration advantage over conventional manned aircraft. Since UAVs have been developed mainly for ISR purposes, it may be difficult to create a cost-effective, highly maneuverable UAV. Second, the use of UAVs for air policing may lower the threshold for pre-emptive attacks by China and Russia given the reduced potential for human casualties. Third, the use of UAVs by both sides may increase the likelihood of incidents, such as midair collisions caused by aggressive behavior or by accident. Fourth, as mentioned above, UAVs may become vulnerable if their control signals are interrupted. Therefore, with constant UAV operations, it is necessary to consider countermeasures against electronic interference.

Despite the above-mentioned challenges, Japan should consider deploying UAVs in air policing operations. The JASDF will begin retiring the fighter jets currently used for scramble missions and introduce new equipment, although it remains unclear which platforms will be used. Nevertheless, Japan must continue air policing as part of peacetime deterrence, and UAVs should be considered as one potential long-term option.

Also, instead of using UAVs as a substitute for fighter aircraft, it is worth considering employing them to carry out ISR functions as a deterrent. While Japan currently relies on fighters to intercept target aircraft to identify them and confirm their intentions, a UAV with a sufficiently capable sensor could serve this function instead. Japan could also employ a hybrid scramble system using fighter aircraft and UAVs, which would allow Japan to maintain strategic unpredictability against China when conducting such missions. Moreover, it would allow Japan to strengthen its presence in the air over the East China Sea by prolonging the endurance time of its air assets.

Regardless of whether Japan uses UAVs as a substitute for fighter aircraft in the future, it must experiment with them. The U.S. military has already accrued decades of experience with UAVs, and China has also gained experience with UAV operations. Japan should begin to gradually train with increasingly maneuverable UAVs to build its own expertise. Such an incremental approach will enable Japan to steadily gain confidence as it develops a culture of UAV operations, which would help facilitate a smoother transition toward using such unmanned aircraft in place of fighter jets in future scramble missions.

II. Use of tankers in scramble missions: Implication from the United Kingdom

Obviously, a long-distance strategic bomber has a longer cruising distance than a scrambled fighter jet. But if the intention of the long-range bomber is to fly around

Japan, Tokyo has to launch several fighters to confront that bomber. Consequently, it makes sense to consider the use of tanker aircraft during scramble missions for aerial refueling. The use of tanker aircraft would allow for a reduction in the number of scrambles and contribute to the effectiveness of the mission. In addition, the ability to extend the endurance of fighter aircraft would enable Japan to strengthen its presence in the skies and provide strategic unpredictability in its operations against China and Russia.

Of course, using tanker aircraft may complicate scramble mission planning and leaves several factors to consider such as the timing of fighter launches and the establishment of meeting points for aerial refueling. In addition, the JASDF currently operates only four KC-767s. The Defense Ministry has announced a plan to procure three more tankers in the current Medium-Term Defense Program (FY2014-FY2018). Yet, even then, the number of aircraft might not be sufficient to maintain an adequate alert standby. However, despite these disadvantages, the added flexibility and mission effectiveness gained by using tanker aircraft during scramble missions makes this a strategy worth pursuing.

III. Consider the introduction of a Civil Air Patrol in Japan

Establishing a Civil Air Patrol in Japan might seem to deviate from the discussion of preparations for scramble missions. However, to prepare flexible air security measures for the future, Japan should explore such an option. As with the CAP in the United States, even if a CAP in Japan were to be established, it would not be usable as an aid for fighter aircraft in scramble missions. The main role of a CAP would be to assist in patrolling Japan's coastlines and serve as a training target for fighters in mock scramble missions. Therefore, a Japanese CAP would not mitigate the burden of the JASDF's scrambles unless the training assistance results in improved efficiency and effectiveness for the fighter pilots.

Nevertheless, a Japanese CAP would provide several benefits. First, a CAP would create a diversity of surveillance options, including training and aerial observation. To implement effective surveillance, it is important to create a variety of monitoring methods. Such observation information could be relayed to multiple organizations, including the JCG and law enforcement. It would also provide an important aid in disaster situations, particularly for earthquakes that frequently impact Japan. Small, general aviation aircraft could be utilized as an alternative to fighter jets and operate at much lower costs in earthquake response. Second, a Japanese CAP would demonstrate to the public the country's strong willingness to defend its sovereignty and foster a sense of nationalism among the citizenry. Third, for younger generations interested in becoming professional pilots, a CAP might open future career opportunities. Similar to the United States, a CAP could serve as a professional pilot pathway for young people that could help alleviate the current pilot shortage.

Leaders should review several issues while studying the feasibility of a Japanese CAP. First, it is critical to clarify the chain of command that the CAP aircraft would be responsible to when performing their duties. In the United States, if the USAF issues a CAP mission, the USAF is responsible for flight operations. In Japan, from the perspective of safety and operational oversight, it is necessary to consider a similar

type of responsibility structure. Second, the private aviation culture in Japan is not as mature as that of the United States. Therefore, the funding and capital investment required to establish a Japanese version of the CAP would rely on private volunteers and strong government support. Securing pilots could also prove difficult, but there are likely already many private (individual) pilots interested in contributing to national security. Furthermore, many retired JASDF pilots rarely fly after their retirement. They are already proficient in surveillance procedures, have a firm understanding of the command and control system, and have sufficient experience and ability. Of course, there are many other issues to consider in studying the feasibility of a CAP. However, to prepare for an increasingly competitive future security environment, Japanese leaders should explore a diverse range of options, including this one.

IV. Consider strategic silence

Strategic silence is a tactic based on a suggestion provided by Admiral Dennis Blair and could be suitable for Japan's security situation. Such a tactic would likely reduce the number of scrambles against Russian aircraft. As mentioned above, Moscow's main focus is not in the east, but in the west. However, Russia has no incentives to reduce its air activities in the Sea of Japan and the Pacific Ocean. Therefore, it is worth considering options to reduce the number of Japan's scramble missions against Russian aircraft, given Japan's limited resources. Most importantly, Japan needs to preserve a strategic advantage by making its air activities unpredictable to the Russians.

However, strategic silence cannot be applied toward China, as there is a high possibility that an unchallenged Chinese flight could be deemed a successful claim of sovereignty by the international community. China has shown that it intends to use air activities to present a *fait accompli* as part of their ambition to become the world's most powerful country, which necessarily requires power projection into the Pacific. Unfortunately, Japan needs to continuously demonstrate to China its strong will to constantly maintain the sovereignty of its territorial airspace by having a physical response to every Chinese flight.

V. Forward airfields for scramble missions (implications from the Baltic Air Policing mission)

Positioning JASDF assets closer to Japan's airspace boundaries would be a symbolically meaningful strategy against China and would indicate a strong posture toward preserving Japanese sovereignty. This would not only enhance deterrence, but would also improve the effectiveness of Japan's countermeasures for dealing with potential intrusions into its airspace. Japan's closest military airfield to the Senkaku Islands is currently at Naha, a distance of approximately 225NM, but Shimoji Island (near Miyako Island) is only about 115NM from the Senkakus. ⁹⁷ Operating missions from Shimoji would reduce by half the time required for Japanese aircraft to intercept foreign aircraft flying in the vicinity of the Senkakus. This would present to military leaders a greater range of options when deciding whether to launch scramble missions.

SENKAKU ISLANDS OKINAWA MIYAKO ISLAND 60 NM YONAGUNI ISLAND

FIGURE 5: GEOGRAPHIC FEATURE OF EAST CHINA SEA

There are some caveats to this proposal. First, the Japanese Defense Ministry needs to get legal approval for weaponized fighter aircraft conducting scramble missions to use private airfields, such as the one on Shimoji. If this airfield were to be nationalized, this hurdle would disappear, but nationalization is extremely difficult. Second, the logistical system on Shimoji is inadequate for scramble missions, and it would be necessary to consider how to manage refueling. Finally, the JASDF would need to dispatch additional crew and aircraft to its forward airfield. This would also require a review of base security and base air defense for this forward-deployed unit. However, if each JASDF air base were to participate in this forward deployment tour for a couple of months on a rotating basis, it would help to reduce the burden on any one unit. This is the same model NATO countries use in its Baltic Air Policing mission. Furthermore, because Naha would remain the primary base for air policing around the Senkakus, it would not be necessary to operate this forward airfield every day. The operational period could be determined strategically by taking into account the regional situation and logistical abilities. James Schoff of the Carnegie Endowment for International Peace mentioned that although he understands the political difficulties and logistical problems facing Japan, in comparison with the great advantages of forward basing, these problems should be manageable.98

CHAPTER FIVE: CONCLUSION

This paper has introduced the air security environment around Japan and examined Tokyo's future air security preparations, particularly regarding scramble missions. Given the differing political motives behind Russian and Chinese air activity in the vicinity of Japan, the JASDF must adopt separate approaches to its scramble responses. In particular, this paper has sought to emphasize the importance of adding and diversifying scramble capabilities with a focus on how to confront China's effort to change the status quo without significant escalation.

In the future, Japan will need to deal with a large number of scramble missions, primarily in response to China's increasing air activities. Tokyo also needs to prepare to address how to deal with the asymmetric capabilities of other countries, including the use of UAVs in peacetime and in gray-zone situations. This paper suggests that to cope with UAVs appropriately, Japan needs to consider introducing new methods and capabilities.

Tokyo should also consider establishing a Japanese Civil Air Patrol to create more diverse observation options. Furthermore, in preparation for the future, it is important to review the overall structure of scramble missions. The use of tanker aircraft in scramble missions should be considered to ensure Japan's extended duration presence in the skies and to enhance mission effectiveness by reducing the number of scrambling aircraft. In addition, the use of UAVs in scramble missions could be one measure by which to extend the duration of surveillance activities and to counter any future asymmetry posed by China's UAV operations. Japan's use of UAVs and tankers can also allow the country to maintain strategic unpredictability in its scramble operations against China and Russia.

This paper introduced two proposals suggested by U.S. experts for Japan to reduce the number of scrambles, while preserving a strategic advantage:

- In its strategy against Russia, strategic silence would allow Japan to reduce the number of scrambles in response to Russian aircraft while allowing Tokyo to maintain strategic unpredictability against Moscow.
- In its strategy against China, the establishment of forward airfields for scramble missions, such as on Shimoji Island, would demonstrate Japan's strong resolve to protect its sovereignty while also enhancing the effectiveness of scramble missions.

The JASDF has thus far maintained air security around Japan through a network of sensors, fighter aircraft, a command and control system, and trained personnel. However, Japan must look forward to consider how the JASDF will confront China's increasing air activities and use of UAVs, while sufficient time remains for Japan to adequately preserve its strategic advantage. Needless to say, a diversification of sensors and countermeasures is needed not only for peacetime situations, but also in gray-zone and emergency operations.

If Japan cannot establish countermeasures against China's new salami slicing tactics in the air over the East China Sea, there is a high possibility that the same phenomenon will occur over the South China Sea and the Pacific Ocean. To preserve Japanese and U.S. strategic advantage, further research should examine how to deal with future grayzone threats posed by UAVs. This paper offers a first step in helping Japan better prepare for these future threats.

GLOSSARY

ADIZ	Air Defense Identification Zone
ANG	Air National Guard
CAOC	Combined Air Operations Centre
CAP	Civil Air Patrol
CCP	Chinese Communist Party
CY	Calendar Year
DoD	(United States) Department of Defense
EEZ	Exclusive Economic Zone
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
ISR	Intelligence Surveillance Reconnaissance
JASDF	Japan Air Self Defense Force
JCG	Japan Coast Guard
JMSDF	Japan Maritime Self Defense Force
MOD	(Japan) Ministry of Defense
NATO	North Atlantic Treaty Organization
NM	Nautical Miles
PAF	(RAND) Project Air Force
PLA	People's Liberation Army
PLAAF	People's Liberation Army Air Force
PLAN	People's Liberation Army Navy
QRA	Quick Reaction Alert
RAF	Royal Air Force
RNORAF	Royal Norwegian Air Force
ROTC	Reserve Officers' Training Corps
SMS	Science of Military Strategy
UAV	Unmanned Aerial Vehicle
	United States Indo-Pacific Command
	United States Northern Command
	United States Pacific Command

ACKNOWLEDGEMENTS

The author is indebted to Dr. Kenneth Allen, Admiral Dennis Blair (Ret.), Tarun Chhabra, Mark Gunzinger, Dr. Jeremy Hodges, Elsa Kania, Dr. Brendan Mulvaney, Dr. Bonji Ohara, Dr. Michael O'Hanlon, Brandon Paladino, William Pittinos, Dr. Carl Rehberg, Ambassador Yukio Satoh (Ret.), James Schoff, and Rear Admiral Masanori Yoshida (Ret.) for their critical feedback and valuable comments.

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